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Mobile Learning Based Intervention – A Case Study Among Marginalised Young People

DISSERTATION

zur Erlangung des akademischen Grades
Doktorin der Philosophie

Alpen-Adria-Universität Klagenfurt

Fakultät für Interdisziplinäre Forschung und Fortbildung

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April 2011

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We don't pretend that media or the television show can solve the problems of the world, but we do believe it would be a terrible mistake not to use these most influential tools to contribute to the solutions.

Joan Ganz Cooney (1969)
Founder of Sesame Street

To Sophie and Noah

Danksagung

Ich möchte mich bei einigen Personen sehr herzlich bedanken, die es mir ermöglicht haben, an dieser Dissertation zu arbeiten und diese erfolgreich zu beenden. Dank gebührt den Professoren und den KollegInnen des Doktorandenkollegs, die mit konstruktiver Kritik und mit vielseitigen Anregungen die Qualität der Arbeit positiv beeinflusst haben. Vor allem danke ich meinem Betreuer, Prof. Lenz, für die zahlreichen Literaturtipps und sein Engagement, das zum Abschluss der Arbeit beigetragen hat.

Ganz besonderen Dank möchte ich meinen Kolleginnen am Zentrum für Soziale Innovation, Ilse Marschalek und Claudia Magdalena Fabian, aussprechen, die mich im ComIn-Projekt mit Tatkraft, Kreativität und Zuverlässigkeit unterstützt haben und es mir auch ermöglicht haben, eigene Forschungsfragen in das Projekt einzubringen und zusätzliche Daten zu erheben.

Auch möchte ich mich bei meinem Arbeitgeber, dem Zentrum für Soziale Innovation, bedanken, das mir ermöglichte, dissertationsrelevante Fortbildungen zu besuchen, und mir damit die Möglichkeit bot, mich mit dem Thema noch eingehender zu beschäftigen.

Last but not least, danke ich von ganzem Herzen Tobias für einfach alles.

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Abstract

Young people in today's society are a highly vulnerable group as they are confronted with challenges such as high competition on the labour market and difficult transitions between different life phases. Those young people at risk of exclusion are called "marginalised young people" as they stand at the margins of society. Experiences of marginalisation result from different factors including educational or economic barriers. These young people are in focus of this dissertation. A mobile learning based intervention has been tailored to the needs of marginalised young people between the age of 14 and 21 and a pilot study was conducted during three months with 95 young people in two countries, namely Austria and the United Kingdom. A mobile learning based intervention seems particularly suited for the target group as all of them, despite lacking access to other information and communication technologies, personally own a mobile phone and can be reached by these means. Mobile learning is associated with several advantages such as flexibility of access in terms of location and time. An online mobile learning platform specifically constructed for the target group has been developed and is supported by pedagogical conceptual frameworks. The platform provides for community building among its members, as it offers different channels of communication and of sharing information, which is mainly based on exchange of videos. Youth workers and social workers act as moderators of the platform during the pilot study. They are responsible for monitoring the activities of the study participants, intervene in case it is necessary and support participation. Furthermore, challenge videos dealing with basic skills for the employment market are uploaded on a regular basis by the moderators, which serve as learning opportunity for the participants, as they are asked to react to these videos by uploading answer videos. These can easily be recorded on the built-in camera of the mobile phone and then be uploaded to the platform.

The main aim of this dissertation is to explore use patterns of the platform by the pilot participants, the interaction between the participants (and the moderators) and the effect of their participation in terms of interaction with others and in terms of gained understanding and insights. To answer these research questions quantitative and qualitative methods have been applied: a

statistical analysis of the log-data, a social network analysis based on log data and two surveys, one before and one after the pilot, as well as a qualitative analysis of data obtained through interviews and focus groups with young participants and moderators.

The analysis of the platform use patterns reveals a considerable variety of use in terms of time spent online and in terms of used platform functions among the participants. While some use it excessively, others only rarely access the platform. In general, participation decreases over the three months of the pilot. From an initial phase of excitement and trial, activities later on seem to be more directed and targeted. In the first few weeks more exploration of the platform takes place as well as trial and error. Later in the pilot, however, the uploaded videos look more sophisticated and more thought through. The use of the platform does not vary between the two genders, which means that equality of access and use of the platform is given. Slight differences of use can be found between the two country groups and between the age groups.

The social network analysis shows the relations of the different study participants. After the pilot, the number of acquaintances and friends as well as the frequency of physical and virtual contact between the participants has increased and the number of people who do not like each other has decreased significantly. Thus, the use of the platform might have supported relations also in the offline life. Online relations only partly correlate with offline relations, i.e. getting in touch on the platform does not depend on whether people know each other in the offline life.

Benefits as well as limitations of use can be observed when all different data are contrasted against each other. The platform has supported interaction and creative expression, and has offered positive learning experience. Limitations result from technical constraints as well as from a lack of embedding into institutional frameworks and of providing for the necessary funding of such initiatives, which is crucial in terms of sustainability.

Zusammenfassung

Junge Menschen sind in der heutigen Gesellschaft eine in hohem Maße gefährdete Gruppe, da sie mit großen Herausforderungen wie großer Konkurrenz auf dem Arbeitsmarkt und schwierigen Übergängen zwischen verschiedenen Lebensphasen konfrontiert werden. Jene jungen Menschen, die vom Ausschluss bedroht sind, werden als „marginalisierte Jugendliche“ bezeichnet, zumal sie am Rand der Gesellschaft stehen. Erfahrungen von Marginalisierung resultieren aus verschiedenen Faktoren, etwa ökonomischen Barrieren sowie Barrieren in der (Aus)Bildung. Diese jungen Menschen stehen im Fokus der vorliegenden Arbeit. Eine auf „mobile learning“ basierende Intervention wurde speziell für die Zielgruppe im Alter zwischen 14 und 21 Jahren entwickelt und eine Pilotuntersuchung wurde in Österreich und in Großbritannien mit 95 Jugendlichen durchgeführt. Eine auf „mobile learning“ basierende Intervention scheint besonders für die Zielgruppe geeignet, zumal alle selbst über ein Mobiltelefon verfügen, obwohl sie ansonsten nur erschwerten Zugang zu Informations- und Kommunikationstechnologien haben. Mobile learning ist mit einigen Vorteilen wie Flexibilität des örtlichen wie auch des zeitlichen Zugangs verbunden.

Eine auf die Bedürfnisse der Zielgruppe angepasste „mobile learning“ Plattform sowie ein pädagogisches Konzept wurden speziell für die Pilotstudie entwickelt. Durch die verschiedenen Kommunikationsmöglichkeiten und Wege des Informationsaustauschs, basierend vor allem auf dem Austausch von Videos, ermöglicht die Plattform den Aufbau von „Communities“. JugendarbeiterInnen und SozialarbeiterInnen übernehmen während der Pilotstudie die Funktion von ModeratorInnen der Plattform. Sie sind auf der einen Seite für das „Monitoring“ aller Aktivitäten auf der Plattform verantwortlich und greifen ein, falls es notwendig erscheint. Andererseits unterstützen sie die jungen TeilnehmerInnen während der Laufzeit der Studie. Außerdem laden ModeratorInnen regelmäßig so genannte „Challenge Videos“ auf die Plattform hoch, welche auf spielerische Art und Weise Aufgaben an die TeilnehmerInnen beinhalten und grundlegende Fähigkeiten für den Arbeitsmarkt fördern sollen. Jugendliche werden gebeten, auf diese „Challenge Videos“ in Form von Antwortvideos zu reagieren. Diese

können ganz einfach mit der Handykamera aufgenommen und anschließend auf die Plattform übertragen werden.

Das Hauptziel dieser Dissertation ist es, Nutzungsmuster auf der Plattform zu untersuchen und die Interaktion zwischen den verschiedenen StudienteilnehmerInnen auf der Plattform zu beobachten, sowie Effekte ihrer Teilnahme zu erforschen. Um diese Forschungsfragen zu beantworten wurden quantitative sowie qualitative Methoden angewandt: eine statistische Analyse der Log-Daten, eine Soziale Netzwerkanalyse basierend auf Log-Daten und auf Fragebögen zu zwei verschiedenen Zeitpunkten (vor und nach der Pilotstudie) sowie der qualitativen Analyse von Daten aus Interviews und Fokusgruppen mit Jugendlichen und ModeratorInnen.

Die Analyse der Nutzungsmuster auf der Plattform zeigt beträchtliche Unterschiede sowohl in der Nutzungsdauer als auch im Gebrauch der einzelnen Funktionen. Während einige die Plattform exzessiv nutzen, greifen andere nur selten auf sie zu. Im Allgemeinen verringert sich die Teilnahme in den drei Monaten der Pilotstudie. Nach einer anfänglichen Phase der Begeisterung und des Ausprobierens nimmt die Aktivität zwar über den Verlauf der Studie ab, scheint dafür aber gegen Ende der Studie fokussierter und durchdachter. Die Nutzung der Plattform unterscheidet sich nicht zwischen den zwei Geschlechtern, was bedeutet dass Fairness des Zugangs und der Verwendung der Plattform gegeben ist. Geringfügige Unterschiede finden sich hingegen zwischen TeilnehmerInnen der beiden Länder sowie zwischen jüngeren und älteren TeilnehmerInnen.

Die Soziale Netzwerkanalyse zeigt die Beziehungen der verschiedenen StudienteilnehmerInnen untereinander auf. Nach der Pilotstudie hat sich die Anzahl der Bekanntschaften und der Freundschaften sowie die Häufigkeit des physischen und virtuellen Kontaktes zwischen den TeilnehmerInnen erhöht, während sich die Anzahl der Personen, die sich nicht mögen, erheblich verringert hat. Die Plattform hat also möglicherweise dazu beigetragen, Beziehungen auch im „offline-Leben“ zu stärken. „Online-Beziehungen“ sind dabei relativ unabhängig von den „Offline-Beziehungen“, d.h. beispielsweise dass die Kontaktaufnahme auf der Plattform unabhängig davon passiert, ob sich die Personen kennen.

Wenn die verschiedenen Daten miteinbezogen und verglichen werden, werden einerseits positive Auswirkungen aus der Nutzung der Plattform sichtbar, andererseits ergeben sich auch Beschränkungen. Die Plattform hat Interaktionen (zwischen den TeilnehmerInnen untereinander sowie zwischen Jugendlichen und ModeratorInnen) und kreativen Ausdruck ermöglicht und hat die Möglichkeit für positive Lernerfahrungen für die TeilnehmerInnen geschaffen. Beschränkungen resultieren aus technischen Gründen sowie aus mangelnder Einbettung in den institutionellen Rahmen. Initiativen dieser Art setzen finanzielle Förderung voraus, was letztlich im Sinne der Nachhaltigkeit entscheidend ist.

INTRODUCTION

Inequalities in socio-economic status, in employment, in education and in many other variables that contribute to individual (socio-economic) wealth can be found among different countries worldwide but also between different populations within a country. These populations might be marginalised, i.e. at the margin of society, due to different reasons, such as migration background, illness and health condition, to name but a few. All these variables impacting on personal (socio-economic) wealth do seem to be highly correlated and thus disadvantages are clustered for some populations.

One of these reported inequalities is access to the modern digitalised world and thus to the information society. That is, these populations - either in different countries or populations within a country - have less access to and make less use of Information and communication technologies (ICT) such as the Internet. The lack of access has obviously an impact on digital literacy skills and Information and communication technology skills. This effect, i.e. the reduced access to these resources and consequently the limited skills in the handling of these technologies, has been coined as digital divide.

Several initiatives in the past decade have tried to solve or at least have aimed at bridging the digital divide to some extent. In some cases, these initiatives made use of Information and communication technologies to close this gap (for instance, the One Laptop per Child initiative), thus tools that first contributed to create the digital divide in the first place were then used to close it again.

In this discourse, mobile learning applications have been found useful since many advantages are associated with this rather recent technology enhanced learning concept. The device, the mobile phone or other mobile devices, themselves are rather inexpensive compared to other Information and communication technologies and also the penetration rate of mobile phones is almost complete in the Western world. Recent technological developments have made the mobile phone a very capable device with many functionalities that even allow for access to the Internet and thus open a whole new world. These advantages might be used in such initiatives as described above.

One of the populations that are affected by the digital divide in the Western countries is marginalised young people who due to different reasons have

dropped out of school, might have a low or no formal qualification degree at all and are unemployed. Terms used to describe these youngsters range from NEETS (not in education or training, not in employment) to at-risk learners.

In the past few years several initiatives and trends can be noted that make this topic of high relevance: (1) An open source movement in mobile learning applications for social impact and change has emerged e.g. the open mobile consortium, (2) the topic appears at international conferences such as the Workshop “Digital Technologies and Marginalised Youth: Reducing the Gap” at the International Conference on Interaction Design and Children (IDC) in Como in the summer 2009 and in Barcelona in 2010, (3) past projects funded by the European Commission such as the “mlearning project“ that aimed at fostering the inclusion of marginalised young people as well as ongoing international research projects.

This dissertation aims at analysing the effect of a mobile learning based intervention on marginalised young people on several dimensions. In the framework of an international project funded by the European Commission a virtual online mobile learning platform was created that reflects the needs of the target group. Within this dissertation the use of the platform is studied as well as the interaction between the participants. Furthermore, mobile learning as concept shall be studied and how this concept can contribute to close the digital divide among marginalised young people. Outcomes might be used for future interventions that are based on similar technological and pedagogical concepts.

As member of the research team and as leader of several Work Packages in the Framework Programme 7 project “ComelN- Online Mobile Communities to Facilitate the Social Inclusion of Young Marginalised People” I had the possibility to investigate the topic further and to complement project activities with own ongoing research with workflows into both direction. In the constraints of a 26-months-lasting project an extensive immersion was not always possible. However, thanks to the dissertation it was possible for me, on the one hand, to investigate some project issues further while of course the ongoing dissertation on the other hand had an impact on the project. For instance, it was possible for me as researcher in the project team and as responsible coordinator of the pilots carried out in Austria to include my own research questions in the evaluation design and to approach the target group. The challenge thereby lies

in differentiating between the project ComelIn and the work carried out within the dissertation while obviously overlaps exist.

In the framework of this dissertation the project ComelIn will be reflected against the state-of-the-art in the field of mobile learning.

The main research questions are whether and how the participants of the study, i.e. marginalised young people, make use of the developed mobile learning application, how they interact among each other and with youth workers acting as moderators on the platform and for the future, whether it would make sense to follow research in the field and to promote this kind of intervention. Research questions will be more deeply explored in chapter 1.

The dissertation is divided into four parts. The introduction, comprising also the research questions, is followed by part I, theoretical considerations.

In this part two major topics which lay the ground for the dissertation will be explored: marginalised young people on the one hand and their access to Information and communication technologies in terms of the digital divide and the technology enhanced learning concept of mobile learning on the other hand. Theoretical considerations are based on a comprising literature analysis of book chapters, journal articles and conference papers. Especially for mobile learning which is a rather young pedagogical field conference papers were a major source as only a few books had been published at the time of writing. Part I aims at analysing determining factors for marginalisation among different populations and young people in particular. Chapter 3 contrasts the phenomenon digital divide against the concept of digital natives. On the one hand marginalised young people are affected by the digital divide; on the other hand they are, like their peers, digital natives who have grown up with many different ICTs which were not available in the previous generations. In chapter 4 the term “mobile learning” will be defined as well as related terms. The aim of this chapter is to give an overview of the history and the state-of-the-art in the field of mobile learning: its applications and evolving theories and pedagogical approaches of mobile learning.

In part II the project ComelIn shall be described: the framework and the, for this work, most relevant steps, the user requirement elicitation, the development of the platform as well as the pedagogical approach.

Part III, the empirical part, comprises a detailed description of the pilot study and the sample. The pilot has been conducted in the United Kingdom (UK) and in Austria. This work focuses on the pilot results obtained from participants in Vienna to whom I was in direct contact but gives some insights also on the results obtained from other Austrian regions as well as from the UK in order to compare the outcomes. Furthermore, all applied methodologies are described in detail. The methods used are mainly of quantitative nature but the quantitative results will be complemented with qualitative results from interviews and focus groups where reasonable. A statistical analysis of log data of the platform has been conducted to understand the use of the platform by the participants and to test hypotheses relating to differences among participants from different regions or different age groups, for instance. In addition, social network analysis was applied to measure the interaction between the participants in Vienna and their interaction with participants from other regions. Finally, in part IV, the various results will be contrasted against each other to come to valuable conclusions and recommendations for the future.

1. Research questions

The research questions guiding this work shall be described in this subchapter. The main research questions are (1) whether and how the participants of the study, i.e. marginalised young people, make use of the developed mobile learning application, (2) how they interact among each other and with youth workers acting as moderators on the platform and, (3) what effect their participation in the pilot has in terms of interaction with others and in terms of gained understanding and insights.

To answer the first research question I rely mostly on statistical analysis of the gathered log-data of the platform. Research question 2 is answered by applying social network analysis and finally, research question 3 will be answered by contrasting both sources of information against each other and complementing the results with findings from the qualitative research consisting of literature analysis and interview and focus group results (which are not separately discussed in the framework of this work). More details on the research questions can be found in chapter 15.

PART I – THEORETICAL CONSIDERATIONS

Part I forms the theoretical foundation of this work which tries to answer questions that are highly relevant and which lay the ground for the consecutive steps of this dissertation.

Of special interest is the target group of the initiative, marginalised young people, and their relation to Information and communication technologies. The following questions shall be answered in this context: Who are marginalised young people? Which factors and determinants are responsible for driving them into marginalisation? Are they affected by the digital divide? Which role do ICTs such as the mobile phone play in their lives?

The second cluster of relevant questions to be answered is grouped around the term “mobile learning”: What is mobile learning? What are the characteristics of mobile learning? Which opportunities on the one hand and which risks on the other hand are associated with mobile learning? What is the state-of-the-art in the mobile learning field? For what purposes and aims has mobile learning been applied? Which mobile learning practices do exist?

Which pedagogical concepts as well as mobile learning design can be used when developing a mobile learning application and environment?

To answer all these questions is the main aim of part I.

2. Marginalised Young People

This chapter aims at defining the term “marginalised young people” and aspects that are related with this term. Youth in general in today’s society are often viewed as fragile but there are several groups of young people who are more exposed to and affected by phenomena that lead them into marginalisation and drive them further into exclusion.

The process of marginalisation shall be examined, in particular, the factors that contribute to marginalisation and symptoms that are linked with already occurred marginalisation.

2.1. Who are marginalised young people?

Neither “youth” as such nor “marginalised young people” are clearly defined terms as definitions vary in literature and in policy debate but nevertheless characteristics can be identified that are associated with these terms.

Youth is often defined as transition period between childhood and adulthood (Tully, 2002) and correlated with a specific age span. Understanding youth in terms of age, however, is more related to policy favoured definitions. In fact, in policy and welfare programmes people between the age of 14 and up to 35 years are considered as youth, whereby most definitions refer to persons between the age of 14 and 27 as belonging to youth. The United Nations, for instance, span youth between the age of 15 and 24.

Most definitions of youth and young people, respectively, are not related to a specific age span but are related to life situations of being in transition (Walther, 2006).

From a sociological and psychological perspective, youth as such is perceived as a construction, either seen as a transitional period, or as a stage of its own within life (Biggart, Bendit, Cairns, Hein, & Mörch, 2004) whereby definitions vary across cultures and over time. Thus, also indicators which mark typical transition points such as the first job or the first apartment vary over time, as these indicators may not be valid to describe youth in fifty years, nor have these been helpful a century ago, as there were different transitions points of entry to adulthood.

Youth as transition period has become the main focus of youth research in the 80's and 90's (Morch, 2003). According to Biggart et al. (2004), this transition period has become longer, fragmented and more complicated as a result of the extension of secondary education and diversification and individualisation of social life at the same time what sociologists call "diversification of pathways into adulthood" (Biggart et al., 2004, p. 13). Passages are no longer linear, for instance, from education to employment, but synchronous, e.g. education and employment at the same time, and may also be reversible in a century that emphasises the importance of lifelong learning but is also characterised by an inflation of education and qualifications, thus education to and from employment.

There is no longer a pre-defined path defined by society but individuals are required to determine their adult positions through a process of "negotiation". Since young people face complex and fragmented situations co-existing simultaneously, they may alternate between being young or adult depending on the different situations and over time (Morch, 2003). This impacts on the conception of themselves making it difficult to decide whether they are "young" or "adult" or find themselves in a "in between" category, for instance as "young adults" (c.f. M. Du Bois-Reymond, 1998; W. I. M. Plug, Zeijl, & M. Du Bois-Reymond, 2003; Walther, 2006; Walther et al., 2002; Westberg, 2004).

A considerable number of young people do no longer experience a traditional and smooth transition from education to the labour market (Spanning & Reinprecht, 2002). There are no clear-cut trajectories, therefore life courses have become more fragmented (Kovacheva & Pohl, 2007; Nyssölä, 1999; Tully, 2002). Life for young people in contemporary society is less predictable (Kemshall, 2008), more challenging and uncertain (Giddens, 2001).

During this transition process from childhood to adulthood young people have different resources at their disposal, "these are likely to vary according to personal characteristics as well as social background" (Biggart et al., 2004, p. 15). However, independently of individual resources a tendency of a "decline in the stability of social structures such as family, work and social security and a loosening of the links between structures such as education and employment" and an increased diversity in household and family life in general can be noted according to Wyn (2007, p. 37). Structural difficulties such as youth

unemployment further contribute to a later entry into the employment market (Brewer, 2004) which is a trend that can be observed globally. According to Green, Owen and Wilson (2001) the median age of entry into the labour market in the EU has increased by two years within only eight years, from 18 years in 1987 to 20 years in 1995.

This forces the process of individualisation and mechanisms of self-responsibility. Risks lie with the individual in terms of responsibilities and an “effective management” and self-regulation towards the present norms of society. The ones failing will be “excluded, marginalized and demonized” (Kemshall, 2008, p. 23).

According to the Eurobarometer, an instrument to measure the public opinion of certain issues relating to the European Union across the member states, in 2007, 64% of the European Unions citizens estimate that the life of today’s children will be more difficult than the life of their own generation (Eurobarometer, 2007).

Lenz (2005) observes that whole countries, mainly developing countries, are driven into marginalisation with the rise of economic blocks in America and Asia which goes hand in hand with political and security policy aspects but also within the so-called developed countries marginalisation of certain groups is a known phenomenon. Further he sees a connection between the carelessness towards marginalised groups and one’s own prosperity and consumption which become the means of individual, social and political behaviour.

The term “marginalised young people” is not clearly defined although the concept of marginalisation is widely used in research and debate of social science today. In the 1870s the term was adopted by social science from the economic field where it was originally coined and introduced in sociology by Robert Park and the so-called Chicago school in the 1920s (Heggen, 2000; Park, 1967). The terms “marginalised” or “being at risk of social exclusion” vary with contexts and perspectives and also in their connotations. Some terms used in this context to describe affected people have changed over time and are nowadays obsolete. There exist still many expressions which partly overlap in their meaning but also distinguish different criteria for definitions. A neutral definition is necessary to avoid further stigmatisation. Stigmatisation may have an impact on the people affected in terms of self-fulfilling prophecies (Heggen,

2000). Not following usual patterns and at the same time having relatively little control over life and resources, especially marginalised people are likely to become stigmatised and are often at the receiving end of negative public attitudes. This phenomenon has also been called “blaming the victim” (Kagan et al., 2004; Ryan, 1976), which is part of a more general “culture of blame” (Farber & Azar, 1999; as cited in Kagan et al., 2004). One of the threats marginalised young people thus have to face is the definition of one's identity by others: “the ideological definition of one's marginalized identity in the interest of the dominant groups in society” (Kagan et al., 2004, p. 6).

The process of marginalisation describes individuals who are driven towards the border of society as they have relatively “little control over their lives and the resources available to them” (Kagan et al., 2004, p. 3). Individuals have limited chances to achieve certain aims because of factors which are out of their sphere of influence (Brüning & Kuwan, 2002). This is in line with a subject related perspective as individuals' limited possibilities for participation in various fields, such as economy, culture and politics are perceived as the main causes for marginalisation. From a societal point of view, however, it might be seen as an external attribution and thus as deficits among the affected people (Brüning & Kuwan, 2002) rather than emphasising the resources that people have at their disposal to control and steer their life situation (Nyysölä, 1999). Also, the concepts of inclusion and exclusion start from a certain perspective, from the ones who perceive themselves as included, from the insiders of a society. These define the outsiders or marginalised who should be included (again). “Inclusion in fact builds on mechanisms of exclusion” (Walther, 2007, p. 102; Weber, 2005) and thus following Walther (2007) there is a power relationship comprised in this concept which entails the risk that social integration is more of a systemic integration according the imperatives of the majority, in which individuals play only a passive role of “being educated” or “being included”, for instance. Sometimes marginalised young people, as they are defined from a central perspective, they are also referred to as “living on the edge” (Kieselbach et al., 2001).

Marginalisation is considered as a staged process with possibilities for every individual to move in either way, from marginalisation, into inclusion and vice versa into exclusion. For Kieselbach et al. (2001, p. 30), marginalisation

involves a “wide variety of personal and social living aspects and implies a long process on a continuum leading from inclusion through a phase of vulnerability to exclusion, and vice versa”. Marginalisation shall not be understood as a status but rather as a process than a state, argues Heggen (2000). It is a dynamic process that takes place over time (Williamson, 2007).

Thus, a marginalised position is perceived as pre-stage of exclusion or as at risk for exclusion (Ulvinen, 1998) while individuals’ position can vary over time. For Ulvinen (1998) only the “permanent marginality produces the possibility of being discriminated, of being outside, alienation and finally social exclusion” (p. 15).

Marginality is thus a status between relatively full control over one’s life and no or little control (c.f. Table 1).

Table 1: From life control to marginal position to social exclusion (Ulvinen, 1998, p. 16)

Life Control / Management	Marginality	Social Exclusion
<ul style="list-style-type: none"> → Well-being → Cultural performance → Security → High standard of living → Good (working) capacity → Normal → Qualification → Competence 	<ul style="list-style-type: none"> Risks Risk taking Risk living Lack of well-being Ambivalence / Drop out – Drop in Problem Compensation Pedagogy 	<ul style="list-style-type: none"> Poor living Otherness / Alienation Insecurity Social deprivation / Poverty Incapacity / Helplessness Deviant Stigmatization Charity

In this view, marginalisation results from several disadvantages concerning one’s own life management.

Other related terms are “young people with fewer opportunities”, “disadvantaged youth”, “and youth at risk” or “NEET”.

The first of these is associated with the social inclusion efforts by the European Commission’s Youth Programme which uses the term to describe in a neutral way the target group. Reiter (2003) understands “disadvantaged youth” as young people who “may be considered disadvantaged when the general instability of adolescence in connection with psychosocial and physical changes is intensified by individual characteristics (deficiencies, handicap, behaviour) and/or circumstances (the situation) in a way that reduces or limits life chances” (p. 256). For Jones (2002), determining disadvantaged or excluded groups, those will be “the most visible, and probably also those who are identified as

social problems (often meaning the problems for society, rather than the problems of society for young people)” (p. 4). This point of view is shared by Sharland (2006, p. 260) who demands for “consistently to question the distinction between what is normal and abnormal, acceptable and unacceptable risk – between youth in transition, youth in trouble and youth as trouble”.

“Youth at risk” is somewhat contended nowadays as youth during their transition to adulthood in general is perceived as being at risk as previously discussed (Beck, 1992; Giddens, 1997). Thus the “terms risk and youth have become synonymous”, and young people are increasingly perceived as either “at risk” or as “posing a risk” (Armstrong, 2004; 2006; Goldson, 1999; 2000; Kemshall, 2008; Swadener & Lubeck, 1995).

Particularly youth with low qualifications or early school leavers are affected by marginalisation on different dimensions because due to their limited qualifications they can find no entry strategy to the employment market. Thus, “early school leavers” and “at risk learners” have become synonyms for marginalised young people. Kritikos and Ching (2005, p. 136) define this group “as young people leaving school before the legal school leaving age and/or leaving school with limited or no formal qualifications”. Leaving school early has wide reaching consequences as those “are at a disadvantage in the labour market; are challenged in their ability to develop personally and socially; and are at increased risk of poverty and social exclusion” (p.140). For Nyyssoelae (1999) “education is very clearly a type of human capital without which there is an increased risk of unemployment and greater probability of an unstable labour market career” (p. 11). A lacking of vocational education – which means having compulsory education only – is considered as an important background factor that increases the risk of marginalisation in general.

A term used in the first place in the United Kingdom in this context is the acronym NEET standing for “Not in Education, Employment or Training”. It comprises young people affected by unemployment but also those at a younger age who would not be eligible for unemployment benefit. Earlier, Istance et al. (Istance, Rees, & Williamson, 1994) among other researchers used the term “Status A” or “Status Zer0” to refer to young people who were not covered by any category of labour market status. Later the term was abandoned in favour to “NEET” which emphasises the heterogeneity of people affected (Furlong,

2006). Also, researchers emphasise that people do not remain NEET; instead it describes a momentary status with people moving in and out of work and education, with only 1% remaining NEET through all of the 16-18-year-olds. Those young people are almost always affected by extremely complex problems (Research as Evidence, 2007).

Taking into account the different terminology, marginalised young people as group cannot be considered as a homogenous following Milbourne (2002, p. 287) who argues that marginalised groups “are not homogeneous; individuals come from diverse communities, cultures and language groups, and also hold different values in relation to material and familiar resources and roles”. This is confirmed by other researchers such as Schwinn (2006) who, based on the assumption that socially and educationally disadvantaged groups are not homogenous, used differential theoretical analyses to describe vertical, functional, and social differences and thus to imply the various contexts and life worlds of individuals.

Despite many differences and a lack of statistical data on these different vulnerable groups by source of exclusion (Brewer, 2004), similarities across Europe between groups at risk can be noted. Kieselbach et al. (2001), for instance, found that among marginalised young people the duration of unemployment is longer; the qualification is lower and the likeliness to come from lower social class or from families with major financial and social problems are higher. According to Parry (2006) affected people come in contact with other disadvantaged people which could further lead to a multiplication of their disadvantages.

In youth studies, the term “marginalised young people” has often been linked to unemployment, the exclusion from the labour market or the incapacity to work, but later different forms of disadvantage and their respective accumulation were associated with it (Nyyssölä, 1999). With the increase of youth unemployment or insecure employments people affected only on the employment dimension are not necessarily considered as marginalised anymore (Spanning & Reinprecht, 2002). Unemployment has become, from a statistical point of view, almost “normal”.

The milieu approach has also been used to describe marginalised populations within society. The so-called sinus milieus have been developed in the 70ies

based on qualitative exploration of different life-worlds (N=1,400, c.f. Sinus Sociovision¹). So far ten different milieus have been identified (c.f. Figure 1) which are constantly updated. The sinus milieu approach differentiates between three different segments of social statuses, lower class/lower middle class, middle class, and upper class/upper middle class, as well as three different fundamental orientations, i.e. traditional to post-modern. Marginalised people are more likely to be found in the lower social classes as well as among populations with more traditional beliefs.

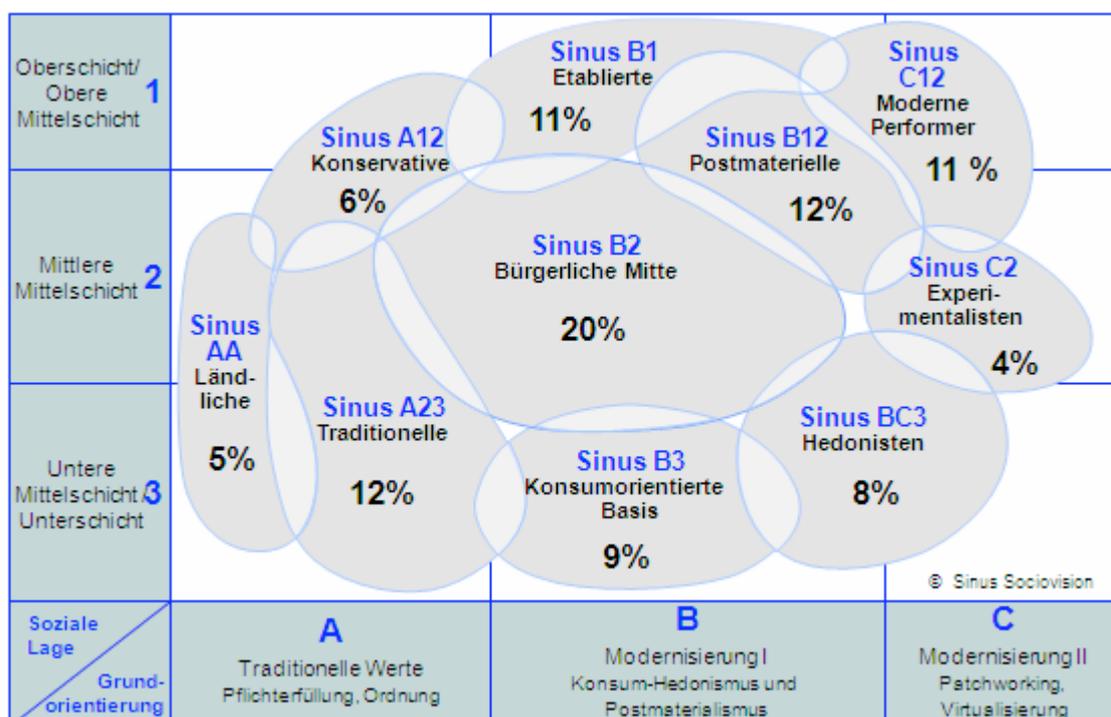


Figure 1: Sinus Mileu in Austria²

According to Parry (2006) disadvantages are always interrelated and clustered. Thus, marginalised young people have to contend “with a plurality of obstacles in attempting to make transitions into adulthood, but have relatively few resources with which to do so” (p. 296). Only when a youth experiences “a weak position in a number of arenas simultaneously can we talk of

¹ <http://www.sociovision.de/>

² http://mediaresearch.orf.at/index2.htm?fernsehen/fernsehen_sinus.htm

marginalisation. Such positions limit their access to economic, social and political resources" (Heggen, 2000, p. 48).

2.2. Determinants for marginalisation

Marginalisation that might further lead to exclusion from society is considered as a staged and multidimensional process "of progressive social rupture, detaching groups and individuals from social relations and institutions and preventing them from full participation in the normal, normatively prescribed activities by the society in which they live" (Silver, 2007, p. 15).

On which dimensions young people can be defined as marginalised or vice versa which factors contribute to marginalisation are questions this subchapter aims at answering.

Forms and dimensions of marginalisation differ among individuals and a range of causal or risk factors contribute to cumulating disadvantaged situations of vulnerable youth. Taking into account the diversity of aspects contributing to marginalisation, a bipolar concept that differentiates between "marginalisation" and "inclusion" is seen as too narrow. Accordingly, marginalisation and the risk for social exclusion can be understood as combination of linked aspects. For Williamson (2007) it is the accumulation of interrelated difficulties that typifies the condition and experience of marginalisation. Heggen (2000) carried out 70 life course interviews with youths in Norway in the age from 19 to 25 who had broken off their schooling early, many at completing compulsory school, some even before. He came to the conclusion that marginalisation occurs only then if "negative coincidence results in a number of important resources in different areas lacking at the same time" (p. 55).

Wagner, Gerlicher and Gebel (2008) state that marginality occurs as interplay of factors on different level:

- the micro-level: e.g. personal premises, talents, and interests
- the meso-level: e.g. social milieu, status, family, and
- the macro-level: e.g. structural conditions, societal values and norms, laws, etc.

Their approach brings in a societal point of view and wider contexts that do not link marginalisation solely to the individual. Nevertheless marginalisation

becomes visible as disadvantages at the side of the subjects. Different disadvantages cannot be considered detached from each other but in complex relationships that influence possibilities and limitations of societal participation. This cluster of simultaneous factors, a coincidence of specific subjective and objective factors in combination with inadequate framework conditions (Brüning & Kuwan, 2002), Heggen calls “a multiple problem situation” (Heggen, 2000, p. 55).

Studies show chains of risk factors in which one leads to the other in succession. National reports on social exclusion of young people identify factors leading to marginalisation which arose at various points: “problems at school; leaving compulsory schooling early or without qualifications; meeting with a lack of access to training or a mismatch between qualifications and labour demand; lack of entry routes into the labour market; falling into poverty; losing housing security; partnerships breaking up; and as a result, limited citizenship” (Kovacheva & Pohl, 2007, p. 33).

Generally speaking there are seven distinct dimensions of marginalisation (Brüning & Kuwan, 2002; Kieselbach et al., 2001; Nyssölä, 1999):

- labour market dimension
- economic dimension
- cultural dimension
- geographic dimension
- institutional dimension
- social dimension
- educational dimension

Some say social exclusion is probable if an individual is affected on three of these dimensions (Brüning & Kuwan, 2002). Either dimension can be understood as factor that contributes to marginalisation as well as a symptom of marginalisation that has already taken place. As all these dimensions are interlinked and clustered it is challenging to identify the starting point for a marginalisation process as it may also differ from individual to individual.

Labour market dimension

The most disadvantaged young people experience difficulties obtaining a job (Brewer, 2004), but also keeping the job as Furlong and Cartmel's (1997) study among disadvantaged young men proves. Disadvantages on the labour market does not only refer to real structural barriers to (re)enter the primary labour market but also to the kind of individual retreat from the labour market in form of resignation from (legal) work constituting a "vicious cycle in which not only different dimensions reinforce each other, but in which the length of unemployment also seems to play an important influential role" which "has an enormous impact on the overall personality development of the affected youth" (Kieselbach et al., 2001, p. 45).

Studies on employment careers show that unemployment in youth does correlate with a later unstable work history (Nyyssölä, 1999).

In McGuirk's (2001) work in Australia, the young people interviewed who worked part-time, had a "very instrumental view of work as a means of simply getting money to survive" (p. 10). To them work was not leading anywhere in particular and it was seen as separate to education. They did not have the feeling of being able to change this or be active shapers of their own future. "They suffer from imperfect information in their educational investment decisions" (Souto Otero & McCoshan, 2005, p. 23).

Marginalised young people further lack social networks that enhance entrance to the labour market. Not being able to find a job often depends on "not having an influential circle of friends" (Kieselbach et al., 2001, p. 45). One of the most interesting results gained by Spannring and Reinprecht (2002) in a study they conducted in Vienna with 350 young adults aged 19 to 25 in 1999 was that the youngsters "inherited" the employment model and the poor resources of their parents.

However, as previously discussed, although unemployment per se constitutes a central risk factor for young people, it per se "is not a sufficient predictor for a risk of social exclusion" (Kieselbach et al., 2001, p. 17). On the contrary, there has been much critique of those approaches which "conflate inclusion with employment because they overlook the fact that a society with full employment would still involve various forms of exclusion" (Davis, 2007, p. 128).

In fact, statistics gathered by Eurostat show that unemployment among youths under the age of 25 have become almost “normal”³: In 2009, in EU27 the average proportion was 19.6%. Unemployment in this age group had the lowest value in the Netherlands (6.6%) and the highest in Spain (37.8%). Austria lies in the middle field with 10% of youth unemployment, while the unemployment rate in the UK is double as high. In most European countries the proportions of youth unemployment have steadily increased in the past decade.

Economic dimension

Linked with the employment status, but apparently not solely, economic disadvantages contribute to marginalisation. Besides exclusion from the labour market, economic exclusion describes a situation of poverty resulting from low income, and poor earning opportunities including long periods of unemployment. The concept of poverty does not only consider culturally defined standards of living but it also includes the personal feeling of being poor and the inability to pay for ones own or ones family livelihood. In Austria, according to the national statistical office a quarter of children and youth under the age of 20 are in risk for poverty (Paus-Hasebrink, 2009).

Cultural dimension

Cultural exclusion is described as not being able to live according to socially accepted norms and values, to take part in the dominant patterns of behaviour, especially with regard to consumption, and to be cut off from societal acknowledged life aims.

Geographic dimension

Spatial exclusion can arise through the spatial concentration of certain neighbourhoods (social focal points). These residential areas often lack an adequate infrastructure with limited space of interaction. In addition, being a resident within such a locality is often also linked to stigmatisation processes.

³ <http://appsso.eurostat.ec.europa.eu/nui/show.do>

Institutional dimension

Institutional exclusion can be described as lack of support by institutions both before and during phases of unemployment, but also dependency on institutions, a situation leading to shame and passivity. In such a situation, those concerned might then withdraw from public and private services.

A range of so-called markers (Eldering & Knorth, 1998) such as school drop-out or delinquency rates indicates the forms of marginalisation or exclusion.

Hartley, McNeill and Melrose (2003) asked 50 participants in the UK with experience of unemployment and of several additional problems, such as homelessness, ill-health or disability, substance abuse, a criminal history, and disruptive family relationships, within their study to identify agencies that had been most helpful for them. Most of them who were able to identify an agency mentioned either governmental bodies or voluntary sector organisation. Besides institutional support as formal agency, they emphasised the importance of social relations to friends and relatives who had been helpful to them.

Social dimension

Social exclusion refers to a retreat from the wider social network or a retreat in the form of personal isolation either as individual or as a group or a milieu. Social exclusion implies both, the loss of social contact or a concentration of the remaining contacts to people who all belong to the same group. Spannring and Reinprecht (2002), for instance, found that unemployed young people have unemployed friends and generate a different life from employed people and Kozman and Wagner found that young people living in poor communities are more likely to have friends who dropped out from school. This form of social inclusion implies social exclusion from the larger social community due to its one-sidedness of contacts (Kieselbach et al., 2001). Disadvantaged young people lack access to a wider set of social networks (Parry, 2006).

Thus, marginalised young people would need competent peers to encourage them and model alternative solutions to motivate them again (Brewer, 2004) or “a really significant relationship with at least one adult” (Jahnukainen, 1998, p. 37).

Young people at risk of social exclusion might be a priori unsuccessful in establishing and maintaining relationships with others (Davis, 2007), either

because they lack the skills and limited resources or because they do not get the appropriate family support or due to other reasons. For instance, their choices and wishes might not be recognised by adults including parents, teachers, or also policy makers. Young people often experienced that they have not been given any chance or motivation to belong to a group and lack the feeling of membership in and consequently loyalty to their community (Davis, 2007).

Besides material constraints, whatsoever, many of the most pressing needs and problems disadvantaged young people have to face are of social nature (Kozma & Wagner, 2006). Social networks do not only provide companionship with other people, but also they convey a concrete feeling of social support (Kieselbach et al., 2001).

Furthermore, social contacts are also important as they allow for accessing resources that otherwise would not be accessible for disadvantaged young people in terms of Bourdieu's (1983) concept of the social capital that is linked with the economic capital. Thus, having meaningful and supportive relations has many impacts on one's lives and opens up additional opportunities which otherwise would not be available. According to Davis' work (2007) young people themselves believe "that experiencing a lack of access to socio-cultural resources such as friends is as excluding as being subjected to a lack of material resources", they also suggest that "a lack of material resources often prevents them from establishing and sustaining social bonds" (p. 134). Similarly, in Heggen's study (2000) the young interviewees emphasise the importance of access to resources through their social network, "often only in one area or in one particular relation: e.g. a close relationship to one or a few adults, an uncle, a girl-friend, a relationship that has the potential to reverse a negative process" (p. 55). According to Field (2005) there is also a positive correlation between social capital and engagement in lifelong learning. The connected ones are most positive in respect to lifelong learning, they believe they are themselves responsible for upskilling; the indifferent ones are least likely to rate lifelong learning as valuable, and the "active non-participants", who show thought through reservations, lie with their ratings between the two groups.

The recent Shell youth study conducted among young people between the age of 12 and 25 in Germany (Shell Deutschland Holding, 2010) shows that the

social gap between different milieus has increased over the past years. Socially disadvantaged young people experience less life satisfaction and also their confidence about the future has decreased since the past financial crisis.

Educational dimension

Marginalisation among young people on an educational dimension includes early school leavers or school drop-outs, truants, those who leave school after reaching compulsory school age or those who limited their educational career to primary school and do not continue education, neither formal nor informal or do also not take part in any lifelong learning activities. Informal learning and lifelong learning have become important as one's competences are more in focus of attention nowadays than solely formal qualifications (Lenz, 2010).

Inequality in participation in and access to education among some groups of people in prosperous societies (such as people with immigration background) is worldwide one of the most pressing and unsolved issues (Heimbach-Stein, 2009).

However, the lack of further education or training increases the risk for marginalisation in general. "Early school leavers are three times more likely to be engaged in marginal activities and tend to occupy low-skilled, part-time jobs which are not linked to education or training" (McGuirk, 2001, p. 11).

European statistics reveal increasing proportions of early school leavers in the EU15 as well as EU27. In 2009, 15.9% and 14.4% of youth between the age of 18 and 24 were not involved in further education or training and had left school prior to the conclusion of upper secondary education⁴. The proportions of early school vary to a great extent between the countries with the lowest proportion in Croatia (3.9%) and the highest proportion in Turkey (44.3%).

In Austria, in 2009, the proportion was 8.7% which was the lowest value in past decade. In the UK, it was almost double as high with 15.7% of early school leavers. When compared by gender, a similar difference can be noted in almost all European countries: males are more likely to leave school early. In average,

⁴ <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsisc060>

in the EU27 the proportion among males is 16.3%, while among females the rate is 12.5%.

Furthermore, according to the PISA study (cited in Lenz, 2010) in Austria, even 10 to 15% of those 15 year-olds who have completed primary education have reading and writing difficulties. Around 10,000 young people completing school each year try to enter the labour market without having sufficient basic skills. Limited literacy and illiteracy reduces the chances for employment dramatically. Although illiterate people find strategies to manage their lives, many feel cut off from many important areas of their lives and from employment opportunities. A lack of basic education leads to experiences of stigmatisation and influences also the overall attitude towards learning throughout their lives (Stoppacher, 2010). Educational degrees remain key in employment according to the Shell youth study (Shell Deutschland Holding, 2010). Young people without a formal degree are less likely to find a qualified job and accordingly their expectation regarding the future is rather pessimistic.

As one of the results of globalisation, in many countries the demand for skilled labour has risen. Inadequate skills or skills mismatch reduce the probability for employment and increase the risk that under-educated and under-trained youth will be marginalised as Brewer (2004) observes: "Education and training are essential components in addressing the challenge" (p. 20). Even if some basic skills are not required in the daily job routines they are demanded by the employers. However, in general most branches including agriculture have been increasingly digitalised and thus basic skills are absolutely necessary in most fields of employment (Stoppacher, 2010). People who have only completed primary education are at risk to find only precarious jobs.

Withdrawal from school is a long-term process that can be influenced by early school experiences but also by other factors.

The reasons for disadvantages or non-participation in educational or vocational as well as lifelong learning activities are manifold. Brüning and Kuwan (2002) give an overview on contributing factors.

First, on the individual level:

- education biography (graduation and certificates)
- socialisation of learning
- interest in learning
- age and gender
- exploitation interest
- value system and attitude to further education

On the social level:

- social status and family background
- employment
- professional status and income
- marital status
- nationality/ethnicity

And additional factors that are influential by cumulating with others:

- social relations
- religious affiliation
- capacity of free time

As well as structural and institutional factors:

- reachability of the educational institution
- childcare
- time structure of the education
- amount of time
- amount of money
- forms of communication of learning contents
- forms of organisation of learning
- offers for orientation
- consultancy of social pedagogies
- quality of pedagogical personal

More detailed on the political or formal level:

- educational system
- legislative framework
- support programmes

Some of contributing factors will be explored more in-depth in the following.

The social and economic background of the family a child is born in has an impact on many educational aspects.

The educational level and social background of the parents is recognised as proven main factor in different studies (c.f. Rumberger, 1987; Valverde, 1987). Children of parents with low qualifications and low occupational status are still more likely to attend only lower levels of education compared to children of parents who have achieved higher educational degrees or occupational status (Du Bois-Reymond, Plug, Te Poel, & Ravesloot, 2001).

Educational disadvantages, material poverty and the loss of socio-economic status typically form a vicious cycle which is often inherited (Heimbach-Stein, 2009).

School drop-out also correlates with the economic status of the family. This can be partly explained “by the relatively higher costs for poorer groups whether these are defined by unemployment, low-income and socioeconomic status, gender, or area of residence” (Selwyn, Gorard, & Williams, 2001, p. 264).

For Heggen (2000) there are two main reasons that drive young people away from school: On the one hand, schools lack the ability to stop rising processes of stigmatisation and on the other hand, he sees a cause in the relation between schools and families. The individual experiences of the pupils at school as well as the ability of their parents or legal guardian to cope with occurring difficulties in terms of relations to peers, teachers, learning difficulties or motivation are crucial.

Many early school leavers had negative experiences at school. Most of them describe their time at school in “wholly negative terms, in terms of considerable discontent, which had a lasting effect upon their self-perceptions” (Parry, 2006, p. 280). Some describe feelings of “having been treated unfairly by school” (Heggen, 2000, p. 52) or define school as a “violent and frightening place” (Hartley et al., 2003, p. 22). These negative experiences among many at-risk learners have resulted in truanting (Hartley et al., 2003) and disengagement.

Lenz (2010) postulates that one of the most important responsibilities of schools is to support a positive attitude towards learning; not to acquire a certain amount of knowledge is the main goal but to enhance self-esteem in their own competence and a positive learning experience are crucial. However, many

school leavers lack these experiences at school and leave school without having learnt how to learn and with a negative connotation of learning.

Young people disengaged in school do also show a limited interest in lifelong learning activities as compulsory school has an impact on the attitude to learn throughout one's life. According to the OECD (2007), one negative experience at school or during vocational training could be enough to put youngsters off trying any kind of training again. If the course takes too long or is too difficult, it may be enough to alienate them from lifelong learning in general. A person who has experienced repeatedly failures at school will avoid learning as it bears the risk to fail again.

Although the participation rates in lifelong learning vary widely (Souto Otero & McCoshan, 2005) it is evident that "participation in lifelong learning increases with education level. The lifelong participation rate in 2003 in the EU is more than seven times higher for people with higher education than for those with lower-secondary as the highest level attained" (Kritikos & Ching, 2005, p. 107). Besides a negative attitude towards learning and a lack of self-confidence in their ability to learn, among low skilled workers and early school leavers there is also a lack of opportunities they could afford (idem). Thus, personal dispositions (knowledge and motivation) along with situational and institutional barriers (available opportunities) to lifelong learning can be identified (Selwyn et al., 2001).

Leaving educational paths early and not taking part in lifelong learning either, has a considerable impact on their lives. According to Wyn (2007, p. 41), "Individuals who are not lifelong learners will suffer economic and social exclusion within this emerging economy".

Therefore institutions or training system which offer lifelong learning opportunities "must be sure to create entry points for those with few initial qualifications, for example by recognising basic employability skills learnt in the workplace such as ability to follow instructions or good timekeeping, even if these are not currently recognised by any existing qualification" (OECD, 2007, p. 6). The learning opportunity must be relevant to their lives (Du Bois-Reymond, 2005) and must reflect the needs of the learners.

The reasons for school leaving and non-participation in lifelong learning are manifold; as previously described it is rather challenging to find strategies that best help to prevent school drop out as these would need to take into account different risk factors for school drop-out. However, there are a few needs that are recurrently found in research and would have to be reflected in any educational offer or intervention to marginalised young people as educational offers often do not reach the specific needs of those who are marginalised and “may favour those who would have done reasonably well in the labour market anyway” (Jones, 2002, p. 8).

Disengagement in school does not necessarily mean disinterest in education in general (McGuirk, 2001). School leavers criticize that school has only tried to teach them things which were not relevant to their lives. For early school leavers there have to be alternative structures of “second chance” education (Kritikos & Ching, 2005).

What is argued by many educational researchers is that the opportunity for new and positive learning experiences has to be provided, which potentially stimulate a so-called “flow-experience” increasing one’s self-esteem (Jahnukainen, 1998).

Additionally to the above discussed dimensions of marginalisation, also gender plays an important role. Studies show that females are more affected by marginalisation but are not as visible as their male counterparts. Male marginalised young people often develop a behaviour that makes the environment aware of their situation, while females tend more to hide away and are also more integrated in family structures and adopt traditional female roles such as housewives or caretaker (Kritikos & Ching, 2005).

Female early school-leavers have a higher rate of inactivity compared to males as they face greater barriers in entering the employment market and in maintaining employment in periods of economic downturns (Brewer, 2004).

Thus, being young and being female leads to further disadvantages (Furlong, 2006) and can imply a double source of discrimination (Brewer, 2004).

The impact of marginalisation on the perception of oneself is fundamental and vice-versa intrapersonal resources and dispositions such as motivation, self-efficacy or personal management skills may help to overcome marginalisation (Biggart et al., 2004).

The “World Programme of Action for Youth” lists several weaknesses that have to be addressed if all youth should be able to take advantage of opportunities that arise from education and training. One of them includes the poor educational opportunities for disadvantaged subgroups of youth, of which one subgroup are girls and young women. Therefore “all aspects of skills development of disadvantaged youth must be gender sensitive and recognize the heterogeneity amongst and between young men and women” (Brewer, 2004, p. 44).

The aim of this chapter was to define the term “marginalised young people” and its overlaps with similar terms such NEET and youth-at-risk. Furthermore, the factors that lead to marginalisation among whole populations in general and among young people in particular, have been explored. In the following chapter the relation of marginalised young people and their access to Information and communication technologies in terms of the so-called “digital divide” will be the focus.

3. “Digital Divide” versus “Digital Natives”

Young people either marginalised or not grow up in a digitalised society. Information and communication technologies have an impact on many aspects of life: communication, learning, jobs, media, public knowledge, etc.

On the one hand, young people have been born into a society that uses many digital devices in their daily routines and therefore are almost naturally able to handle these technologies and can thus be called “digital natives”. On the other hand, some young people lack behind in either access to these technologies as also in their ICT skills or media competency.

Marginalised young people are affected by both trends. They are digital natives but lack behind in many areas that relate to ICTs.

The aim of this chapter is to analyse the “digital natives” concept on the one hand and the digital divide on the other hand and to understand how both have impacted on marginalised young people. Factors that lead to e-exclusion will be explored.

3.1. Digital natives

Young people in contrast to more mature people have spent more time online, have played more video games, have sent more text messages, etc.

Tapscott (1998) has coined the term of “net generation” to describe the younger generation in contrast to past generations which grows up with different technologies that were not available earlier or at least not very common to own personally such as personal computers (PC), the Internet and other ICTs (Mainsah, 2007). This notion implies a generation gap between younger and older generations. This is often manifest in families where parents search for strategies to allow for a balanced media consumption of their children, while these try to find tactics to bypass the rules established by their parents. Digital skills of the parents but also theirs instructors are often challenged by their children or pupils, who often have a greater expertise in handling ICTs (Ribak, 2001; Wilhelm, 2006). In their study the London School of Economics found that children are typically the Internet experts in families and thus they describe this situation as “lasting reversal generation gap” (Peters, 2009; Smithers, 2003).

The age of ICT users has decreased significantly in the past decade with the improvement of usability on the one hand, and affordability due to competitive market prices and lower production costs on the other hand.

Young people are often considered as forerunners in the adoption of new technologies (Thulin & Vilhelmson, 2007) and thus, their interests are studied by marketing agencies before introducing a new piece of technology as they are among the major consumers. Several statistics reveal that young people spent more time online, etc. For instance, a study in the UK (Wigley & Clarke, 2000) showed that 7-16 year olds were double as likely to have ever accessed the Internet compared to adults. Brewer (2004) has noted that young people are more receptive to new ideas, and more innovative in their response to within the context of a knowledge based society which seems to allow for a faster and more flexible reaction to rapidly changing Information and communication technologies. Young people often also find innovative ways how to incorporate these technologies in their daily and how to adapt these technologies for their own purposes in terms of appropriation. For instance, text messages have been far more popular among young people and adolescents than among adults (Lee, 2005) which has impacted on their way of communication. Young people use technologies often also in a way it was not originally intended for, they do not only adapt the technology but “appropriate” it (Bakardjieva, 2005). The concept of appropriation states that “with creative appropriation, new dimensions of a technology are opened up and widely recognized, thanks to the spontaneous inventiveness of its users” (Bakardjieva, 2005, p. 18). Thus, the creativity of individuals has led to a multifunctional use of (mobile) devices (c.f. Pachler, Bachmair, Cook, & Kress, 2010; Pachler, Cook, & Bachmair, 2010).

Young people enjoy using these technologies independently from adults, find out new things in the virtual world, become members in virtual communities, develop their own interests and preferences and show their belonging. Modern media have a symbolic value for handling age-related challenges for adolescents (Niesyto, 2009).

To describe this new generation of digital media skilled young people different terms have been introduced by researchers and the media:

N-generations as abbreviation for net-generation or D-(digital) generation or Digital Natives (Prensky, 2001). Young people are perceived as “native

speakers' of the digital language of computers, video games and the Internet" (p. 1).

Some speak of multiliteracy of youths (Pierroux, 2009) who have several personal technologies as identity markers and for social activities, among others, at their daily disposal such as MP3 players, handheld computers, mobile phones, play stations, etc.

The newly available Information and communication technologies have impacted on the lives of young people regarding several aspects. They have changed their lifestyle more than of any other age group (Wilska & Pedrozo, 2007). New forms of youth cultures have been shaped by the introduction of ICTs (Tapscott, 1998; Wilska & Pedrozo, 2007).

Studies have found correlations between academic success and the use of ICTs, for instance between home computing and grades in English and Mathematics (Rocheleau, 1995), or between standardised test scores and ICT use (Attewell & Battle, 1999).

Other studies suggest that the use of ICTs has a positive impact even on a personal and psychological dimension. It may improve the users' self-esteem, their motivation and support collaboration and networking between different people and increase also the involvement with their families (Tsikalas, Gross, & Stock, 2002; Wartella, O'Keefe, & Scantlin, 2000).

Although the above studies are encouraging, no causal conclusion can be deduced as the positive outcomes can be due to other reasons that are not obvious in the first moment. Carey (1997; as cited by McGuirk, 2001, p. 31), for instance, argues that "the educational value of computers does not lie in the computer per se nor the software used, but rather, it is the process of teaching/learning employed that largely determines its value" and „it is the learning culture or environment”.

Prensky (Prensky, 2009) suggests even more wide-reaching consequences from the use of ICT. Digital natives are constantly interacting with the digital world and are fully immersed in it and this results in a fundamental different way of thinking, perception, information procession and learning. Their learning is "short, burst, casual, multi-tasking" (Prensky, 2005). This new mode of acquiring knowledge may even rely on different neuronal structures, human brains might undergo changes in its structure and functioning because of the use of digital

media (Prensky, 2009). The new learning type acquires knowledge through interactivity and discovery instead of getting lectured as in a traditional teaching setting; he appreciates working in teams and interactivity and responds better to visual than text based learning materials (Oblinger & Oblinger, 2005).

Other common terms to describe this new generation are “the new media generation” (German: die neue Mediengeneration, (Weiler, 1999)), the “windows generation” (Schwab & Stegmann, 2002), “born to be wired” (Yahoo Finance, 2003), “online experts” or “generation@” (Opaschowski, 1999). This multitude of terms shows how multi-faceted the young people’s media world today is (Höflich, 2001).

In contrast to the digital natives, digital immigrants are people who have used or adopted ICTs at a later stage in their life (Prensky, 2001), i.e. older generations but also people who have less access to these technologies. Even though digital immigrants might be fascinated by the technology they are also more sceptical towards it. For example, they do not believe that students can learn successfully while watching TV because they themselves cannot since they have never practiced it as Prensky (ibid) argues and further claims: “Digital Immigrants think learning can't (or shouldn't) be fun. Why should they – they didn't spend their formative years learning with Sesame Street” (p.1).

3.2. Digital divide

In contrast to the concept of digital natives, i.e. a generation that grew up in a digitalised world and that has adopted ICTs as their second nature, there stands the notion of the digital divide. According to this notion there are groups of people worldwide who have less access to these technologies and lack behind also in their ICT skills or digital media competencies.

One by the digital divide affected populations is marginalised young people although they belong to the same generation as the digital natives do.

The aim of this subchapter is to explore factors that contribute to the digital divide among young people and then to analyse the relation between ICTs and marginalised young people, the role ICTs play in their lives and the related skills and preferences they have in regard to the use of ICTs.

According to Hradil (2001) social inequity results from different levels of access of persons or groups of persons to material and immaterial resources. One of these resources underprivileged people have rare access to is modern digital media and Information and communication technologies.

The notion of the digital divide first appeared in the 1990s in the course of the OECD policy debates (McNair, 2006). First it meant solely the access to digital information technologies, and the access to the Internet was primarily in focus, later on a more differentiated perspective referring to different kinds of ICTs was overtaken and in the recent years, the speak is of the so-called “second digital divide” meaning besides access also relevant skills that lack behind.

Already in the 1960s information equality in the contemporary sense became an issue of great concern (Yu, 2006).

Until now, different related terms have evolved: While some speak of “information inequality” or “information gap” and “knowledge gap”, others use the terms “information divide”, “information disparity” or “information inequity”. Still other researchers emphasise the contrast between “information rich” vs. “information poor” or “information haves” vs. “information have-nots”. All these terms underline that lacking access to the Internet and other ICTs implies a lack of information. For instance, Sweetland (1993) defined information poverty as a result from information deprivation due to lack of information access, but also information overload and/or self-imposed information deprivation.

Britz (1998; as cited by Yu, 2006) based his definition of information inequality on a multidimensional concept of knowledge, information and information infrastructure. He later defined information poverty as “that situation in which individuals and communities, within a given context, do not have the perquisites skills, abilities or material means to obtain efficient access to information, interpret it and apply it appropriately; [it] is further characterized by a lack of essential information and a poorly developed information infrastructure” (Britz, 2004, p. 194).

Thus, to reduce the digital divide to solely access to ICTs is a simplification as “this type of top-down analysis fails to recognize that access on its own does not result in use, and that support, interest and ‘desire’ are important too” (as cited by Lee, 2005, p. 318; Silverstone & Hirsch, 1992).

Variables such as interest and skills are difficult to measure. Thus, statistics on access to the Internet and other ICTs are easier to obtain.

On a global dimension the digital divide in terms of access still varies to a great extent between different countries, mainly between the developed world and the developing world as Figure 2 shows.

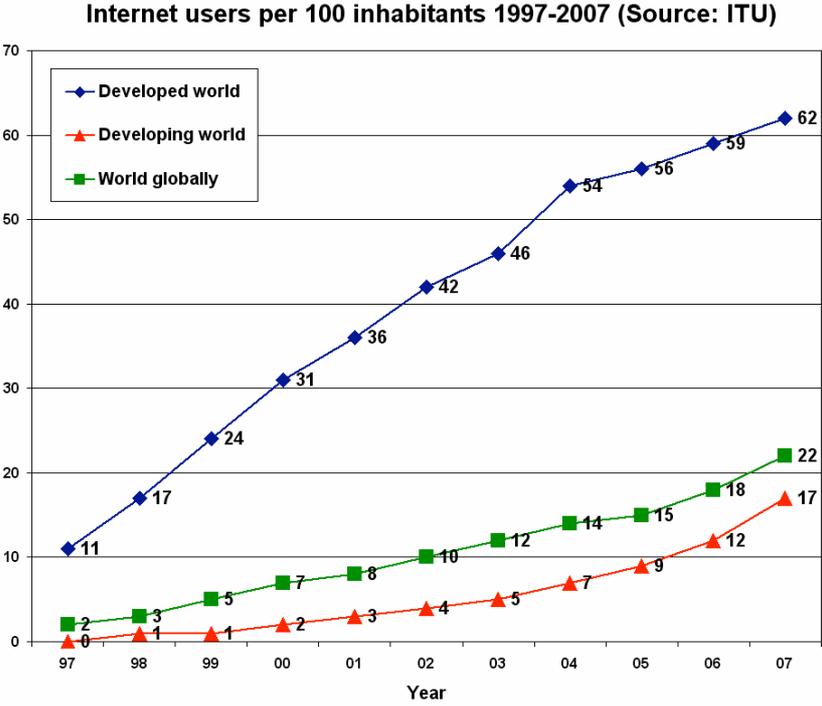


Figure 2: The digital divide on a global scale in terms of Internet users (source: ITU)⁵

⁵ International Telecommunication Union

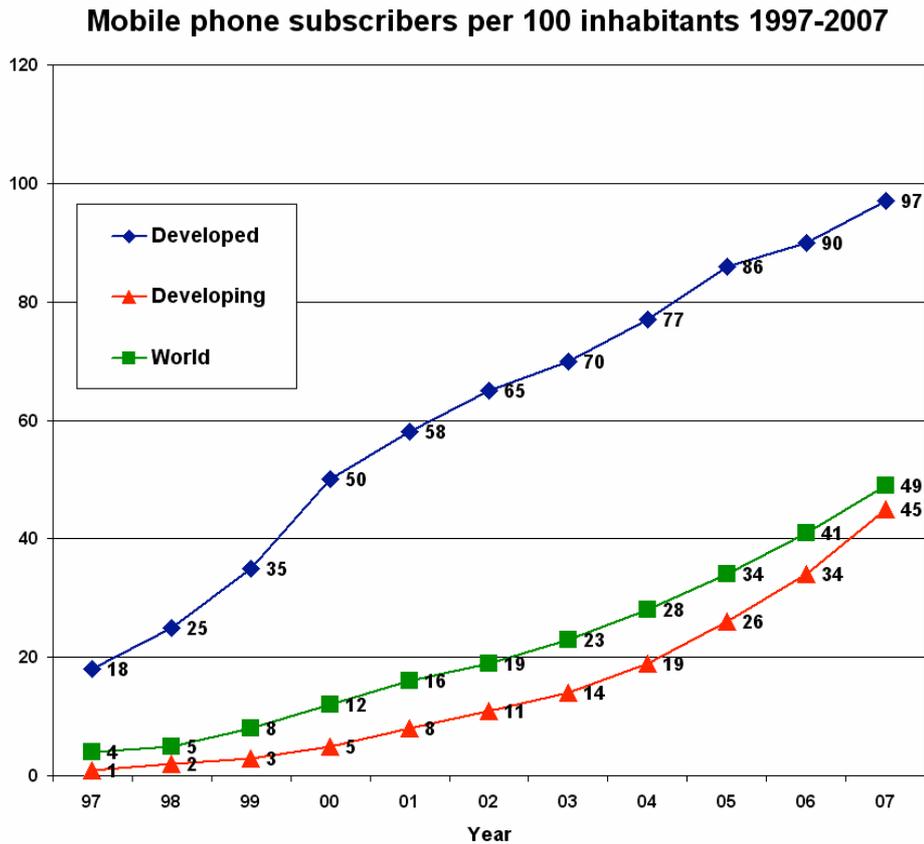


Figure 3: The digital divide on a global scale in terms of mobile phone users (source: ITU)

According to Yu (2006), when differentiating between different ICTs, Internet is still the biggest divider between information rich and information poor and this is confirmed by the above presented statistical data. The digital divide is significant on a global scale and has not been reduced in the past years but the gap has rather increased than decreased. Interestingly, the gap between mobile phone users in the developed world and the developing world compared to Internet users is not as wide (c.f. Figure 2 and Figure 3).

The International Telecommunications Unit (ITU), an organisation of the United Nations, has developed an index to overcome other ICT indices which are limited only to access. The Digital Access Index takes into account more factors such as Internet tariff, adult literacy, school enrolment and infrastructure. According to this index, which can range between 0 and 1, Sweden is most and Niger is least developed. Austria and the UK with indices of .77 and .75 lie in the upper middle field.

However, not only on a global dimension but also within developed countries some groups of people lack access and “these parallel the ‘advantaged-disadvantaged’ fault lines” (Kozma & Wagner, 2006, p. 113). Almost one third of European citizens are not actively participating in the modern digitalised world (ICT Results, 2010). Correlations are to be found with educational level or socio-economic status. For instance, in Europe, only 24% of people with low education have used the Internet compared to 73% of people with high education. Similarly, 32% of unemployed people versus 54% of employed have used it.

This shows that the digital divide is interlinked with other divides.

Laouris (2005) has analysed the relation between the digital divide, the literacy divide and the economic divide and came to two different plausible models. In model A (c.f. Figure 4) there is a simple causal relation between literacy which impacts on the economic status and this in turn is responsible for the digital divide. If an intervention was set than it had to first remove illiteracy and economical barriers before finding strategies to lower the digital divide.

In model B, additionally to these simple causal relations, the digital divide itself has an impact on literacy and economic status. Thus, in the second case, strategies to close the digital divide would also have a positive effect on the literacy divide and the economic divide.

In several initiatives as has also in this study the latter model has been applied.

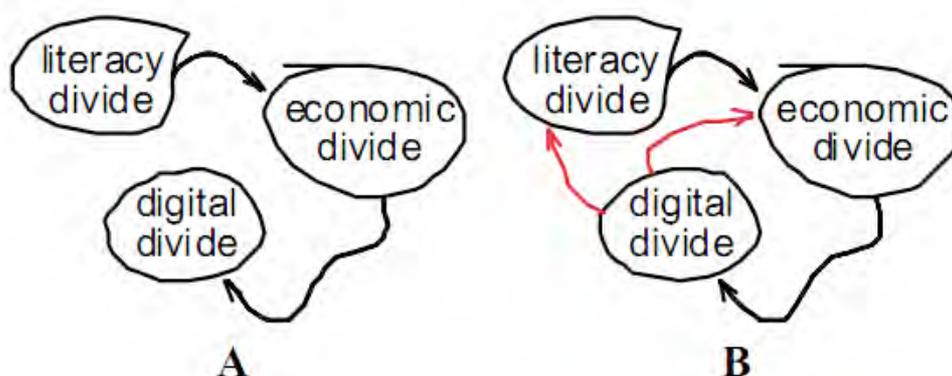


Figure 4: Relationships between different divides (Laouris, 2008, p. 4)

Young people who stand at the margins of society are clearly affected by the digital divide. Literature suggests that the same factors that led them into marginalisation are responsible for their limited access to ICTs and thus limited ICT skills. However, little is known about the concrete impact on marginalised

young people as Livingstone and Helsper (2007) argue in their article: “Little academic and policy attention has addressed the ‘digital divide’ among children and young people” (p. 671).

Nyíri (2005) believes that the digital divide will extinguish itself with the higher affordance of ICTs today. He claims: “give a kid a keyboard and a screen, and illiteracy becomes a thing of the past. Provide a disadvantaged, barely literate person, with access to the internet, and soon s/he will run a small virtual business enterprise” (p. 1).

That providing access is not sufficient but that additionally enabling to handle these technologies are prerequisites has been shown by several studies.

For instance, Laouris (2005, p. 262) states: “Our ten-year-long experiments in social intervention and change have scientifically documented that technology alone cannot serve our purpose. It needs to be accompanied by vision, strategy, scientific theory and methodology, and a great deal of commitment”.

On EU level policies have been developed that aim at addressing the digital divide. The Riga Ministerial conference in 2006 clearly states that digital technologies shall be open to everyone and that these shall also be used to bridge other divides such as social and economic exclusion. Thus, eInclusion is given a top priority as one of the three pillars of the EU i2010 strategy (ICT Results, 2010). ICTs are recognised as tools which have the capacity to make society more inclusive and to bridge the very divide it sometimes creates.

In recent years, the mobile phone as tool for eInclusion has gained attention. In Sub-Saharan-Africa where there is often no infrastructure for landlines, mobile phones can be used to access the Internet (Shuler, 2009). Similarly, in Japan many households do not have a computer but mobile phones are widely used as main computing device. Mobile phones nowadays have many functions computers originally had, thus mobile phones and computers have merged into one device and these new “smart phones” can easily be deployed to disadvantaged children as schools can afford to loan such devices (Sharples, Milrad, Arnedillo Sánchez, & Vavoula, 2007).

3.2.1. The digital divide referring to mobile phones

According to Rice and Katz (2003), several digital divides exist when differentiating between different technologies. People who have access to one

kind of ICT might not have access to another one; the non-users of the Internet differ from the non-users of mobile phones. Thus, within countries and between countries several of these inequalities exist in parallel. These different digital divides partly overlap but they might be predicted by somewhat different variables. However, income and education have turned out to be the strongest predictors in different digital divides according to studies (e.g. D'Haenens, 2003).

The various factors that correlate with the digital divide will be discussed in more detail later in this chapter.

So far, little effort has been invested by policy makers and the scientific community to react to the digital divide referring to other kinds of technologies besides inequity of access to the Internet. In this regard Townsend (as cited in Geser, 2004, p. 4) states:

The advent of inexpensive mass-produced mobile communications in particular, has avoided scholarly attention, perhaps because it seems pedestrian compared to the nebulous depths of cyberspace. Yet the cellular telephone, merely the first wave of an imminent invasion of portable digital communications tools to come, will undoubtedly lead to fundamental transformations in individuals' perceptions of self and the world, and consequently the way they collectively construct that world.

In fact, the use of mobile phones has already impacted on the lives of people in different ways. For instance, it has changed social interaction in terms of organising and cultivating relations. People do no longer depend on fixed dates or times but are able to adapt on their time schedule. Plant (2001) coined the term "aproximeetings" to express the flexibility of social contacts: appointments can be cancelled or delayed at any time. With the advent of mobile phones it is possible to get in touch everywhere and anywhere. These new possibilities have implications for individual planning, scheduling and the use of time. Thus, the use of the technology has led to new patterns and new rules in social relations.

The mobile phone has particularly shaped social interaction among young people. For instance, text messages as preferred channel for communication, is much more used by young people than by adults. New social rules have developed and some of these are specific to youths. Mobile communication is perceived as an always open door to their networks of friends. Contacts are

often impulsive, short and fragmented and would otherwise without the use of a mobile phone have unlikely occurred (Thulin & Vilhelmson, 2007).

Götzenbrucker (2005) gives some examples and termed the set of rules that apply to mobile communication among young people as “reciprocity norm” (Reziprozitätsnorm). It includes rules on a time dimension (e.g. call back in appropriate time), on a numeric dimension (e.g. the number of approaches needs to be balanced between two people) and on a media-technological dimension (i.e. the choice of the appropriate channel).

Besides its social function among young people the mobile phone often has a function as identity marker and as leisure device. In contrast to personal computers that are often shared within an household mobile phones are personal devices and thus can be adapted according to the individual preferences, and young people can personalise them, choose ring tones or coloured covers to express their style, make it a lifestyle accessory (Krause, Klimmt, & Schneider, 2004) and an extension of their person (Haste, 2005).

Mobile phones are lead media among young people and have impacted on and shaped youth cultures. According to Höflich and Gebhardt's studies (2003), based on 19 explorative focus group discussions with young people, youths have a strong emotional bond to their mobile phones by turning them into identity markers which display their self-perception and self-affirmation as part of a young flexible generation which segregates them from older generations at the same time. This segregation takes place not only through the use of the technology itself but also through the different way in which it is used (Kromer, 2003).

These examples show the importance and meaning of mobile phones for young people. Not having access to mobile phones would imply lacking behind in relevant skills that are prerequisites in today's society (Döring, 2008). In an increasingly mobile information society lack of access to mobile communication tools may lead to social exclusion.

However, in the Western World almost every young person has a mobile phone. For instance, in Germany (Medienpädagogischer Forschungsverbund Südwest, 2007) 95% of females and 92% of male youths between the age of 12 and 19 possessed a phone in 2007. It was the most likely-to-have personal ICT

followed by the MP3-player. It is thus the most popular piece of technology among young people.

The diffusion of mobile phones has occurred worldwide independently from cultural habits and values (Geser, 2004). Around 95% of all nations have established mobile phone networks. Even for people who are threatened by social exclusion mobile phones have become accessible. Unlike other ICTs such as the Internet the diffusion of mobile phone has happened in a more democratic way.

As mobile phones today have become convergent media with Internet access and storage for information, its potential role in closing the digital divide to some extent is increasingly discussed. Large-scale impacts could be achieved due to its portability and low costs in many areas of the world (Kim, 2009). This applies especially to areas without fixed landlines, low or no Internet connectivity and rarity of PCs.

In 2002 the president of the European Consortium of Communication Research, Jan Servas, acknowledged the mobile technologies as (better) alternative to reach people without access to computers.

Similarly, Attewell (2004) claims that they could reach even the hardest and most disadvantaged audiences, for instance illiterate people.

It could contribute reducing global inequalities (Kim, Miranda, & Olaciregui, 2008). Traxler (2009a) postulates that the use of mobile phone could not only bridge the digital divide but could contribute to a wider social change in general as mobile learning could be used as vehicle to reduce some of the other experienced inequalities seamlessly.

In the following, factors that contribute to the digital divide will be explored.

3.2.2. Educational reasons

Several studies show that there is a significant correlation between educational level and the use of the Internet, thus there is a broad consensus of this fact among researchers (c.f. Rice & Katz, 2003).

Researchers such as Selwyn, Gorard and Williams (2001) found evidence that the populations that experience exclusion from educational opportunities correspond to those who have lacking access to ICTs.

The JIM study conducted in Germany (Medienpädagogischer Forschungsverbund Südwest, 2007), for instance, found that among youths the educational level plays an important role in access to technologies: the higher the qualification, the higher the probability to have their own computer or at least to have one in their household. Furthermore, the media selection correlates with the educational level (Pietrass & Ulrich, 2009). According to Bonfadelli (2002), formal education has a positive impact on information oriented and media competent use whereas among people with low levels of education the use for entertainment purposes is more likely to be found as well as excessive use of media. Thus, offline conditions such as socio-cultural environments as well as educational degree have a significant impact on the online life of young people (Biermann, 2009).

Another study in Germany, the so called KIM study (Medienpädagogischer Forschungsverbund Südwest, 2008a) showed differences in the media use between secondary school students (Hauptschüler) and high school students (Gymnasiasten). A higher proportion of secondary school students found the television as essential media in comparison to high school students. Concerning the use of the Internet the proportions were reverse. The higher the educational degree was, the higher was the probability that the Internet was seen as essential modern media. Pupils with higher educational levels also show a broader use of the Internet and its various tools: from instant messenger or sending and receiving emails to search engines. These results are confirmed by the recent Shell youth study (Shell Deutschland Holding, 2010): Young people from low income households show a different pattern of media use. Especially among male young people gaming is the preferred mode of consumption, while young people from higher income households spend more time with reading and with creative activities.

The analysis demonstrates not only a clear connection between education and access to and use of ICTs but also an impact on media skills. Thus, education has the potential to mitigate some of the factors that play a role in the formation and perpetuation of the digital divide.

3.2.3. Economic reasons

The socioeconomic status of the family is not only a crucial factor for educational success according to the PISA studies (e.g. Prenzel & PISA-Konsortium, 2005) but also does it correlate with access to and use of ICTs.

A study in the US, for instance, showed that the discrepancy of access between low- and high income families was appalling (Wilhelm, Carmen, & Reynolds, 2002). Around 95% of children of high income household had at least one computer at their disposal in the household, while only 33% of the children living in a low-income household had. Similarly to the different use of media depending on the educational level differences in the purpose of media use are to be found among children living in households with high and low socio-economic conditions. Children of low income families (15,000 USD or less) were more likely to play games on their computers, kids of high income families (75,000 USD or more) were more likely to use their computers for more challenging and school related purposes such as word processing or school assignment.

Another US study (Selwyn et al., 2001) concludes that high income families are nine times more likely to have access to a computer in comparison to low-income families and 20 times more likely to have access to the Internet (!).

In a study among British 11-19 year-olds Haste (2005) found that middle-class children have more access points; the more affluent ones have home access, Broadband and bedroom access, compared to the poorest ones who have only occasional access.

While some of the above described situations might have been changed to some extent in the recent years to the increasing affordability of ICTs, resulting in an increased proportion of low-income families who have a computer and Internet in their household, the gap in experience between those who have had access to ICTs over years and those who have gained access only recently is still evident. Livingstone and Helsper (2007) claim that existing inequalities in access have important consequences as youths with home access have spent more years and more time online, used the Internet more often and thus have developed higher levels of online skills. Thus, disadvantaged young people with rare access to computers and the Internet have to catch up to the skills levels of their peers with a longstanding experience in the handling of ICTs.

3.2.4. Gender aspects

Gender differences are to be found in access to ICTs and also in their use. Wilska and Pedrozo (2007) found in their study in Finland that gender was even the most important factor for the digital divide. Girls showed less interest in ICTs and were also less skilled compared to their male peers. These findings are consistent with findings from many other studies such as Livingstone's (2003) and Lee's (2005). They found only slight differences concerning the motivation to use ICTs but rather considerable differences in their digital literacy.

Boys have been online for longer and access the Internet more often and for a longer time (Livingstone & Helsper, 2007). They are more likely to have more high-tech equipment in their bedrooms according to a study in the Netherlands by D'Haenens (2003). Boys do not only have a computer in their bedrooms more often but also outside their homes they are more likely to access different kinds of ICTs. This complies with Livingstone and Helsper's (2007) findings which showed that boys have more points of access at their disposal.

Boys were more likely to be intensive users in terms of frequency of access and Internet session duration also in the German JIM study (Medienpädagogischer Forschungsverbund Südwest, 2007). Differences, however, do also exist concerning the patterns of use: Boys tend to play more games while girls seem to be more attracted by applications for communication. Similarly, D'Haenens (2003) reports that girls made more use of social applications such as email or chat, and boys used it more for technical applications such as games or downloading files.

A possible explanation for the discrepancy in access is given by McNamee (1998) who found that males tend to express their masculinity by controlling their sisters' access to the home computer and other ICTs. On the one hand, also mothers probably contribute to this gender gap in their children as they might perceive pieces of technology as "male territory" (Van-Zonen, 2002, as cited in Livingstone, 2003). Fathers on the other hand could be threatened by the gained computer expertise of their sons (Ribak, 2001).

Based on the observed gender differences we can suggest that interventions might need to be specifically tailored to the gender-specific needs. In any case, they need to be offered in a way to attract both genders to the same extent.

3.3. ICT and MYP

A considerable number of studies have focused at analysing the use of media by younger generations including the ones who are disadvantaged on several dimensions. These studies have tried to answer research questions such as: Which relevance do media play in the construction of ones identity, the construction of knowledge and meaning making in comparison to other agents of socialisation in the course of socialisation among disadvantaged young people? (Paus-Hasebrink, 2009).

One of the outcomes of these studies is that disadvantaged young people have a different preference in their media use as they are more entertainment and leisure oriented compared to their peers who seemingly use modern media and Information and communication technologies more for school and work related activities such as information retrieval in the Internet.

Young people with a low educational degree only rarely use the Internet for searching for information compared to pupils who completed A-level (Medienpädagogischer Forschungsverbund Südwest, 2008b).

According to their findings, differences result from different motives for media use. Low educated and qualified young people give “killing time” and “have fun” as main motives for using ICTs.

Milieu specific approaches, however, make differences in socialisation responsible for the different media use. It does not lie in the individual choice but in social und structural life circumstances and experiences of those young people (Kutscher, 2009). Furthermore, as Pietrass and Ulrich (2009) explain, entertainment or information oriented media use is not only related to education, but also to milieu specific and media aesthetic preferences which are satisfied by different media formats and different media designs.

Iben (1990; cited in Paus-Hasebrink, 2009) observed already in the 1990s that disadvantaged young people are more likely to be excessive television and video consumers and lack basic social experiences. The excessive media consumption combined with a difficult life situations and circumstances and lack of social experiences would result in new socialisation types who in pedagogical institutions need to catch up in their social learning. The impacts would be

manifold. Besides a different socialisation, he noted difficulties in their attention spans and their ability to concentrate, as well as deficits in their verbal expression and development of thought.

When relating these observations to ICTs which are nowadays available (besides TV and video) similar findings have been reported in different studies. One clear effect of limited use of ICTs is limited skills in media competencies or skills. However, using modern media also requires specific media skills. So it could be called a vicious cycle of insufficient or different media skills resulting in a different use of media and this in turn not contributing to the enhancement of one's media skills.

In an Austrian panel study on (media)socialisation among disadvantaged children characteristics of media use could be identified (Paus-Hasebrink, 2009). In general, it was observed that media played an increasingly important role in the analysed households. Interestingly on the one hand, in all households, a similar pattern of parental practice in regard to media use was noted which was characterised by insecurity and lack of consistency. On the other hand, all children had experienced very specific (media)socialisation and faced very specific disadvantages.

Regarding conditions for media use in families Theunert (as cited in Niesyto, 2009, pp. 14-15; 2005) observes in her report:

Auch wenn der Umgang mit Medien als Bildungsprozess mit zunehmendem Alter zu einer selbständigen Angelegenheit der Jugendlichen wird, so basiert die Verarbeitung der Medienerlebnisse und Medieninformationen auf den sozio-kulturellen Voraussetzungen der jeweiligen Familie. Es geht demnach nicht nur um die Frage der Zugänge zu Medien, sondern verstärkt auch um die Frage danach, wer sich welche Medienangebote auf welche Weise und aus welcher Motivlage heraus aneignet.⁶

Another Swiss study (Heinz Bonfadelli & Moser, 2007) concludes that young people with migration background are as group not homogenous. Besides migration background the social environment, the educational level, as well as age and gender have a significant impact on the use of media. Socio-cultural differences in the use of media and media socialisation would not point to social

⁶ Translation: Although increasingly with age the handling of media as educational process is regulated autonomously by the young people, the processing of media experiences and information is based on the socio-cultural conditions of the family. Thus it is not about the access to media but the real question is who does and for what reason and how adopt which kind of media.

disadvantages and inequity but to different media and socio-aesthetic patterns and preferences in the first place.

With the arising of web2.0 media users become media contributors as they can actively participate in the Internet by sharing content with other users. However, having access to modern media and thus the option to participate does not result automatically in a comprising media use but requires media competences as Schell (2008) points out.

In terms of access to ICTs and digital media, in the recent years, the use has become almost ordinary among young people (Medienpädagogischer Forschungsverbund Südwest, 2008b). Although young people irrespective of their educational background are more likely to have their personal devices or at least access to ICTs, the quality of access (e.g. Broadband connection) often differs as well as the equipment.

In this regard, Moser speaks of a “Second Digital Divide” (as cited in Niesyto, 2009): No longer is inequity in access the crucial issues but the quality and intensity of use is fundamentally different between people on the one and the other side of this second digital divide.

Thus, initiatives that aim at closing the digital divide should address the value and the concrete benefit in context of individual life situations.

Furthermore, similar to other products which are targeted to specific customers, the Internet is oriented towards a specific audience too.

When offers in the Internet allow for specific use or is fed with specific contents which are not relevant for disadvantaged groups these are excluded due to their different media use and specific content preferences.

As Kutscher (2009) argues, explicitly or implicitly, Internet sites address specific target users in terms of their content, their form, etc. resulting in offers that are open only for specific groups and leading to a so called “voice divide” (Klein, 2007), i.e. disadvantaged groups have no voice in the Internet, their interests are not heard. These experiences result in homogeneity of the virtual world where specific user groups dominate the others.

Specific cognitive structures are needed that allow for an active use of all different kinds of media to open up one’s communication and activity repertoire in today’s world.

Researchers recommend target group oriented interventions that are offered in the Internet as well as outside that train skills needed in an online environment (Niesyto, 2009).

Whether training of media competencies would reduce inequity is still an open question according to Kutscher (2009) as socio-cultural phenomena are complex and difficult to tackle. Niesyto (2009) lists the following differences that have to be considered when trying to explain the different use of media by disadvantaged young people and their peers: differences in their preferences of use and navigation; differences in their reading, writing and visual comprehension skills; and (as recurrently found) differences in the use for information versus entertainment purposes. Therefore, any interpretation of their media use has to be reflected in the light of their life worlds and socio-cultural background.

Studies such as the PEW Internet & American Life Project⁷, an ongoing study on issues, trends, and attitudes in the US and in the world found that young people with lower educational level are less aware of privacy issues while young people with higher educational background show themselves more critical towards private contents published in the Internet and often rate these as “worthless”.

The term “media competence” has a valuing connotation as it has a normative character describing which kind of media competence favour which kind of media use and rating education relevant media use higher than entertainment use (Schäfer & Lojewski, 2007). This should be kept in mind when tailoring interventions to disadvantaged young people that the widely available concept of desired media competences might be challenged and might not be desirable for other groups of populations.

When interventions are targeted to the audience then probably young (disadvantaged) people have to be “caught” where they are. For instance, video platforms such as YouTube are seamlessly popular among people with lower as well as higher educational level but the first ones make more use of all the offered functionalities such as rating videos, commenting on videos, recommending videos to others and uploading their own videos (Schorb, Keilhauer, Würfel, & Kiessling, 2008). The reason lies in the possibility to use

⁷ <http://www.pewinternet.org/>

materials with symbolic value (as contributors or consumers) such as music or pictures and specific media preferences.

This shows, in contrast to the previous findings, that they are indeed active contributors in the web2.0 landscape and that active participation can be achieved when they have found their medium of expression.

Thus, interventions have to be based on target specific concepts, which match their aesthetic, social and communicative needs, forms of adoption and topics.

4. Mobile learning and mobile communities

As becomes clear in the previous chapters, ICTs and especially mobile phones play a crucial role in young people's lives. Mobile phones are important communication tools and have also acquired the role of identity markers as young people personalise them and create them individually to express themselves.

While marginalised young people often do not have access to computers in the Internet and are thus exposed to the digital divide, their access to mobile phones is comparable to the access of their peers. Almost every young person above the age of 14, irrespective of socio-economic background, personally owns a mobile phone.

The use of mobile phones has impacted on many spheres of life such as the social life and has even resulted in new social norms such as the reciprocity norm.

Relatively recently mobile phones have been recognised as instrument for learning by pedagogues and researchers and the term "mobile phone" has evolved.

The aim of the following chapter is to define the term and to analyse the state-of-the-art in the field of mobile learning. Furthermore, chapter 4.4 gives an overview of mobile phone practices, i.e. which mobile phone applications for learning are currently available and used for which purposes and in which disciplines.

Since the platform to be developed in the framework of the Comeln project was meant to be based on a virtual online mobile community and on the video format as channel for communication, specific topics such as mobile phone application based on mobile2.0 and those relying on video formats will be explored in more detail.

4.1. Defining mobile learning

Mobile learning is a rather young research field and thus, uncertainties exist even in the scientific community what mobile learning is and what constraints the term has as Traxler (Traxler, 2009b, p. 3) points out:

mobile and wireless technologies, including handheld computers, personal digital assistants, cameraphones, smartphones, graphing calculators, personal response systems, games consoles and personal media players, are ubiquitous in most parts of the world and have led to the development of 'mobile learning' as a distinctive but ill-defined entity.

Furthermore, a substantial and credible evidence-base of mobile learning is yet to be developed (Traxler, 2009b).

The diversity of projects and mobile learning applications contribute to the difficulties to define what mobile learning actually is, what it stands for and what the characteristics are (Sharples et al., 2007).

Vavoula (2005) found out that learning often occurs 'mobile', that probably it is the most prevalent way of learning. In her study participants were asked to register all learning episodes in a personal learning diary. Almost half of the learning (49%) happened away from home or the learner's own office, 21% occurred in the workplace outside of the office, 5% outdoors, 2% in a friend's house, and 6% in other places of leisure.

Although, as previously mentioned, the research field has only developed in the past decade different traditions in defining the term already do exist. The terminology has been developed further and shaped by different disciplines as the mobile learning field is one example of interdisciplinary research where researchers with different backgrounds collaborate and have an impact on. Mobile learning applications are developed and analysed by pedagogues, psychologists, sociologists, computer scientists, web developers, providers, user interface designers, etc.

The different prefixes that have been added to the word 'learning' such as e-, m-, online, ubiquitous-, lifelong-, life-wide-, personalised-, virtual- have nearly become buzzwords. While some of these new forms of learning refer to a site or a temporal extent such as life-wide and lifelong learning others seem to relate more to conditions and environments (Kress & Pachler, 2007).

From a rather techno-centric understanding of mobile learning in the beginning, the mobility of the learner and the learner as subject of the mobile learning research was underlined at a later stage, and the most recent definitions of mobile learning aim at taking into account mobility as societal phenomenon. The evolution of the term starts with those who defined mobile learning from "the point of view of the portability of technological tools or devices used to

mediate learning activity; second, those that understand mobile learning from the point of view of the mobility of learners whilst using portable devices and wireless technologies to support learning” (Mwanza-Simwami, 2009, pp. 97-98). Similarly Taylor (2007) poses the question whether ‘mobile learning’ signifies learning mediated by mobile devices or, mobility of the learners, independently which device they use or mobility of the content so that it can be accessed from everywhere.

Niall Winters (2007) provides a categorisation of different definitions of and different perspectives on mobile learning, respectively: (1) the techno-centric perspective, which predominates in academic literature, (2) mobile learning in relation to e-learning which sees m-learning as an advanced development of e-learning, (3) mobile learning as augmentation to formal education and finally (4) the learner-centred perspective on mobile learning.

To this categorisation of definitions of mobile learning two more categories evolve in literature: (5) definitions that emphasise the mobility aspect and (6) definitions that reflect mobility of the society as a whole.

In the following these six different approaches will be analysed:

(Ad 1) **The techno-centric perspective:** Early definitions were anchored in the technology used; the kind of mobile devices and its hardware (Traxler, 2005) were explicitly mentioned in the definition of the term: “It’s elearning through mobile computational devices: Palms, Windows CE machines, even your digital cell phone” (Quinn, 2000) or any form of learning through devices which are very small, autonomous from the electrical supply, and small enough to accompany people anytime and anywhere (Liang et al., 2005; Pieri & Diamantini, 2009; Roschelle, 2003; Trifonova & Ronchetti, 2003).

This techno-centric definition is obviously shaped by researchers with technological backgrounds who place a high emphasis on novelty and functionality of the devices (Winters, 2007). This is still the most predominant kind of definition to be found in scientific literature (Stone, 2004).

Devices that are mentioned in this context are: any handheld or palmtop devices (Traxler, 2005), mobile computational devices (Quinn, 2000), “ubiquitous communications technology, and intelligent user interfaces”

(Sharma & Kitchens, 2004, p. 205), PDAs, mobile phones, iPods, PlayStation Portable, etc. (Winters, 2007), smart phones and palmtops (Keegan, 2005).

While some researchers prefer working with Personal Digital Assistants (PDA) in the framework of their studies (Attewell & Savill-Smith, 2004; da Bormida & Lefrere, 2003; Norris & Soloway, 2003; Prensky, 2005), other favour the mobile phone and prize its ubiquity since for them it is the most mobile device of all devices that is taken everywhere (Chen, Chang, & Wang, 2008).

Similarly, tools of different devices are included in definitions of mobile learning, i.e. if we refer to mobile phones, mobile learning applications that make use of voice, SMS (short messaging service) – text messages, MMS – multimedia messages, voiceXML – dialogues over the phone, camera functions (still and video), J2ME – small games on mobile phones, ge positioning systems, WAP, MiniBrowser – access to the Internet via mobile phone (Colley & Stead, 2004; Prensky, 2005), Java midlets and games downloaded to the mobile phone (Mayorga-Toledano & Fernández-Morales, 2004).

In this technology oriented definition of mobile learning the constraints of the term are also technology-defined. As Traxler (2009a) points out: “if we were to address whether learning delivered or supported on the current generation of laptop and Tablet PCs should be termed “mobile learning”, then the answer must be no” (p. 15). The reason for this constraint refers to the portability of the device. While mobile phones, iPods or PDAs are taken everywhere unthinkingly, this is not the case with laptops or tablet PCs.

Since mobile devices are not produced or designed for learning purposes any conceptualisation of mobile learning is limited by the nature of the technologies and devices (Traxler, 2009a).

The techno-centric perspective was found to be constraining (Traxler, 2007) and researchers claimed that the definition did have to shift to a learner-centric perspective in order to be able to catch the main characteristic of mobile learning. For instance, Laouris (2005) postulates: “We thus deduct that a socially and educationally responsible definition must view the learner as the one being mobile and not his/her devices!” (p. 7).

(Ad 2) **Mobile learning in relation to e-learning:** The second trend of defining the term is characterised by a shift from the techno-centric perspective

to the learner perspective. The learner experience comes into foreground and research is undertaken how mobile learning is different from other types of learning and particularly how it differs from e-learning (Traxler, 2009a).

Pinkwart, Hoppe, Milrad and Perez (2003), for instance, define e-learning as “learning supported by digital electronic tools and media”, and by analogy, mobile learning as “elearning that uses mobile devices and wireless transmission”.

M-learning is thought as closely related to e-learning (Stone, 2004), as either a subset of e-learning (Peters, 2009) with some shared characteristics as “just enough, just in time, just for me”-learning or as natural evolution from e-learning (Sharma & Kitchens, 2004) or as intersection between the two (Harris, 2001). Mobile learning is e-learning “using a mobile device and wireless transmission” according to Hoppe, Joner, Millard, and Sharples (2003).

The difference between mobile learning and other forms of learning such as e-learning see Kress and Pachler (2007) not as constituted by the different natures of learning but by different conditions and environments. When bringing mobile learning into relation with e-learning there exist two different understandings in the scientific community (Sharma & Kitchens, 2004): on the one hand, the ones who predict that any e-learning will become m-learning without particular changes in content and structure of learning resources since Internet is increasingly accessible from everywhere due to available wireless devices and on the other hand, those who claim that mobile learning is a completely different approach that shapes a new way of learning that takes into account new potentials created by the new approach such as learning that is location-based and situation-dependent. Thus the latter claim that defining mobile learning as an extension of e-learning means failing to characterise the unique nature of mobile learning. Traxler (2005) criticises: the technocentric/e-learning based definitions only seek to place “mobile learning somewhere on e-learning's spectrum of portability”.

(Ad 3) **Mobile learning as augmentation to formal education:** The third perspective on mobile learning as augmentation to formal education is, in fact, rather rarely to be found in academic literature as mobile learning is much more often mentioned in the same breath as informal learning and life-long

learning that often take place outside of educational institutions. In this definition formal learning is perceived as “traditional” face-to-face learning, as lecturing, and mobile learning as an augmentation of learning in the classroom (Winters, 2007).

(Ad 4) **The learner-centred perspective on mobile learning:** A technology-based definition of mobile learning is not sufficient as it does not include educational relevance per se (Sariola, Sampson, Vuorinen, & Kynaslahti, 2001). It is the learner and his/her mobility that should be taken into the focus of attention. The constraints of this kind of definition are quite open since it sometimes even comprises books as archetypical mobile learning instruments that obviously have been used for centuries and thus mobile learning is not a new concept; learning has been mobile ever since books have existed (Taylor, Bo, Bernazzini, & Sharples, 2005). This definition differs from the one given by Pachler and Seipold (2009) who underline the different characteristics of mobile learning:

...we see mobile learning as concerning the processes of coming to know, and of being able to operate successfully in, and across, new and ever changing contexts and learning spaces with and through the use of mobile devices. And, we consider it as being about understanding, and knowing how to utilize our everyday life-worlds as learning spaces (p. 153).

Similarly Kress and Pachler (2007) describe mobile learning as new habitus of learning. Those who acquired this new habitus are used to an immediate and ubiquitous “access to the world (to be) framed” (p. 207). The mobile learner is constantly on the move while mobility in their understanding does not solely refer to move across locations but it rather implies a “constant expectancy, a state of contingency, of incompleteness, of moving toward completion, of waiting to be met and 'made full'” (p. 207). Thus, those who are mobile are those who have incorporated this new habitus.

(Ad 5) **Definitions that emphasise the mobility aspect:** While the mobility aspect certainly plays an important role in the learner-centred definition of mobile learning it is even more emphasised in this kind of definition where the

word 'mobile' in 'mobile learning' is the most predominant aspect of description of the term.

Shepard (2001; Seppälä & Alamäki, 2003) claims, for instance: "M-learning is not just electronic, it's mobile" (p. 330). Similarly O'Malley et al. (2003) define mobile learning as "Any sort of learning that happens when the learner is not at a fixed, predetermined location" and Keegan (2005) took a similar position saying "I feel that in the definition of *mobile* learning the focus should be on mobility" (p. 3).

The mobility aspect can be interpreted threefold and all of these aspects are valuable to teachers and learners at the same time (Kynäslähti, 2003): convenience, expediency and immediacy.

Sharples et al. (2007) differentiate between four different aspects of 'mobile': mobility in the physical space – while the location might be relevant to the learning taking place or also just a backdrop as filling the gaps between one activity and the other-; mobility of the technology – portable tools and resources that can be alternated-; mobility in conceptual spaces – learning topics compete with each other, the attention of the learner might easily shift from one to another and depends heavily on personal interest, curiosity or commitment-; mobility in social space – learners perform in different social spaces; and learning dispersed in time – learning as cumulative process involves connections and reinforcements among a variety of learning experience (Dierking, Falk, Rennie, Anderson, & Ellenbogen, 2003; Sharples et al., 2007), across formal and informal contexts.

However, in the first place "learning across contexts" is the predominate interpretation of mobile learning when speaking about the word "mobile" in "mobile learning" (Sharples, Taylor, & Vavoula, 2007; Walker, 2007). Traxler (2007) gives examples for these contexts: Mobile learning could be learning while travelling, driving, sitting, or walking, hands-free learning or eyes-free learning.

(Ad 6) **Definitions that reflect mobility of the society as a whole:** A more recent interpretation of the term "mobile learning" refers to societal changes, to the fact that the (Western) society has become and is still getting increasingly mobile.

Mobile devices have not only impacted on new ways of knowledge and ways of accessing it but also new forms of art and commerce. Thus, mobile learning is not about mobile and is not about learning “but [it is] part of a new mobile conception of society” (Traxler, 2009a, p. 14). Mobile technologies are changing the nature of knowledge which in turn alters the way of learning and instructing (Traxler, 2009a).

A rather complex multi-factored definition of mobile learning that tries to integrate all these different perspectives on the term has been given by Laouris and Yiannis (2005) who describe mobile learning with an equation consisting of different variables and by Koole (2009) with her FRAME-model of mobile learning.

Laouris and Yiannis aim at coming to a systematically complete definition of mobile learning consisting of many different parameters that interact with each other. They formulated the following equation:

$$\text{Mobile learning} = f\{t, s, LE, c, IT, MM, m\}$$

Thus mobile learning is the function of these different parameters while *t* stands for *time* – mobile learning time can be continuous in contrast to previous paradigms of learning where learning only took place in specific locations such as the class room, *s* stand for *space* – space in mobile learning has no constraints anymore and might even refer to the virtual space. By *LE* the authors mean the *learning environment*, which is shaped by the available technology, the presence of available services such as agents, facilitators or coaches, and by *c* the *content* which is now organised in a completely different way, from outside it may seem as the learner follows quite a chaotic pattern shifting from topic to topic. The parameter *IT* points to *technology*. It comprises all different kinds of mobile devices and the infrastructure supporting its functioning such as antennas, etc. *MM* refers to *mental*, the mental abilities of the learner, his or her prior knowledge, preferences, basically the learner’s characteristics and *m* to *method*, as conglomerate of different approaches how to deliver and interact with content, from pedagogy to philosophy as well as technical methods of presentation. The methods used should be tailored to the

type of learning experience and the particular moment of learning. Beyond the definition of the term mobile learning the equation presented by the author seems to imply design principles for mobile learning applications.

The FRAME (Framework for the Rational Analysis of Mobile Education) model is also more than a pure definition of mobile learning, it is also a framework for analysis of existing mobile learning applications or for development of new ones that could be used in the concerning evaluation. Nevertheless it allows for considering all elements of mobile learning at the same time and thus to characterise mobile learning.

In the model the main elements are the device (D), the learner (L) and social aspects (S). As displayed in Figure 5 the overlaps between the three main aspects result into more aspects: the device usability (DL) as intersection between the learner and the device; social technology aspect (DS) as overlap of device and social aspects; interaction design (LS) as result of a combination of learner and social aspects and finally mobile learning (DLS) as combination of all three main aspects in the centre of the Venn diagram as ideal case of a mobile learning application where all elements are considered during the development.

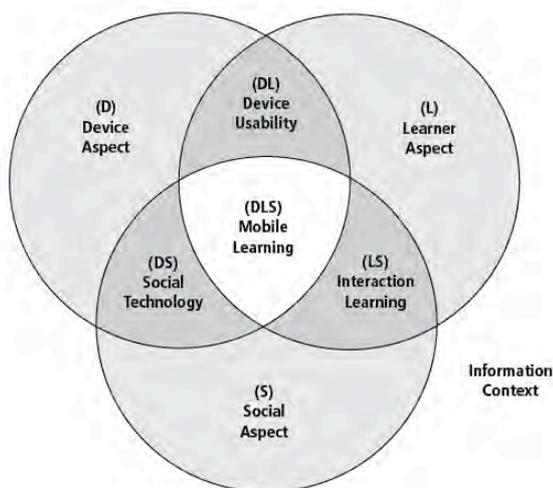


Figure 5: Frame model (Koole, 2009, p. 27)

The device aspect comprises the technical, physical and functional characteristics of the device such as input and output capabilities as well as other hardware and software components. The device usability intersection bridges the needs from the learner's side and the hardware and software characteristics of the mobile device. "Highly portable, intuitive, and transparent devices can help to reduce cognitive load and increase task completion rates because the learner can concentrate on the tasks rather than the tools" as Koole describes (p. 54).

By learner aspect Koole means the characteristics of the learners such as their cognitive capabilities, their prior knowledge as well as their motivation. The interaction learning intersection (LS) represents a synthesis of learning and instructional theories; it relies upon the philosophy of social constructivism which claims that learning is "collaborative with meaning negotiated from multiple aspects" (Koole, 2009; Smith & Ragan, 1999).

The social aspect takes into account all physical or virtual interactions and cooperation. In the intersection with the device aspects social technology describes how the technology can be used to allow for communication, for instance via text messages or the Internet.

4.1.1. Related terms

As previously mentioned, some researchers criticise that mobile learning is ill-defined. Also, it can be noted in the mobile learning discourse that other terms are used almost interchangeably with mobile learning or have an overlapping meaning. There exists a range of terms: mobile education, m-learning, mlearning that are close to the original term (Masters, 2008).

Ubiquitous learning and computing, for instance, is also used for mobile learning applications in that sense that the application is part of the everyday environment and the interaction with the technology is available wherever the user needs it (Weiser, 1991; Weiser, Gold, & Brown, 1999; cited after Liu et al., 2003;). "Augmented learning" is another term used in this context. Price (2007; cited after Kress & Pachler, 2007) expresses the potential of (mobile) technologies to link and to interact with the physical world as "augmentation".

Polsani (2003) finds the terms "mobile learning" too restricted since it seems to point to a technology or to a delivery format. Instead he proposes the term

“networked learning” as a form of education whose site of production, circulation, and consumption is the network.

Hug and Friesen (2009) have coined the term “microlearning” which in fact spans more than solely mobile learning since it refers not only to learning via portable devices but also to learning via different media such as television, radio, the Internet and others. With this term the authors want to take into account the fragmentation of learning via these tools. Both in terms of content as in terms of time this kind of learning is microscopic compared to other kinds of learning. Learning takes place in minutes or even seconds instead of learning on a meso- or macro-level with hours, days or months of learning. Content consist of small units and rather narrow topics with which the learner engages in “small but conscious steps” (p. 4) and the technology to transport the content is increasingly portable instead of monolithic systems.

However, all these terms are not as widely accepted as “mobile learning” by the scientific community and it is the most frequent to be found in scientific reviews.

4.1.2. Characteristics of mobile learning

As divers the definitions of mobile learning may seem the most share some characteristics that obviously have been influenced by these different trends of defining and conceptualising mobile learning.

In the tradition of the techno-centric definition of mobile learning Keegan (2005) characterises it as follows: “One of the characteristics of mobile learning is that it uses devices which citizens are used to carrying everywhere with them, which they regard as friendly and personal devices, which are cheap and easy to use, which they use constantly in all walks of life and in a variety of different settings, except education” (p. 3).

When compared to e-learning many differences are found (c.f. Laouris & Yiannis, 2005; Motiwalla, 2007; Sharma & Kitchens, 2004; Traxler, 2009a).

E-learning is more text- and graphic based while mobile learning uses voice, graphic and animation based instruction in the first place. Compared to mobile learning e-learning is much more tethered: It takes place in the classroom or the internet lab in contrast to mobile learning happening in the field or while mobile. Thus, e-learning is bound to a specific location (which implies travel time to

reach the location) while for mobile learning there are no geographic boundaries. In terms of communication in e-learning settings communication is more time-delayed and asynchronous (e.g. email) versus interactive and spontaneous communication in mobile learning. Finally, e-learning is more formal and mobile learning rather informal learning.

Kukulska-Hulme (2007) describes mobile learning as “frequently interrupted or fragmented, may be highly context-dependent, and [that] takes place in physical environments that may be far from ideal” (p. 3). Personal, spontaneous, opportunistic, informal, pervasive, contextual, private, bite-sized, portable and situated, “noisy” are more adjectives used to describe mobile learning (Traxler, 2007). Sharples (2009) finds that mobile learning may be mobile but not necessarily. According to him mobile learning may be extended and interleaved and it may involve a variety of personal and institutional technologies. Mobile learning is a complex and yet little understood phenomenon that “crosses traditional boundaries of public and private spaces” (Pachler, Cook, & Bradley, 2009, p. 80) and it is inextricably bound to the learner’s life world. It is neither sequential nor consistent (van’t Hooft, 2009).

4.1.2.1. Advantages and disadvantages of mobile learning

Probably the best way to describe and characterise mobile learning is to find arguments speaking for and against mobile learning that have been discussed in literature. After all, we should and could ask the question whether mobile learning is worth exploring as educational resource and instrument or if it is just about fascination by technology that drives the researchers and the pedagogues.

As in all innovations the discussion about introducing new tools to (formal) education can get highly political.

Physical attributes of the mobile device

Mobile devices are part of everyday cultural resources; they have shaped communication patterns as well as other (social) aspects of life (Bachmair, Pachler, & Cook, 2009). As Inkpen (1999) noted, handheld devices are already integrated in the child’s world, they have become a part of their culture. They fit

naturally in the learning environment (Shuler, 2009) as mobile devices are able to overcome many issues associated with larger technologies. Studies show that mobile devices can be more easily integrated than desktop computers (Moseley & Higgins, 1999). Thus, the device could constitute a “cultural resource outside school and a learning resource within” (p. 29).

The following attributes are associated with mobile devices:

Multi-functionality, multimodality and technical convergence: With the evolution of mobile technology devices have become multifunctional, combining features of originally different technologies, for instance, a built-in camera, an MP3-Player, a navigation tool, access to the Internet, etc. Today, conventional mobile devices can store a vast amount of information (Kim et al., 2008). These different features and functionalities might all be used when developing a mobile learning application enabling a multi-faceted and multi-modal (Kress & Pachler, 2007) and multisensorial (Nyíri, 2002) learning experience whose potential is not yet explored (New Media Consortium, 2007).

Usability: Mobile devices are easy to handle and to manipulate, so that an instruction booklet is not even necessary (Figg & Burson, 2002; Graham, 1997; cited after Pieri & Diamantini, 2009; Steinberger, 2002) and do not require any training (Nyíri, 2003). Mobile phones are rather personally owned compared to other ICTs, thus users are familiar with this piece of technology (Kukulska-Hulme, 2007). However, even users who are not digital literate can easily access the network (Wang, Shen, Tong, Yang, & Han, 2005).

Connectivity to other devices and to networks is mentioned as educational affordance of mobile devices by Klopfer and Squire (2008).

Flexibility and portability: Compared to other ICTs mobile devices are rather small in size and thus, are brought everywhere. Also, resources can be easily modified and adapted to individual preferences (Kress & Pachler, 2007).

Nonlinearity: Hyperlinking materials allows for combining different unrelated as well as related documents (Kress & Pachler, 2007).

Ubiquity: Mobile devices are ubiquitously used which for Weiser and Brown (1999) makes them “calm technologies” seamlessly embedded in

the world as to make them disappear (O'Malley & Fraser, 2006). They do not pre-occupy the learner's attention; the learner seamlessly switches from focusing on the device to having it at the periphery of attention.

Personalisation: Since mobile devices are personally owned as mentioned previously they can be personalised and adapted according to the own preferences and thus it enables to create a personal learning environment (PEL). "Just for me"-learning is a term used in this context.

In contrast to these fairly positive characteristics attributed to mobile technologies also concerns are expressed in various publications.

Research in mobile learning is a recent development and systematically gathered evaluation results are hardly available (cited after Ally, Schafer, Cheung, Rory, & Tin, 2007; Attewell, 2005; British Educational Communications Technology Agency, 2004; Keegan, 2002; Savill-Smith & Kent, 2003). First results show limitations of the device such as the rather small screen size, the limited processing power and memory capacity, incompatibility problems due to different operating systems and differing input devices. For instance, entering a large amount of text is impractical and is a particular challenge for left-handed persons as input devices are often designed for dexterity (Shuler, 2009).

They are not powerful enough and are therefore often used in combination with other tools in order to make use of the full range of possibilities (Ng, Nicholas, Norman, & Pearce, 2007). The reason for poorly designed mobile technologies is that they were not designed for educational purposes as Traxler (2007) explains:

...hardware devices and technical systems are all without exception designed, manufactured, and marketed for corporate, retail, and recreational users. Any educational uses of the devices and the systems are necessarily parasitic and secondary. Therefore, conceptualisations of mobile learning are also constrained by the distorting nature of the technologies and the devices (p. 6).

Physical aspects of the device thus on the one hand limit the potential of mobile learning and on the other hand may provide an optimal learner experience.

Costs

Because the acquisition costs are small in comparison with desktop computers it would be much easier for an institution to provide all their pupils with a mobile phone (Thomas, Schott, & Kambouri, 2004). However, the price does not differ to a great extent from a net-book anymore. Accessing the Internet via phone used to be quite expensive (Mayorga-Toledano & Fernández-Morales, 2004) but costs are continually dropping since smart phones that enable user to access the Internet are increasingly widespread and providers are obviously interested to allow their clients to access the Internet from their phones. Several studies suggest that participants are not willing to spend their own credit for mobile learning purposes, for example, to send text messages (c.f. Lee, 2006; Kukulska-Hulme, 2007). Especially children and youngsters have pay-as-you-go card and no contracts that often imply all-inclusive packages.

The question in studies as well as in implementations in educational institutions always remains who bears the costs for the acquisition and for the credit to spend. Also, it has to be taken into account whether the participants' own mobile phones are used (which makes support a challenge and comparability of study results impossible) or whether they should be deployed with another phone (with the disadvantage that they have a "educational mobile phone" or "research mobile phones" additionally to their private phones).

Time/efficiency

Time that is spent on-the-way, waiting on a bus or while travelling in the underground, can be used for mobile learning activities and thus used more effectively and efficiently. For instance, Prieri and Diamantini (2009) find: "any moment which would otherwise be "wasted", or that before now could not be enriched with didactic contents, has now become a potential learning moment thanks to mobile learning" (p. 184). Since the society becomes increasingly mobile much time is spent on-the-move which could be used for mobile learning activities and thus constitute a source of productivity (Wagner, 2008). Cardinali (2006) has noted that the nomadic learner is no exception anymore.

Students can use their travel time to the educational institution to get prepared for the lessons ahead, while employees can use dead-time to further qualify themselves. Learners and future employees need to persist in a competitive

world and thus ask for innovative solutions to efficiently support their learning. M-learning is one step into this direction (Abernathy, 2001). Mobile devices may help to combine work studying and leisure time in a meaningful way (Turunen, Syvänen, & Ahonen, 2003).

However, this argumentation does not take into account that learners need breaks between different learning phases. Also, when learning takes place all the time and everywhere the borders between free-time and learning time slightly diminish.

These rather short periods of learning are fragmented and easily to be disturbed. Some researchers ask the reasonable question what effect this fragmented learning will have on the learner's concentration and their learning ability and go even further by asking whether it is plausible that an increase of attention deficit disorders might be caused or at least partly called forth by the use of ICTs that are accessed at the same time or run stand-by during other activities in a multi-tasking way.

Learning characteristics

Mobile learning is associated with different ways of learning which are enhanced by this new approach or even made possible because of mobile learning applications.

As Prensky (2005, p. 2) put it as follows:

...among the most frequent, time-tested, and effective of these [ways of learning] are listening, observing, imitating, questioning, reflecting, trying, estimating, predicting, speculating, and practicing. All of these learning processes can be supported through cell phones. In addition, cell phones complement the short-burst, casual, multitasking style of today's "Digital Native" learners.

In this context there is talk of constructive learning, collaborative learning, informal and life-long learning, situated learning or just-in-time learning. The latter allows learners to find information and learn what they want and need at the very moment as they have constant access to their mobile device. This situated learning may arise from practical tasks. This seems more convincing than learning at a time and applying it only (much) later (Ally, 2009a). In contrast, computers which are not "ready at hand" will have little impact on learning since they are not used in a "day-in, day-out" manner (Soloway et al., 2002; cited after Ng et al., 2007).

Constructive learning allows the learners to actively construct ideas and concepts. This approach is not only associated with mobile learning but also with all other forms of technology enhanced learning. This has drastically changed pedagogy inside and outside of classrooms from a hierarchical perspective of knowledge delivery (teacher to student) to a perspective where the teacher acts rather as coach supporting the learner's activity.

Mobile learning allows for culturally sensitive and authentic learning experiences (Koole, 2009) as clues may complement the already available information and context-aware applications might complete the picture (Gregson & Jordaan, 2009). Collaborative learning is fostered as mobile devices are used to coordinate activities without replacing face-to-face contact and tasks are also often conceptualised for a group of learners. But also autonomous learning is encouraged by mobile education (Luckin, Brewster, Pearce, Siddons-Corby, & du Boulay, 2004) as students can learn self-paced and according their own preferences and the structure of their learning (Dawabi, Wessner, & Neuhold, 2004) which allows for "unique scaffolding" (Peters, 2009).

Given that mobile learning activities take place outside dedicated learning environments it contributes to life-long learning and may be perceived as informal learning activity. According to Baumgartner (2008), structural changes in educational requirements as well as demographic developments demand for measures outside of formal educational settings whereby lifelong learning has gained importance.

Also the cognitive load of the learners is reduced in well-implemented mobile education which "can potentially help learners to retain, retrieve, and transfer information when needed" (p. 41). Not only the devices can be personalised but also the mobile learning process can be customised to the needs of the learner as well as the space where the process takes place (Benedek, 2007) and thus allow for a personalised learning experience (Shuler, 2009). This may help to bridge the "gap between different learning styles and learning abilities" (Laouris & Laouri, 2008, p. 261).

However, as in all forms of self-paced and self-regulated learning self-discipline, the ability to reflect and meta-skills about how to learn are prerequisites (Syvänen, Pehkonen, & Turunen, 2004). The fragmentation of the mobile

learning process is another issue to be faced. Learning in a mobile environment occurs by definition often on-the-way and thus is often disrupted and unexpected. The question was raised whether this kind of learning formed a strong basis for mobile learning (Leino, Turunen, Ahonen, & Levonen, 2002; cited after Syvänen et al., 2004). Fragmentation can happen because of conditions in the surrounding (e.g. noise) or in the learner (e.g. concentration) or technical problems (e.g. connectivity).

Also one could pose the question how mobile learning differs from other ways of accessing information-on-the-go.

Learning outcomes/skills

Learning at different locations and context sensitive learning where the environment is part of that learning may enhance encoding and recall as known from psychological studies.

Also, learning with technologies trains ICT-skills at the same time that are crucial skills today in highly competitive employment market where a big proportion of work places require at least basic digital literacy. Similarly, “Sesame Street” has proven some decades ago that the exposure and consumption of learning mediated by media can accelerate learner’s skills while producing economic benefit to society at the same time (Shuler, 2009). As Shuler (2009) further argues mobile technologies help to “level playing field” enabling digital equity and beyond that, even more important in her perception, mobile technologies have the potential “to advance 21st-century skills such as collaboration, communication, and global awareness” (p. 19). Cochrane (2009), who conducted mobile learning projects in tertiary education, observed that learning outcomes for students from mobile learning are: development of critical thinking skills and group communication skills, development of potentially world-wide peers support and support network and finally learning how to maximise technology to enhance their learning experience across various contexts.

Location

Mobile learners can learn wherever they are physically and through their mobile devices they can also virtually access distant locations (Koole, 2009). Since

nowadays it is possible through most mobile phones to access the Internet, endless learning resources can be accessed from anywhere.

What makes mobile learning special in comparison to other forms of technology enhanced learning is that the location of the learner can be integrated into the learning process and complement the learner's experience in a certain location. For instance, in a museum, a visitor may access multi-media information on a mobile device via geo-positioning systems in addition to the exhibits. Location awareness can be used to tailor new pedagogical approaches that allow for situated learning that otherwise would be very difficult to achieve (Traxler, 2009b). Outdoor activities are made possible with portable devices where learning processes and outcomes may be recorded and stored for a later retrieval, for example in classrooms. Among other educational affordances that mobile devices offer, Klopfer and Squire (2008) argue that this unique context sensitivity allows for gathering data unique to the current location and environment, either real or simulated data.

Continuity

Anywhere and anytime learning implies a certain continuity of the learning process. Learning is not bound to a certain location as the classroom or home; instead learning does not have any physical or timely limitation but is embedded in every day-life and environment (Vavoula & Karagiannidis, 2005). Resources stored on the device maybe accessed anywhere and anytime.

Learning anywhere enables "continuity between institutional learning and learning from real-world phenomena outside school hours" (Syvänen et al., 2004, p. 157) and thus between formal and informal learning.

Also ideas or observations can be collected and documented the very moment they are born (Thomas et al., 2004): they can be stored as video or audio file, as note, can be sent to another person or uploaded to an Internet platform. As Sharples (2007) notes: "One major opportunity is to support a person through a lifetime of learning, providing young children with tools to capture and organise their everyday experiences, to create and share images of their world, and to probe and explore their surroundings" (p. 15-16).

Shuler (2009) points out that particularly for children it is important to align their learning with current situations, scenarios, and environments as to more easily

remember and transfer basic concepts or also vocabulary. Just-in-time-learning, when learners are able to apply it, and on demand learning, when learners need and want particular information, is more effective according to Shore (2008; cited after Shuler, 2009). Children are often quite impatient when they want to know certain things; they lose their interest after a while and forget what they wanted to know. It may be seen as an advantage of mobile learners to be able to answer their inquiries right away.

Thus mobile devices as learning tools offer continuity across locations and time in terms of instant access but also even in terms of a whole life-time.

On the one hand, mobile learning offers continuity but on the other hand the different spheres of life such as work, spare time, school, etc. are blurred and this requires from the learner to be able to deal with this increasing blur of boundaries (Kondor, 2006).

Communication

The aspect of communication is obviously one of the most evident functions of mobile devices such as mobile phones. In mobile learning pedagogy this fact is often reflected in the design of a specific task. As mobile phones enhance communication over distance and time, in terms of asynchronous communication via text messages, etc., and synchronous communication as calls, collaborative learning and working are made possible with this kind of technology enhanced learning tool. Exchange can be recorded and analysed at a later stage, also communication can occur multi-directional or mono-directional, i.e. directed at several persons or one person (Kress & Pachler, 2007).

In fact, the mobile phone as communication device supports the exchange with others and has no boundaries like in face-to-face communication (Nyíri, 2002).

Also Klopfer and Squire (2008) underline the social interactivity aspect as one of its educational affordances mobile learning has to offer. The new technologies may even help to overcome cultural and communication barriers by offering different channels and ways of communication (Kukulska-Hulme, 2007).

In context with text-speak, i.e. texting slang and abbreviations, that has evolved in the last decade due to the increased use of text messages among young

people and the limited size of these messages, educators and parents fear that this new form of language might suppress “appropriate” language and thus introducing mobile learning applications might even foster this slang and have a negative impact on the children’s’ writing skills.

Acceptance by learners and by educational staff

The introduction of mobile devices as educational tools is twofold if it comes to acceptance by learners and by educational staff in formal education: students are often fascinated by the new technology and expect edutainment, i.e. a mixture of education and entertainment.

As many pilot studies indicate learning with a mobile device is enjoyable for students (Prensky, 2001; Savill-Smith & Kent, 2003; Schwabe & Göth, 2005; Seppälä & Alamäki, 2003) and may increase participation (Dawabi et al., 2004). Mobile learning applications can be applied to a wide age range of students (c.f. Inkpen, 1999; Sharples, Corlett, & Westmancott, 2002; Soloway et al., 2002), applications range from kindergarten children to mature people with Alzheimer syndrome. Kukulska et al. (2007) mention similar advantages: “mobile learning has considerable attractions in terms of delivering learning in ways that will increase inclusion, widen participation and improve efficiency, flexibility and access” (p. 54).

In a survey conducted among students and teachers benefits of face-to-face education, online education and mobile education in particular were compared: Students favoured mobile learning applications (Sharma & Kitchens, 2004) as they found it to be more communication-rich and effective in contrast to teachers who missed the social component of face-to-face interaction and found virtual education also more demanding.

Among students the lack of confidence to use this new kind of technology does not seem to play a role compared to static devices as most of them have experience in using mobile devices (Jones, Issroff, & Scanlon, 2007).

However, in some pilot studies the participation in mobile learning activities declined after an initial exploration phase once the fascination by the new technology decreases. This fascination may be induced by parts of society, particularly policy makers, who to a large extent are motivated “by a certain fascination, even fetishisation, of technology” (Kress & Pachler, 2007, p. 200).

If learners accept and desire mobile devices as enhancing tool in their education depends also on the accompanying costs whether they have to bear them or whether devices and data traffic are covered by an institution or in case of a research project by the respective project.

Teachers are often overstrained with the introduction of new technologies. Training units are required to enable the handling of the new device from a technical point of view. Beyond that also pedagogical training is needed to show the full potentials and the limitations of new technologies in education. There is a lack of experience of how to design meaningful mobile learning applications and content among educational staff and methods for learner support (Kukulska-Hulme & Pettit, 2007). The great diversity of mobile technologies constitutes a challenge for educators. Thus, if in a mobile learning setting students use their own mobile phones it is a challenge to design mobile learning applications that can be accessed by all.

Mobile devices vary to a great extent in terms of features and functions so that support is a challenge for educators.

Among other reasons, already existing time constraints are often mentioned by teachers as argument against the introduction of new tools. Another recurrent argument to be found are that teachers perceive mobile phones in the classroom rather as a tool for distraction from learning than as a tool to enhance learning (c.f. Shuler, 2009). It is not possible to control everything pupils do on their phones, so it could also be used for cheating. Thus, the use of mobile phones by pupils in classroom is often a “zone of conflict” between teachers and learners (Sharples, 2002). Whether the school should regulate the use of private mobile phones in the classroom is a hot issue in many institutions (Sharples et al., 2007). Teachers also fear that the devices might be used for other purposes than learning such as playing games, cheating, etc. (Mifsud, 2004).

Educators do also bring up the question whether mobile learning is useful after all, whether they students should be learning at a train station with all environmental distractions (Motiwalla, 2007).

Thus, educators are challenged in their fundamental principles of teaching. According to Prensky (2005) a high degree of flexibility of rethinking is required from their side.

Inclusion

One of the great advantages of mobile learning applications is the aspect of inclusion, in terms of geographically or socially hard-to reach populations, such as in rural areas or in developing countries, and in terms of a variety of different learner needs (Traxler, 2009d). Even people at the margin of society have access to mobile devices. Mobile learning applications are capable of reaching even the hardest and most disadvantaged audiences (Attewell, 2004). They do not require advanced ICT skills compared to other ICT tools and do not intimidate users (Nyíri, 2003) since they are familiar with the use of mobile devices. The tools are relatively low cost and thus affordable also in low-income communities (Shuler, 2009).

Also for learners with different needs mobile learning applications might be designed in a way to suit their needs, for instance, for learners with dyslexia (Traxler, 2009b).

Ethical considerations

On the one hand mobile devices are found to be inclusive and thus it would be probably unethical to use every tool in our hand to help bridging the digital divide. On the other hand there are clearly negative aspects of mobile learning and thus ethical considerations one should have in his or her mind when introducing mobile learning applications. For instance, unethical behaviour among participants or also by the ones to introduce the technology can be made possible through the device. Forms of violence or bullying, such as “happy slapping”, have evolved along the penetration of mobile devices among young people. When a person is filmed with a mobile built-in camera (sometimes also just an ordinary digital camera and afterwards the video clip is uploaded to a video sharing platforms) while she or he is victim of aggressive behaviour and this video is then shared across a community, this is known as “happy slapping”.

This form of cyber-bullying or sharing of other inappropriate content is difficult to prevent and to control.

Physical health concerns, i.e. the long-term impact of mobile phones radiations on personal health, are other issues that have not been completely eliminated

by reliable studies. For some children who have access to ICTs and medial tools such as computers or television introducing mobile devices as educational tools means increasing “screen time” which might already be prevalent in their lives.

Data privacy is another concern that also relates to research as in evaluation processes of mobile learning applications an intrusion in a private sphere of a learner may occur, for instance, when log data are taken into account. In terms of privacy educational institutions might fear that assessment data or other confidential data could leak onto the students’ personal devices.

Research

While research in mobile learning has been very convincing, results from long-term studies or results beyond in terms-of-time and sample constrained research projects are hardly available. Also it is argued, that a theory of mobile learning, that informs the pedagogy of mobile learning and regulates effective assessment or the design of new applications, has still not been established in the mobile learning community.

4.2. The history of mobile learning

As previously mentioned the term “mobile learning” is a rather young term and has only evolved in the last decade. Different traditions in defining the term do nevertheless exist and these definitions have clearly been shaped by different disciplines.

Depending on the constraints of the term it could be argued, however, that mobile learning is not innovative as a new concept per se if, for instance, it is not defined in relation to a specific technology. Further it could be argued, that mobile learning exists at least since the invention of letterpress. Lecture books could be brought everywhere and could be accessed anytime which constitute two core characteristics of mobile learning.

However, mobile learning in a more constraint understanding of the term has only evolved in the past twenty years. In fact, the first publications were

available in the late 1990s and the first conference on mobile learning, with the name “World Conference on Mobile Learning” or “mLearn” was only held in 2001. The foundations nevertheless have been laid earlier. For instance, Sharples (2007) points to the Xerox Dynabook project that already in 1972 proposed a “self-contained knowledge manipulator in a portable package the size and shape of an ordinary notebook” which would allow children to explore, create and share dynamic games and simulations (Kay, 1972; cited after Sharples et al., 2007).

If following Prenky’s and Keegan’s arguments mobile learning has happened as a logical consequence of the technological development and as a further step after other forms of technology-enhanced learning such as e-learning. Educators started early to use computers for education purposes although they have not been specifically developed for this purpose. If one bears in mind that computing power has increased dramatically in the past thirty years and current mobile phones exceed computers of older generations by far it is more than obvious that these technological tools could be used for education as computers have served this purpose too. To understand the rapid technological evolution Prensky (2005) compares the processing power of today’s high-end mobile phones with personal computers of the late 1990s. In fact, they have the same computing power but do need only one one-hundredth of the energy. Even the simplest mobile phone with voice-only functions has more computing power than the on-board computer installed in the spaceship that landed on the moon in 1969. Thus, according to Prensky, people have a very capable computer in their hands; only they do not realise this as they call this device something else.

Keegan (2002) compares the evolution stages from distance learning, d-learning, to e-learning to m-learning with stages of development from the Industrial Revolution in the 18th and 19th century, to the Electronic Revolution of the 1980s and Wireless Revolution of the last years of the 20th century. According to Keegan there has never been a technology that has penetrated the world with the depth and the rapidity of that of mobile telephony.

Since this rapid advancements in processing power, memory, connectivity of mobile phones (Kim, 2009) as well as the convergence of telephony, computer, and broadcasting functions (Wagner, 2008) media richness, ubiquitous access

and personalised settings have been made possible which laid the ground for the evolution of mobile learning concepts. The mobile phone has replaced the personal computer such as in Japan, where young people see no reason why they would need a computer if they have a mobile phone instead (Johnson, Levine, & Smith, 2009).

Programmed instruction dates back to Skinner to the 1950s, one of the most influential learning theorists of the 20th century, who developed the so-called teaching machine. This machine housed a set of questions and a mechanism through which learners could answer and in case the answer was correct got rewarded. Skinner developed this machine to overcome serious problems of the educational system: he found that the reinforcement was aversive; they were used too long after response, and were provided infrequently. Thus, he proposed that this machine could partly replace teachers. Although this proposal seems out-of-range in times of e-learning and mobile learning some of his thought have been absorbed in the development of distance education, e-learning and mobile learning.

Research in mobile learning, its methodologies, tools, frameworks have been borrowed and strongly influenced by other research fields, such as Technology-Enhanced Learning and Mobile Human-Computer interaction (Vavoula & Sharples, 2009).

Since the point of departure for mobile learning was e-learning Traxler (2009b) argues that mobile learning offers “refer back to ‘conventional’ e-learning and perhaps this is the mark of early ‘mobile learning immigrants’ and not the mark of the growing number of ‘mobile learning natives’ (p. 1).

Some of the first mobile learning projects were not very encouraging since the technological constraints such as the quite narrow mobile phone displays seemed not to be sufficiently engaging for the learners (e.g. Regan, 2001; cited after Noessel, 2004). Also, these early innovations were desktop-based and only in the past ten years mobile learning has been developed in diverse fields such as in educational institutions, museums, or work places (Sharples et al., 2007).

For several years in the field of mobile learning there were only small scale projects available (Traxler, 2004) exploring new approaches and testing the technical feasibility. However, in recent years mobile learning has slowly moved

from small scale to large scale implementations where whole educational institutions make use of mobile learning applications (Arrigo et al., 2007). The number of mobile learning projects and applications is expected to increase also in the future. For instance, third-party applications are easy to acquire and inexpensive and cover a wide range of learning activities such as calculating, reading material, tools for measuring, etc. From the launch of the App Store for the Apple iPhone in less than six months 10,000 of these applications were available (Johnson et al., 2009). Although these applications do not only allow for learning activities and third-party applications are only one part of potential learning applications on a mobile phone, the example may illustrate that an increase of mobile learning offers is most likely.

Stoica et al. (Stoica, Komis, Karalis, & Baron, 2009) has proposed three phases for the introduction of technologies into education: innovation, incitation and prescription. In the first phase researchers invent new possible educational instruments; applied to the context of mobile learning in this stage the focus was on the mobile device and the learners, theories of mobile learning and contexts. In the second phase, new technologies are developed and diffused, that is in the mobile learning field the design of different applications. Finally, in the third phase, the instruments have already been established as valuable education resources and are mentioned in educational programmes. The cited authors argue that mobile learning is currently struggling between the second and the final stage. In this final stage a “new level of maturity” to the mobile learning landscape would be added by creating an evaluation framework.

4.3. Status quo of mobile learning

The aim of the previous chapter was to describe the evolution of the field of mobile learning practices, from the very beginning in the 1990s until nowadays. In this chapter the actual status quo will be analysed to understand where mobile learning as research field but also as approach of pedagogical practice stands at. So far, the mobile learning field seems still under development, still at the stage before a formal recognition by educational institutions as well as and a sound pedagogical approach are established. Also, many open issues still need to be solved including a sound theory of mobile learning (c.f. chapter 5)

and tools for evaluation for proof of concept as well as ethical issues to consider.

Everett Rogers (2008) differentiates between different phases of innovation when analysing the diffusion of innovation after its introduction. Rogers defined diffusion as a process by which “an innovation is communicated through certain channels over time among the members of a social system” (1983, p. 5). The adoption process starts with (1) knowledge: individuals are exposed to the innovation but lack information. The consecutive second stage Rogers names as (2) persuasion: the individual starts to get interested in the particular innovation and starts to seek actively for information. In the third phase (3), the decision phase, the individual contrasts advantages and disadvantages of the innovation against each other and decides whether to adopt or to reject the innovation. In the (4) implementation stage, the individual adopts the innovation to a varying degree depending on conditions that determine the usefulness of the innovation. In the final fifth stage (5) the individual decides whether to use the innovation any further to benefit from the whole potential of the innovation.

Similarly to these different phases of innovation diffusion Rogers also distinguished between different groups of people regarding their adoption of the innovation.

These adopter categories are innovators, early adopters, early majority, late majority and laggards.

As illustrated in Figure 6, innovators are the smallest proportion and are the first to adopt the innovation. The innovators are in average relatively young and come from high social class. The early adopters are the successors; they are opinion leaders among other adoption categories, in average they have higher socio-economic and educational background compared to the late adopters. The early majority has some opinion leaders among them, is in contact with the early adopters, and have an average social status. Then the late majority follows to adopt the innovation. They show a high level of scepticism, are financially not as liquid and have lower educational degrees. Finally, the laggards are the latest to adopt the innovation, they have no opinionship, are averse to changes and are in average the oldest segment among these adopter categories.

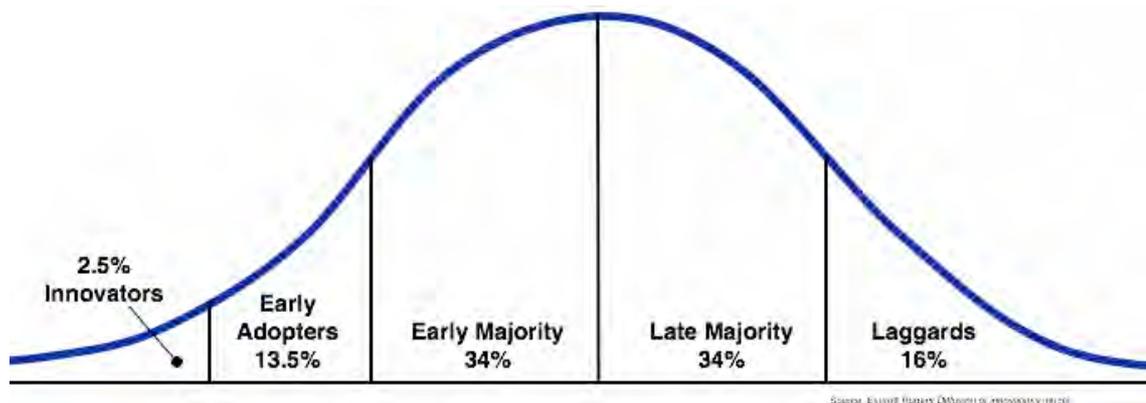


Figure 6: Diffusion of innovations

When Roger's model is applied to the field of mobile learning Masters (2008) concludes that mobile learning had been used and researched only by innovators and at the best by early adopters until then. His analysis is based on a systematic literature review of surveys detailing the use of mobile learning beyond pilot and project phase with the result that no articles were found. According to him "m-learning is not yet part of the mainstream educational media, and is still struggling to establish itself" (p. 5794).

This view is shared by many researchers who claim that mobile learning is still at a stage of small-scale projects (Traxler, 2004). Most of these small-scale projects are to be found in developed countries, including Europe, North America and the Pacific Rim (Traxler, 2009b).

In 2002 Keegan found that the fields of education and training had not acquired new technologies such as wireless services that had already been adopted by various applications, from refrigerators, business and intelligent houses, nor did he find anything to be planned ahead (Keegan, 2002). Kukulska-Hulme et al. (2007) see the associated costs for text messages or web access as well as usability as the major hindering factors for the uptake of mobile learning into large-scale implementations.

Tatnall et al. (2003) have used the Actor Network Theory by Latour (2005) to investigate the difficulties in adopting mobile learning in educational institutions. Following this theory humans and technology both are conceived as actors with agency and the inherent difficulties in its adoption are more caused by complex interactions within the organisations than by characteristics of the innovation itself.

The mobile learning field is a young research field and as such it is highly opportunistic and technology driven, the aims lie more in producing solutions and less attention is given to research methods (Wingkvist & Ericsson, 2009). Only a few studies have been theoretically based. Still in 2009, a shared opinion across the scientific community in the field is that insufficient work has focussed on the scientific underpinning (Traxler, 2009b). Work does not find its way into scientific publishing, i.e. journal articles but the scientific community is rather present at conferences specifically dedicated to the field of mobile learning.

However, mobile learning might be immature in its theoretical foundation and its tools, but the field is changing and evolving rapidly (Traxler, 2007). The Horizon report (Johnson et al., 2009) draws a rather optimistic picture: “In a marketplace that turns out 1.2 billion new phones each year, innovation is fluid and ever-present” (p. 8) and the “variety and quality of educational content is growing at a fantastic pace” (p. 9). In countries such as Japan, the mobile phone or other mobile devices are used for a variety of purposes beyond the usual functionalities, for instance, to read e-book or also to collaboratively write on m-novels. One might argue that it is only a matter of time until this innovation is adopted in other countries as well. Learning on mobile devices has already become part of our learning culture to some extent as the study by Vavoula (2005) showed who found that 52% of all learning episodes involved at least one piece of technology including mobile devices.

Similarly, the eLearning Guild, a community of practice for designers, developers, and managers of e-Learning noted that in the Guild’s member database the instructional modalities used by the members included mobile learning in 17.3% of all cases (Wexler, Brown, Metcalf, Rogers, & Wagner, 2008).

Statistics on the penetration of mobile devices in many countries such as the United Kingdom, Italy, Sweden and many more show that these are already above 100% which means that in average people have more than one mobile phone (Prensky, 2005). Thus, opposed to earlier arguments mobile devices and the associated “maintenance” seem affordable. Several facts indicate that mobile learning is gradually moving from small-scale to large-scale implementation as mobile devices are not geographically bound anymore to

specific countries but are to be found also in the developing world and mobile learning offers are increasingly diversified.

4.4. Practices of mobile learning

An analysis of already developed and realised practices of mobile learning applications to further understand the status quo of mobile learning is the main focus of this chapter.

There is an extensive number of examples for mobile learning applications at different stages, from an exploratory proof-of-concept-stage to a formal introduction into an institution, available. Therefore many different kinds of practices are described in academic literature as well as in research reports or conference papers that differ in its aim, in its target group, or in its technical realisation.

Several researchers (Johnson et al., 2009; Motiwalla, 2007; Patten, Arnedillo Sanchez, & Tangney, 2006; Shuler, 2009; Traxler, 2009a) have systematically analysed available mobile learning practices and applications to come to different categories of mobile learning. However, these categories of practices vary and thus within this analysis the categories have been contrasted against each other and complemented with each other where possible. Furthermore, recent practices that have not been taken into account by these researchers have been added to this synthesised overview.

For each evolved category at least one example shall be given where possible.

Collaborative applications

These encourage for knowledge sharing or collaborative problem solving, exchange of ideas, etc. inspired by collaborative learning principles. This includes any application that involves a number of learners at synchronous or asynchronous time that allows for synergies between the different learners at different locations.

Staudt and His (1999) describe using handheld devices to share information during collaborative tasks.

The “CatchBob!” project, coordinated by the Swiss Federal Institute of Technology of Lausanne (Nova, Girardin, Molinari, & Dillenbourg, 2006), aimed at studying how the perception of space and places impact on collaborative learning processes.

Location aware applications

These kinds of applications make use of the location of the learner, the application either complements the psychical location with information and multi-media content or information of the physical location is automatically or manually recorded in the device and feeds back into a learning resource. The contextualised information allows learners to interact directly with their environment.

For example, in a museum visitors are handed a mobile phone with a geo-positioning system. Whenever they enter a room in this museum they get specific multi-media content on their mobile phone that gives them some additional information on the exhibition or background information on the life of the exposed artist’s work.

Data collection applications

These applications make use of the device’s ability to record data in different formats, such as text, images, videos or audios.

For instance, for a geography class a pupil with his or her mobile phone might collect data in a forest, record noises, make pictures of specific trees and send all this information via MMS to the classroom platform where it is uploaded and serves as documentation material for later discussion in the classroom.

Another example for this kind of mobile learning practices is “MapTribe”, a software that can be installed on a mobile device and can then be used to detect at which locations other users are and to add and share objects indicated on a map (Cherubini & Nova, 2004).

Referential applications

These make use of different referential resources such as dictionaries, translators, e-books, concept maps which can be accessed via the mobile device.

For instance, on excursions students can access the online wikipedia on their mobile phone to get some additional information.

Administrative applications

These include scheduling functions, altering and reminding functions, calendars, learning organisers or information storage on the device such as short notes.

Administrative applications have been used in numerous projects, for example, to remind students to attend the upcoming lecture or to schedule an exam, etc.

Interactive applications

This kind of applications allows the user to interact with the application, after the input of some specific information the learners obtains feedback on his/her device which helps in the learning process.

For instance, multiple choice quizzes provided on mobile devices may serve as example for this category.

Microworld applications

These model real world domains to enable the learner to practice in a constrained version in form of a learning scenario, i.e. simulations and modelling tools, e.g. to explore geometric concepts within the context of a billiard game.

Personalised applications

Personalised applications present material in a way that is adapted to the skills and preferences of the specific person. For instance, persons might choose to get RSS feeds that meet their interests from a specific service.

Connected applications

This kind of applications needs other technological devices to interact with such as a desktop computer or an electronic blackboard.

4.4.1.1. Disciplines and branches of mobile learning

In terms of disciplines, topics and explored themes that have made use of mobile learning applications there is a great variety.

These range from language learning to music:

Language learning

As Kim (2009) states the development of mobile technologies “has opened up a huge array of possibilities for the domain of literacy development and language learning” (p. 417). For teaching pronunciation and listening skills mobile devices seem to be very suitable and have been successfully introduced to language learners (Uther, Zipitria, Uther, & Singh, 2005). In Japan companies offer short English or Japanese lessons when dialling a certain number (McNicol, 2004). SMS functions have been used for vocabulary learning or text blogs for training writing ability, mobile wikis for group discussions and podcasts for listening training (Wang & Higgins, 2008). The project iRead at the Escondido Union School District (USA) uses iPods and other voice recorders to make pupils record their own voices while reading and listening to it afterwards to improve reading skills and comprehension.

The International Children’s Digital Library (ICDL), the largest collection of children’s literature available on the Internet, released an iPhone application to access and read these stories free of charge.

The project “Learning Letters with Elmo”, funded by the US Department of Education, aimed at enhancing literacy skills of children by encouraging parents to engage their children in daily literacy-learning based on a mobile intervention. Text messages were sent out regularly to parents as well as audio messages to parents and children. These messages suggested activities in the real-world to engage the children in learning letters.

Numerous studies and projects have explored this possibility to enhance language learning in formal as in informal literacy development. However, the majority of these projects are limited to an experimental stage.

Computer science

For instance, at Clemson University in South Carolina, USA, computer science students are developing tools with a pedagogical and social focus for mobile devices (Johnson et al., 2009).

Mathematics

In the Horizon report (Johnson et al., 2009) there are some example applications mentioned that turn the mobile device into a sophisticated calculator or other applications that visualise results for an enhanced understanding of the rather abstract results.

Campus life

At Stanford University, USA, students on the campus can access via mobile device a campus plan, ongoing sports activities, or other campus-related information.

Music

There are applications for ear training, reading music, and generating warm up exercises. Others include instrument simulators or applications for music composition (Polishook, 2005).

Health

In South Africa public health workers send text messages to patients with tuberculosis to remind them to take the medication. In other countries such as Kenya mobile applications are successfully used to anonymously ask questions about taboo topics as HIV/AIDS (Shuler, 2009).

Banking

In Kenya the mobile provider Vodafone has set up mobile-banking enterprises that in the year 2008 already had 1.6 mio clients.

Politics

Political campaigns nowadays make use of Information and communication technologies to reach their potential voters. For instance, the president of the United States, Barack Obama, announced his choice of vice-president to support via text messages (Shuler, 2009).

Citizen Journalism

Member of the public play an active role in collecting, reporting and disseminating news using their mobile devices by shooting videos or taking pictures of events that are then send out. Twitter, a micro-blogging tool, has been used world-wide to disseminate recent news to spread. In some countries where media encounter censorship twitter is used to overcome that and to spread uncensored news as this form of social media is rather difficult to control.

4.4.2. Mobile learning features

Prency (2005) gives an overview about functionalities and features that are used in different mobile learning applications. In his view not only high-end devices and powerful devices can be used for mobile learning but also those with only very basic functionalities.

Short text messages

Text messages are used as reminder or for quizzes. For instance, test preparation companies (e.g. Go Test Go) use SMSs to deliver test-preparation questions at times that the learner has chosen. They have also been proved to be very useful for administrative purposes (Naismith, 2007).

Graphic displays

Screens of mobile devices allow for meaningful amounts of text to be displayed. Thus, mobile devices can be used to provide the learner with longer texts, or with news. In Asia, particularly in Japan, it is very common to read whole books on a mobile phone.

Voice only

Voice only applications are used for language learning, e.g. for training pronunciation, or for listening to novels. In some countries with high levels of illiteracy there are services for illiterate people who can access information this way.

Downloadable programmes

Since mobile devices are equipped with memory programmes that have been developed for desktop computers, these can now also be used on mobile devices. Programmes and data can be downloaded and stored on the device. For instance, Java based applications have been designed for mobile learning purposes. These can be downloaded and then used without costs.

Internet browsers

Newer generations of mobile phones allow for accessing the Internet. Thus, educational applications that foresee the access to the Internet can now also be used via mobile phone. Earlier applications that used WAP were very unsatisfactory due to the high costs (Lim & Lee, 2002; Loh, 2000; Mayorga-Toledano, 2003).

With the evolution of 3G network some of these issues are overcome, the quality of the connection is higher and providers offer now packages with

included data traffic which makes Internet applications on the mobile phone worth exploring.

Global Positioning System (GPS)

Local aware systems in mobile learning applications have been used for many subjects such as geography, geometry, architecture, science, math, or in museum learning.

Camera and video clips

The built-in camera of mobile phones can be used to record data, store it, and exchange it with other learners. Images and video files can be used for many purposes such as for storytelling.

4.4.2.1. Making use of the video format

The video format has been used rather randomly compared to other formats since technology to access videos online has only recently made possible or at least made easier and more reliable with the development of the 3G network. However, with the emergence of well-known websites for video-sharing such as YouTube, user created video as format has become more popular on mobile devices. Nevertheless, there is a lack of research in this field.

Since the project Comeln seeks to develop an online mobile learning platform that allows the storing and sharing of videos mobile learning practices that have used this format will be analysed in more depth. Similarly, mobile 2.0 projects are of special interest as the platform will be based on a virtual community.

The Swedish project KLIV, which stands for continuous learning within health care, has shown that self-produced learning materials in form of video clips enhanced peer-to-peer learning. The videos were found to be an excellent reference point for learning.

Ackerman (1996) has argued that after recording learners need to step back or distance themselves to impose momentary order on the situation.

An interesting study to analyse user created mobile videos was carried out by Puikkonen (2009): The data of eleven mobile phone users including diaries, device logs and altogether 255 videos shot with the built-in camera were collected over the period of two weeks. The data was analysed on the basis of the GEMS model (Salminen, Lehtikoinen, & Huuskonen, 2005), i.e. how people Get, Enjoy, Maintain and Share video content on their mobile phones. The most

common audience for the created videos were the people themselves who used the camera function for documenting purposes. Other audience were family members and friends.

A previous study (Puikkonen, Ventä, Häkkinä, & Beekhuyzen, 2008) among teenagers who collaboratively created mobile videos demonstrated that the mobile video creation could serve as great tool for creativity.

The video format was also used in projects to enhance English skills to show the literal meaning and the special use of the English idioms. Students found this approach very engaging (O'Malley et al., 2005).

At Shanghai Jiaotong University, following a blended learning approach, computer science students could connect their smart phones to a network to view live broadcasts of their lectures; they could view from the instructor's station with the teacher's screen or from a virtual student's perspective with a video of the Powerpoint slides and audio of the instructor, or from the "front row" with a close-up of the instructor.

The Digital Narrative project (Arnedillo Sánchez & Tangney, 2006) engaged participants in creating a one-to-three minute movie on their mobile phone within four hours. This approach aimed at facilitating communication, negotiation, decision making skills, creativity among students who could show their out-of school interests. After the creation of the storyline participants were divided into three groups: the ones were responsible for sound, the others for the actual shooting of the video clip and the third ones were occupied with editing. While the first two groups could walk around and create their piece of work independently or collaboratively the editors remained in the editing room and waited for the files that were transferred via MMS.

Besides the sharing of videos using the Internet or MMSs on the mobile device another increasingly used option is the one where videos can be viewed by scanning barcodes, QR codes or RFID tags, placed in a working environment or in an educational context (Brandt & Hillgren, 2004).

A project in Japan, carried out by Ogata (2009), proposed a personal learning assistant which supports the learner to share and use life-log data by linking video clips on a mobile device and environmental objects with placed RFID tags. The learner is able to compare his own video with the video of a similar task and identify how his approach differed or lacked specific ingredients.

4.4.2.2. mobile2.0

Web2.0 applications have revolutionised technical enhanced learning as it gives the learner a stronger role in organising his/her own learning which also requires meta-learning skills to handle their own learning process. Many web2.0 applications can also be used on mobile devices or have been adapted to mobile technologies. Thus, users can write blogs, chat, or create journals on their mobile phones. For instance, Winksite (www.winksite.com) claims to enable every mobile phone user to create his or her own mobile website and community which can be viewed and accessed worldwide.

4.4.3. Domains

In terms of domains there are three big domains of mobile learning practices to be found. These are work-placed learning, informal learning, and formal/institutionalised mobile learning.

4.4.3.1. Formal learning

Formal learning means learning in institutional contexts where the outcomes of that learning are assessed and might be part of a curriculum. In this context mobile learning applications are sometimes used to complement traditional learning, for instance, to demonstrate topics that are challenging to teach with traditional methods. Mobile learning applications are used in the classroom as well as in the field. Some researchers argue that mobile applications are best to be used to support particular aspects of learning, such as alerts, reminders, multiple-choice tests, daily tips, communication with peers and managers, or glossaries (Keegan, 2002). Kukulska-Hulme (2007) identified three motives for mobile technology in education: improving access, exploring the potential for changes in teaching and learning, and alignment with wider institutional or business aims. Particularly distance education institutions are forerunners in the adoption of mobile technologies in the provision of education. For instance, the Norwegian Knowledge Institute has experience in this field.

Examples of mobile learning in the classroom are widespread: e.g. DiGiano et al. (2003) report the use of PDAs in the classroom; other applications have been used to share files between students and teachers (Ray, 2002); or to allow students to ask questions anonymously, answer polls or give feedback (Ratto, Shapiro, Truong, & Griswold, 2003), or take part in quizzes (Segall, Doolen, & Porter, 2005). The GoKnow Mobile Learning Environment was constructed for teachers to create curriculum-based learning opportunities with multi-activity assignments, and multimedia documents, etc.

Formal learning might also be supported by external offers. The BBC Bitesize project, for example, allows pupils to access resources to complement materials they access during school hours. These include interactive games, multi-media content, etc. which are grouped around different topics.

Examples of applications for fieldtrips are also quite numerous to be found. For instance, Chen et al. (2003) reports of a mobile learning application used in the field for bird watching or So (2004) reports on applications that are used to disseminate and collect information during field trips.

The Ambient Wood (Rogers et al., 2004) and the Savannah projects are other examples:

In the Ambient Wood project students were encouraged to carry out contextualised scientific enquiry and to reflect on these interactions. While the 11-12 year old students explored woodland, they were presented with different forms of digital augmentation at different times. The study showed that this kind of exploration promoted interpretation and reflection at a number of levels of abstraction.

The aim of the Savannah project (Facer et al., 2004) was similar. Children should develop a conceptual understanding of animal behaviour by exploring the virtual "Savannah". This consisted of a playing field where a group of children equipped with a mobile device with GPS moved around and while navigating around, could "see", "hear" and "smell" the world of the Savannah. A second group of children remained inside and were asked to reflect on how well they had succeeded in the game, and they could access other resources to support their understanding and develop strategies on how to survive the virtual Savannah as lions.

Both latter two examples can be named as participatory simulations, i.e. learning games where players have an active role.

In the augmented reality game “Environmental detectives” that has been developed at MIT, students can use a pocket PC with GPS to investigate the causes of environmental disasters. An augmented reality game or simulation combines real-world experience with additional information provided by a location-aware mobile device.

De Crom and Jager (2005) used PDAs instead of paper-based workbooks in field trips. These were used to download information and also to take notes.

MyArtSpace is another often referenced project. It was funded by the UK Department of Culture Media and Sport to develop a mobile application for pupils on field trips to museums and art galleries. Students could produce their own interpretation of a museum or gallery visit through taking pictures, voice recordings and notes that formed a personal webpage which could be shared in classroom (Sharples et al., 2007).

4.4.3.2. Work-placed learning

Work-placed mobile learning applications include mobile training and mobile support. The technologies are used to get instant advice and recommendation to improve the productivity and efficiency.

It is especially useful for mobile workers who are constantly on the move and not working in a fixed location.

In an example by Smørdal and Gregory (2003) mobile devices are used to support medical students in hospital placements. The “Eduvision pilot project” used mobile devices in teacher education in Kenya (“Kenya pilots handheld education,” 2005). A similar project was realised by Seppälä and Alamäki (2003) to supervise teacher and trainee students. They could discuss and exchange their ideas about teaching methods through text messages and digital pictures that could be downloaded to the mobile phone.

The MOBlearn project was an EU funded project which aimed at exploring context-sensitive approaches to informal, problem-based and workplace learning. The evolved mobile learning architecture was constructed to support

creation, brokerage, delivery, and tracking of learning and information contents, using ambient intelligence, location-dependence, personalisation, multimedia, instant messaging (text, video), and distributed databases.

4.4.3.3. Informal learning

Two examples for domains within mobile learning in informal learning shall be given at this point.

Museum learning

Handheld devices are increasingly used in museum instead of the conventional audio guides in order to allow the visitors to not only access audio content but also multi-media content.

The Tate Modern in London, for example, offered to their visitors a Multimedia Tour on a PDA with a location-sensitive wireless network, so that visitors would automatically receive complementary information in the very moment they stand in front of a specific piece of art. The additional information consisted of video clips, still images giving more context information on the piece of art and audio files. Also, it was possible for visitors to answer questions or to create their own soundtrack for a work (Proctor & Burton, 2004).

Interactive museum guidebook on handhelds (Grinter et al., 2002; Hsi, 2003) as wells as e-guides, location-aware mobile systems (Cheverst, Davies, Mitchell, Friday, & Efstratiou, 2000) for tourists, are increasingly used in museums and on journeys, respectively.

Lifelong learning

Mobile devices can be lifelong companion (obviously substituted with each other) that have a lifelong learning functions as it is possible to retrieve and store learning resources in the very moment they are needed (Sharples, 2000).

4.4.3.4. Aims besides learning

Beside the obvious aim of mobile learning practices to allow students to learn, mobile learning has particularly been used to reach out to specific populations

who are otherwise difficult to reach. Mobile phones have also been used for counselling in the past decade.

Inclusion

Remote/rural/development mobile learning: Mobile learning applications are used to reach out to people who otherwise would be difficult to approach for instance because they are geographically remote, so to overcome environmental and infrastructural challenges. Populations outside of formal education can be reached through innovative technology enhancing learning offers (Baumgartner, 2008).

White (2004) has researched the use of mobile devices in disadvantaged communities in developing countries.

In Northern Australia, indigenous learners in remote communities participated in m-learning and gained confidence in learning.

The MILLEE project aimed at fostering English literacy of children in developing parts of India where English language skills are widely seen as key for socioeconomic success. The project provided interactive English-language games and had a positive impact on English acquisition.

In Europe, the EU-funded project “m-learning” aimed at investigating “how the use of mobile technologies might address the literacy and numeracy skills needs of young adults aged 16–24 who are outside formal learning settings, start to change their attitudes towards learning and contribute towards their life chances” (Mitchell, 2004, p. 105).

Traxler (2008) claims that the mobile community has already sufficiently demonstrated that it can take “learning to individuals, communities and countries that were previously too remote, socially or geographically” (p. 9).

Counselling and guidance

Mobile devices have been increasingly used to get in touch with patients or people who seek advice and support from a counselling service. According to Döring and Eichenberg (2007) m-therapy or mobile therapy is very powerful as mobile phone users have outnumbered PC and Internet users. Counselling organisations such as Pro Familia in Switzerland or the Swiss helpline for children (Schweizer Sorgentelefon für Kinder) additionally to their regular

services, i.e. counselling via land line calls, Internet chat and email counselling, offer also counselling via text messages. This service has been very well received and is used in the first place to establish first contacts and to provide information for potential face to face counselling.

5. Theory of mobile learning

One of the major challenges mentioned by the mobile learning scientific community is the provision of a theoretical underpinning of the research field. Currently, it might be argued that most practices described above lack a theoretical basis completely. Basic research is needed to clarify some of the fundamental questions to come to standards in the field of mobile learning and to get recognition for the field as being worth to explore in pedagogy as well as in other associated disciplines. However, one might ask what makes mobile learning different from e-learning or other forms of technology enhanced learning and whether it isn't sufficient to simply adapt the theories known in the TEL field to mobile learning. Such theories include the often cited "activity theory" or the "constructive learning" approach.

Also, an open question is whether learning isn't simply learning in terms of a cognitive process that does not depend on the tool that is used to enhance that learning. Thus, one might ask why mobile learning needs a theoretical underpinning at all.

Bachmair, Pachler and Cook (2009) see media, knowledge and learning as cultural resources within the interrelated triangle of structures, agency and cultural practices and ask which of these features are relevant to mobile learning. As examples for structure they mention media convergence, applications of mobile media and media literacy, while by agency they mean the appropriation as internalisation and externalisation with regard to learning and media use in everyday life.

To them it is important to understand how mobile devices contribute to learning in terms of using and developing knowledge and in this context, what kind of knowledge and learning is inherent in the cultural practice of the mobile phone use and the attendant structures of mass communication in a society. These

new media practices might be linked to a new learning habitus in differently constructed life worlds and socio-cultural milieus.

When investigating these questions it becomes clear that an analysis within mobile learning has to face certain constraints that are related to the data collection which are particular to the field of mobile learning.

Coming back to the above mentioned research questions Sharples et al. (2007) claim that mobile learning compared to other types of learning activity differs in its mobility: Learners are constantly on the move, learn something somewhere and apply the newly acquired knowledge somewhere else. This characteristic among others is specific to mobile learning and thus, research has to be invested to come to a theoretical framework of mobile learning as postulated by many researchers in the scientific community. According to Shuler (2009), "Only once we have a theory for learning with mobile technologies in different settings and different populations can these devices be used to their full potential" (p. 26). Pachler (2009) claims that an underlying theory is needed to get recognition for the field. The researchers involved in mobile learning however need "to be guided in their work by a set of overarching research purposes to which their specific enquiries align" (p. 3). However, these are still missing, neither does an explicit frame exist to guide the choice of research methods nor the tools for the analysis are agreed upon. Further, Pachler postulates that interdisciplinarity and variety in methodological approaches are needed to fully answer these questions.

The field of mobile learning can only be fully explored by different disciplines as the associated research questions differ to a great extent regarding the associated theories and expertise that is needed to answer these questions. The social and cultural context will need to be analysed in mobile informal learning as well as vice versa the contexts and social and cultural practices created by them. These are questions that might be answered by sociologists, psychologists or pedagogues. Besides educational benefits, for researchers with technological background other questions will be more relevant for their work, e.g. usability, design, connectivity, interoperability, information processing, data handling, etc.

As Pierroux (2009) points out, mobile learning research has different interests: tracking patterns of portable devices in different settings, theoretical model

building, design approaches and methods of collecting and analysing empirical data related to mobile learning.

Given the young age of the mobile learning field with the first mobile learning projects in the second half of the 1990s and the first specific conferences taken place only a decade ago, it is not astonishing that all these fundamental questions have not been fully answered and that standards for mobile learning have not yet evolved (Vavoula, 2009).

Pachler (2009) argues that developing appropriate methods for mobile learning research does not necessarily mean that a completely new set of methods for data collection and analysis have to be developed from scratch but rather that existing practices have to be analysed regarding the suitability that eventually need to be refined.

According to Traxler and Kukulska-Hulme (2005) criteria for good evaluation and thus for theory building in the field of mobile learning are:

Rigorous, meaning that conclusions must be trustworthy and transferable

Efficient, in terms of cost, effort, time

Ethical, specifically in relation to the nuances of evolving forms of provision

Proportionate, that is, not more ponderous, onerous or time-consuming than the learning experience or the delivery and implementation of the pilots themselves

Appropriate to the specific learning technologies, to the learners and to the ethos of the project concerned – ideally built in, not bolted on

Consistent with the teaching and learning philosophy and conceptions of teaching and learning of all the participants

Authentic, in accessing what learners (and perhaps teachers and other stakeholders) really mean, really feel, and sensitive to the learners' personalities within those media

Aligned to the chosen medium and technology of learning

Consistent across:

- different groups or cohorts of learners in order to provide generality
- time, that is, the evaluation is reliably repeatable
- whatever varied devices and technologies are used

Some of these criteria might be specific to the field of mobile learning research (e.g. evaluation duration should not extend the duration of the actual learning episode), while others are not.

Whether theories that are prominent in the TEL field can be adapted to the mobile learning context is still an open issue. However, the situated or constructive learning approach as well as Activity theory or conversational theory are some examples of theories that have found their way into mobile learning.

Introducing theories from the e-learning field bears the risk of copying e-learning applications and simply “shrinking” them to the size of a mobile device instead of finding new innovative solutions that have only been possible because of the use of mobile devices. Shuler (2009) points out: “This results in ‘mobile versions’ of established approaches and fails to take into account the unique affordances of learning through mobile technologies” (p. 7).

Traxler (2009b) mentions three dilemmas in the theory building process within the mobile learning scientific community. Firstly, when importing theory from e-learning one has to worry about transferability; when developing a theory ab initio then the validity of the evolved theory has to be proven; lastly, if subscribing to a more general and abstract theory then yet it has to be decided whether this theory is as specific and granular as desired for mobile learning.

The theory of conversational learning, for instance, has been imported to mobile learning. According to this theory mobile technologies facilitate conversational learning as they allow people to converse with each other, by exchanging ideas and sharing knowledge (Naismith, Lonsdale, Vavoula, & Sharples, 2005).

Laurillard (2007) recognises the impact of mobility and mobile technologies on the “conversational framework”. On the one hand she sees advantages in increasing the interaction between learners and their environment, on the other hand she also sees disadvantages if the teacher is unable to set up appropriate tasks.

Another in the mobile learning field introduced theory is the “Activity theory” by Engeström (1987) which was modified by different researchers such as Sharples. Following this theory learning is analysed as a cultural-historical activity system mediated by tools that constrain and support the learner in their goals.

Bachmair, Pachler and Cook (2009) however argue that “mobile learning is not one approach to teaching and learning besides others; instead it permeates all approaches” (p. 25).

Several limitations in data collection constrain mobile learning research. Mobile learning is often thought of taking place particularly outside school in the spare time, while mobility is one of the core characteristics. However, the mobility aspect makes mobile learning difficult to analyse. Research in the majority of the cases has to be based on the learner’s own accounts and meta-cognitive analyses of their learning in form of post-hoc interviews, surveys or diary studies (Vavoula, 2007). Criteria that come from basic research such as keeping all variables as constant as possible in order to measure the effect of the variable of interest as “purely” as possible, are not applicable to the field of mobile learning where less control over the research context has to be taken into account.

Obviously retrospective studies are limited regarding the accuracy as they rely on recall of the participants. The inconsistency of the various mobile learning episodes regarding their context and learning outcomes makes it difficult to research. Furthermore, the rapid change of technological devices and the diversity of tools available makes comparability of results almost impossible (Pachler, 2009). Longitudinal studies or reproducing results is thus a challenge.

5.1. The pedagogy of mobile learning

The mobile learning field is best characterised with the help of the concept of appropriation by Bakardjieva (2005): “With creative appropriation, new dimensions of a technology are opened up and widely recognized, thanks to the spontaneous inventiveness of its users” (p. 18). This is the case in the field of mobile learning as mobile phones and other mobile devices were never invented and conceptualised as educational tools. But the creativity of individuals has led to a multifunctional use of the device, being the use for educational purposes one of them. Since the mobile device has not been created for educational institutions and the influence of these on the mobile

phone industry is yet very limited pedagogy has to build on the devices as they are and try to find solutions that work best for the specific purpose.

According to Vavoula (2007) a productive pedagogical vision recognises the cultural emergence of innovative educational practice following Bakardjieva's concept of appropriation or "technology-in-use-in-social situations", and what by other researchers is often named as "learner-generated context".

In this chapter research in the field of mobile learning pedagogy will be explored.

Several researchers and educators see a great change in the field of didactics that is partly correlated with the introduction of Information and communication technologies into the classroom while the impact might be perceived in either direction. According to Sharples (2006) every era of technology had its influence on education as technology has also influence on culture in general. At the times of emerging mass print media the text book was the prime medium of instruction and didactical concepts reflected a transmission model which aimed at teaching the content of the text books. In the past fifty years with the emergence of computer technology different models have evolved. These rather reflect the construction of knowledge, information processing, modelling and interaction. Thus, it is not surprising that in the era of mobile technologies researchers call for a theory that reflects these new technologies as well as the mobility of the learner.

The introduction of computers and the Internet has changed the role of the teacher and has alleviated the chain of authority in the classroom. The teacher is no longer automatically the expert, the one-who-knows, but rather a coach in a situation where the "wisdom of the crowd" (Surowiecki, 2005) of the class outnumbers his/her own expertise and where the teacher likewise benefits from a shared learning process. In this shift towards learning communities, the tutor or teacher has now more the functionality of a guide and a facilitator rather than being a "sage on the stage". Freire (2004) speaks of "co-intentional learning" where teacher and learner jointly converse to come to a common understanding. Both, learners and teachers are thereby responsible for the learning process.

To overcome some of the shortcomings in the educational system, Skinner proposed already in the 1950s that machines should replace teachers in

activities that a teacher could not perform as well as some teachers could perform. Skinner (1950), however, in the view of many educational theorists posed a quite provocative question by asking, if a theory of learning was needed at all.

As Nyíri (1999) observes the typical patterns of knowledge acquisition have changed. Following the notion of lifelong learning as most prevalent aspect of learning in a modern society the distinction between adult and child is blurred. Formal education institutions are complemented and partly replaced by virtual learning environments. Nyíri calls the world of the Internet and mobile phones an “organic learning environment”.

Sharples et al. (2007) speak of a convergence between the new learning paradigm and new technology as illustrated in Table 2.

Table 2: Convergence between learning and technology

New Learning	New Technology
Personalised	Personal
Learner centred	User centred
Situated	Mobile
Collaborative	Networked
Ubiquitous	Ubiquitous
Lifelong	Durable

The fact that learning outside of school has become an important facet of learning, and in some cases is perceived as a failure of the educational system in place, has prompted many researchers such as Papert (1994) to call for a different theory of learning. Most research so far is based on classroom learning or learning that takes place in laboratories. Thus, this research is not appropriate for learning that takes place while on the move and lacks the full exploitation of mobile technologies from a pedagogical perspective.

However, first the question which aspects a theory of mobile learning has to cover to make it distinct from other learning theories needs to be answered. It must reflect that learning occurs mostly outside of the classroom and that it is personally initiated and structured (O'Malley et al., 2005). If learning outside the classroom and fixed walls has been taken into account by educational thinkers (c.f. Argyris & Schön, 1996; Freire & Freire, 2004; Illich, 1971; Knowles, 1984;

cited after Sharples et al., 2007), these fail to analyse the mobility of the learner. Furthermore, a theory of mobile learning must be tested against certain criteria such as whether it can be applied both to the field of formal and informal learning, whether it analyses the dynamic context of learning, and whether the theory recognises learning as a constructive and social activity. The authors argue that current learning theories fail to satisfy all these criteria but that a mobile learning theory will probably build on post-Vygotskian theories and theories of learning as conversation as coined by Pask and Laurillard. A theory of mobile learning must take into account that communication is the basic essence in the process of coming to know and in negotiating its meaning (Sharples, 2006). Also the evolving theory should not only differ from theories of classroom, but also from workplace learning and lifelong learning (Sharples et al., 2007). Conceptualisations of mobile learning must take into account that it is personal, contextual and situated which makes the learning taking place highly “noisy” which is a challenge for both, the definition and theory as well as the evaluation of mobile learning as there are many variables which cannot be controlled (Traxler, 2009a).

The changed understanding of didactics and pedagogy is highly correlated with the notion of constructivism; this will be described in more detail later in this chapter.

The social constructivist approach has to be seen from the perspective of a global change in learning (Mitchell, Millwood, & Fallenboeck, p. 27-29). Heppell (2005) gives an overview of trends in learning globally (c.f. Table 3).

Table 3: Global trends in learning

learning globally is moving from:	learning globally is moving to:
transforming	ingenious
stable	agile
quality controlled	quality assured
content delivery	user generated content
one size fits all	personalisation
individualised	collaborative
national	global
one to many	peer to peer
interactive	participative
curriculum centric	learner centric
teaching	learning
pieces	projects
Piaget	Vygotsky
mundane	engaging

According to this comparison, learning is moving from “transforming” to “ingenious”. While previously the teacher was responsible for transforming the knowledge of the learner, the learners themselves are now responsible for their learning which implements a certain empowerment and self-responsibility. Also learning has become more agile in terms of learning resources and in terms of the process of learning itself, while previously the rules and the process to reach the learning aim were stable and set. Previously the emphasis of education laid on content delivery, from the teacher to the learner, now content is created by all, including learners and teachers. From an individual approach where one teacher taught several pupils at the same time and all followed the same path according to the set curriculum, collaborative and personalised learning is now emphasised. Learners shape and create their own learning paths depending on their needs. Tasks are not given solely to individuals but group work has become more common which enables the pupils to coach each other and thus enables them to give peer-to-peer support. The Internet has connected learners globally, thus learning using ICTs even in formal education is not constrained to national boundaries and this has impacted on the learning in general.

In TEL there is a multitude of theories which have been developed for the granularity of the computer screen and these “web didactics” cannot seamlessly be transferred from e-learning to mlearning (Hug & Friesen, 2009). As online learning differs from face-to-face-learning, the pedagogy of mobile learning also differs from e-learning (Pieri & Diamantini, 2009). Sharma and Kitchens (2004) found the following differences between the two (c.f. Table 4):

Table 4: Differences between elearning and mlearning

Current e-Learning Methods	M-Learning
Pedagogical Changes	
More Text-based and Graphic based instructions	More Voice, Graphics and Animation based instructions
Lecture in classroom or in internet labs	Learning occurring in the field or while mobile
Instructor to Student Communication	
Time-delayed e-mail	Instant announcement of e-mail delivery
Passive communication	Instant communication
Asynchronous	Interactive, spontaneous
Student to Student Communication	
Face-to-Face	Flexible
Audio-teleconference is quite common	Audio-teleconference and Video- teleconference both would be possible
e-mail-to-e-mail	24/7 instantaneous
Private Location	No geographic boundaries
Travel time to reach to internet site	No travel time since wireless internet connectivity
Dedicated time for any group meeting	Flexible timings on 24/7 basis
Poor communication due to group consciousness	Rich communication, due to one-to-one communication, reduced inhibitions
Feedback to Students	
1-to-1 basis	
Asynchronous and at times delayed	Asynchronous and synchronous both
Mass/standardised instruction	Customised instruction
Benchmark-based grading	Performance & Improvement-based grading
Simulations & lab-based experiments	Real-life cases and on the site experiments
Paper-based	Less paper, less printing, less cost
Assignments & Tests	
In-class	Any location
Dedicated time	24/7 Instantaneous
Restricted amount of time	Any amount of time
Standard test	Individualized tests
Poor feedback	Richer Feedback
Delayed feedback	Instant feedback
Fixed-length tests	Flexible-length/number of questions
More text-based tests and assignments	More audio and visual animation based tests and assignments, in-field tests /experiments
Presentations, Exams and Assignments	
Theoretical and text based	Practical oriented exams direct on site hands-on based
Observe and monitoring in lab	Observe in the field and monitoring from remote location
Class-based presentations	1-to-1 presentations with much richer communication
Use of one language	Auto translation for delivery of instructions in many languages
Individualised, component-based group work	Simultaneous collaborative group work
Paper-based assignment delivery	Electronic-based assignment delivery
Hand-delivery of assignments at a particular place and time	E-delivery of assignments at any place and time
Instructor's time used to deliver lectures	Instructor's time used to offer individualised instructions and help

While some of the above mentioned differences are obvious, others are not. For instance, instructor-to-student communication can occur either asynchronously and synchronously. Similarly, student-to-student communication does only rarely happen face-to-face in an e-learning environment. However, the intention of Sharma and Kitchens was to find only potential shifts that do not necessarily have to take place.

Naismith et al. (2005) as well as Vavoula and Karagiannidis (2005) give an overview of different learning theories and how mobile learning applications have been based on these. They distinguish different types of mobile learning:

Behaviourist learning theory: Skinner and Pavlov are the founders of behaviourism. Drill and feedback are realised in different mobile applications, e.g. quick feedback and reinforcement is facilitated via mobile phone.

Constructive learning theory: The researchers associated with constructive learning are Piaget, Bruner and Papert among others. The principle of constructive learning is participation, for instance in form of participatory simulations. Mobile devices allow for participative activities such as mobile games, etc.

Situated learning theory: Lave and Brown are theorists in this field that demands for problem and case based learning, and emphasises context awareness. Learners can take a mobile device out into an authentic context.

Collaborative learning: Vygotsky can be perceived as representative for the field of collaborative learning. Mobile devices provide additional communication and sharing options.

Informal and lifelong learning: Eraut is one of the names associated with informal as well as lifelong learning. Mobile devices become an accompanying tool throughout the learner's life and constitute a source of information supporting intentional and accidental learning episodes.

Support, coordination of learning and resources: Mobile devices can be used for alters, and other aids to regulate the learning process.

According to O'Malley et al. (2005) not the theory of learning that lies behind the actual development is as important, as long it is organised as blended learning including face-to-face contact.

5.1.1. Constructive Learning approach

The constructive learning approach has been shaped and influenced by many different educational thinkers.

This approach builds on the development theory of Piaget, Dewey's and Vygotsky's theory of education (1997).

Dewey (1859–1952) perceived learning as a process by which people construct knowledge about the meaning of objects and of events. He thought that teaching should take into account the student's actual experiences and that it should emphasise active learning. A traditional educator had a dictatorial rule, while the new type has the role of a leader of a social group because of wider and deeper knowledge.

Vygotsky (1964), the founder of cultural-historical psychology, believed that the environment mediated individuals' activities. Through interaction and cultural mediation children "internalise" rules and the habits in their culture, from speech patterns to symbolic knowledge. He coined the concept of the "zone of proximal development" which describes the next stage as potential of human cognitive development that can be reached with guidance. This acknowledges that the outcome of learning is greater when it does not happen in isolation but rather in social interaction.

In opposition to "knowledge" which could be simply transmitted the basic concept of Bruner (1986) is learning through problem solving including mental models, metacognition and self-regulation.

Other more recent thinkers having an impact on constructive learning theories include Kolb (1984) with his experiential learning theory which sees education occurring as a direct participation in the event of life and knowledge as reflection of these experiences: Brown et al. (1989) and Lave and Wenger (1991), who coined the situated learning theory and Laurillard's concept of conversational framework. The latter one has been particularly influenced the evolving theory of mobile learning and will thus be deeper explored in the following subchapter. According to the situated learning theory, active learners move from a "newcomers" to an "oldtimers" within their learning community, the so called "Community of Practice". Situated learning is learning that takes place in the same context as it is applied and knowledge is the product of a social process whereby knowledge is co-constructed. The Communities of Practice

(CoP) in opposition to traditional learning environments lack hierarchy since all members interact as peers. The emphasis lies on inventiveness, evolution of ideas and direction of community. Lave and Wenger name three characteristics of CoP: the domain – the shared interest; the community – some regular form of group relationship; and the practice – the development of a shared repertoire of resources.

While all these theorists differ in some aspects of their understanding of learning, there are basic assumptions all these build on.

According to the constructive learning approach the learners “construct” their knowledge and are able to collect, share, display and analyse multiple perspectives on issues (Herrington & Herrington, 2007).

This has led to changed understanding of the learning process and has impacted on didactics and pedagogy as learners and teachers have now different roles. The transmissive model of teaching has been omitted in favour to a constructive or sociocognitive model with the learner at the centre of activities. The focus lies on learner control; learners decide on their learning path depending on their level of knowledge and needs. Learners choose what they want to learn but might also need support. This idea is expressed with the notion of “self-service” education.

As regards the use of technology for learning tools can be used to support knowledge acquisition via sharing and collecting information and experiences in a virtual community. The needs of the individual learners thereby drives the use of these tools which might be adapted to the own preferences creating an individual personal learning environment. The tool allows for retrieving artefacts that encourage learning. As Wishart (2007) argues didactic activities based on mobile devices have to be rooted in a constructivist approach. Furthermore, she finds one of the strengths of using such devices is that they can provide for carrying out meaningful experiences of situated learning.

When speaking in terms of Lave and Wenger, in a Community of Practice a Technology Steward guides the use of appropriate communication technologies; and the community learns how to benefit from the use of these tools. Passive members of the community are activated by other members and are gradually brought into a more active role.

Obviously there are several implications of the constructivist approach on the design of new educational activities supported by mobile devices. For instance, a radical form of constructivism does not foresee any provided content at all but only content created by users. In this case, a (mobile learning) course starts only with the communication facilities but without any content (Taylor et al., 2005). Learners decide which content they want to share while teachers act as facilitators.

5.1.2. Conversational Theory

The Conversational Theory can be seen as a special case of the constructive learning approach with an emphasis on conversation as basic mechanism of learning. It is often described as a radical form of constructivism that extends the notion of learning beyond the individual by explaining how organisations and whole communities learn. In general the theory does not distinguish between people and interactive systems such as computers or mobile devices involved in a conversational dialogue.

This idea dates back to Pask (1976) and Dewey (1903) and has been further developed by Laurillard (2002).

According to Dewey education is as important to social life, as nutrition and reproduction is to physiological life and further “This education consists primarily in transmission through communication. Communication is a process of sharing experience till it becomes a common possession” (p. 13).

Learning is a continual conversation between different learners, between teachers and learners but also between learners and external representations of knowledge and artefacts to reach a shared understanding. This exchange takes place between two different kinds of world, the discursive and the interior mental world of descriptions and conception; and the interactive and exterior world of action. Individuals can link these two worlds through reflection and adaptation. Conversation thereby is not a solely exchange of information but it rather constitutes a “process of becoming informed about each other’s ‘informing’” (Sharples, 2000, p. 114). Conversational learning requires the learner to externalise understanding and to be able to converse with him or herself about the own knowledge.

As illustrated in Figure 7 the learner in his/her social, cultural and technological environment uses the tools and resources available to support his/her learning. The learner acts within this environment, for instance by solving a problem, and reflects upon it, by abstracting from the activity and linking the experience with previous knowledge.

The teachers, perceived as assistants in this learning process, make a two-way communication possible and adjust to the learners' needs. Both learners and teachers reflect upon their experience and this dialogue can be enhanced by (technological) tools.

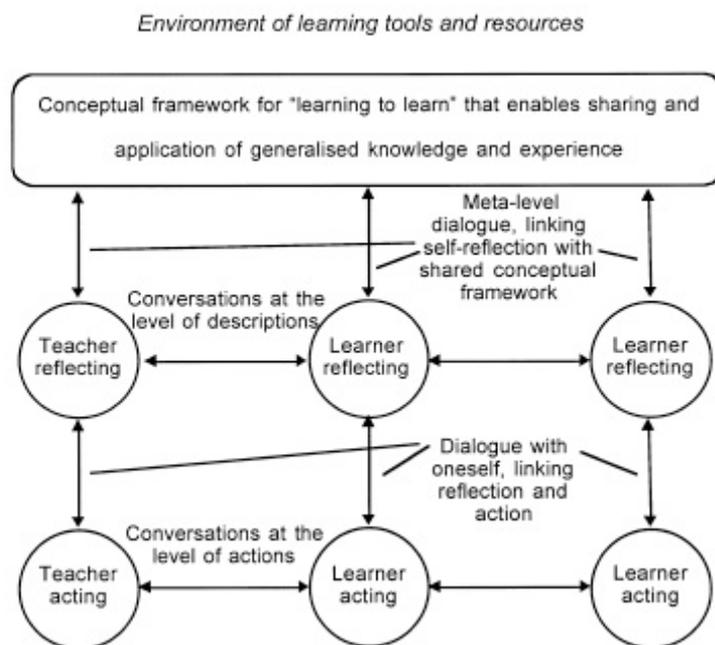


Figure 7: A conversational framework for personal learning (Sharples, 2000, p. 181)

The teacher similarly as in other constructivist theories of learning has no ontologically privileged position but is partner in a conversation.

The most successful learning is made possible when the learners are in control of their learning, when they can collaborate with others, ask questions, evaluate their own knowledge and ideas and plan new actions. An effective learning experience according to Laurillard is learning that is discursive, adaptive, interactive or reflective. The student therefore must be able to apprehend the structure of discourse, interpret the forms of representation, act on descriptions of the world, adjust actions to fit the task goals, adjust descriptions to fit the topic goal and reflect on the cycle of goal, action, feedback (Sharples et al., 2007).

The great advantage of the Conversational Framework is that it can be applied to learning with mobile devices as it equally recognises mobile devices as partners of learning as conversation. In cases where no conversational partners are available, or “there are no tools for model building to hand, or learners lack the language and the concepts to converse at the level of descriptions” (Sharples, 2000, p. 116), technology can support the learning as conversation. The technology can provide or support the context in which the conversation takes place. The use of technology also implies the chance to bridge the gulf between formal and experiential learning. Conversation links different experiences across contexts with each other, including, for instance, phone calls between different people.

5.1.3. Activity Theory

Activity theory builds on the constructive learning theory by Vygotsky. It has been shaped by Engeström (1987) and by Leon'tev (1978) and further refined and applied to the field of mobile learning by Mike Sharples. It constitutes one of the theories besides the underlying constructive learning theory which is able to recognise the complexity of mobile learning with its different elements and its interplay, such as different locations, actors, goals, social settings, content and tools. The latter fact that it explicitly mentions tools as fundamental element makes it easy to transfer to mobile learning. Tools are used to achieve certain goals. Objects thereby include physical tools such as PDAs or mobile phones and conceptual tools such as the human language and software applications, etc. Activity theory is used to understand activities in organisations or, if applied to the field of education, activities of learners who are embedded in their context. According to this theory, as illustrated in Figure 8 on the one hand subjects act on objects transforming these with the help of physical and conceptual artefacts. On the other hand, subjects are influenced by the rules established in their (learning) community and by the division of labour. The community is aimed at a shared goal and labour is divided among them, both horizontally and vertically, i.e. division of tasks and division of power and status. Learning is based on contradictions that arise when activities are examined.

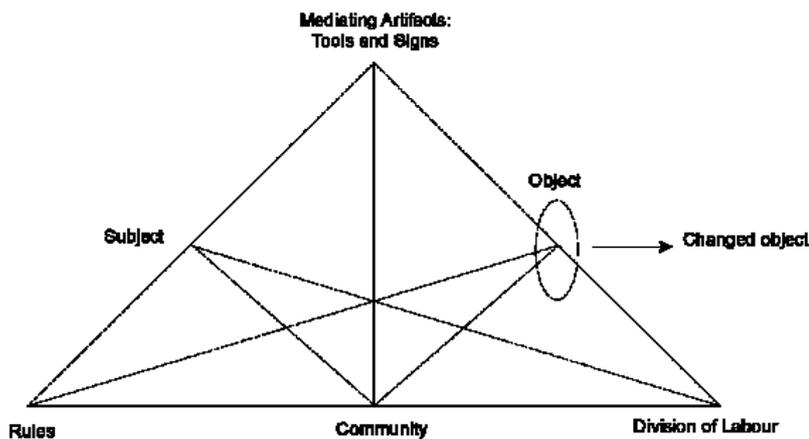


Figure 8: Engeström's expansive activity model

In brief, the principles of Activity theory are (O'Malley et al., 2005, p. 31):

Activity is the focus of analysis. Individual and group actions can only be understood in relation to an interwoven system of activity.

Activity systems are multi-voiced. They include many perspectives, traditions and interests which are in continual interaction and change, giving rise to inevitable conflict that demands analysis and resolution.

Activity systems are shaped over time. Current activity can only be fully understood by taking a historical perspective, to understand how it has been shaped and transformed by previous ideas and practices.

Contradictions are sources of change and development. Activities are open systems, such that the introduction of new ideas and practices can cause conflict with existing ways of acting and describing. The process of resolving such tensions may lead to new understanding and thus to opportunities for change.

Activity systems contain the possibility for expansive transformation. They go through extended periods of qualitative change, as the contradictions are internalised and resolved, leading to the emergence of new structure, tools and activity.

Vavoula (2005) adapted Engeström's Expanded Activity System to mobile learning and identified three influencing factors, being *control*, *context* and *communication*, as adaptations of Engeström's original terms *rules*, *community* and *division of labour*.

Control: The learners are put in control of their learning as their learning is self-paced. They can access materials and can work through them whenever it is convenient and according to their own preferences. This is regarded as one of the essential advantages of technology enhanced learning.

Context: Two important aspects are distinguished, the physically embodied technological context and the human, semiotic context, where the learning takes place.

Communication: There is a dialectical relationship between the technological and the semiotic worlds. Learners can adapt their communication when the technology allows for different ways to converse.

Sharples et al. (2007) build on the conversational framework and Activity theory in their attempt to formulate a theory of mobile learning as communication in context. They emphasise the communicative aspect between learners and technology, where both converse with each other and knowledge is shared in the community.

The authors distinguish between two layers, the semiotic and the technological layer (c.f. Figure 9). On the semiotic level the learner's object oriented actions are mediated by cultural tools and signs, while on the technological level the user interacts with tools, e.g. the mobile learning technology.

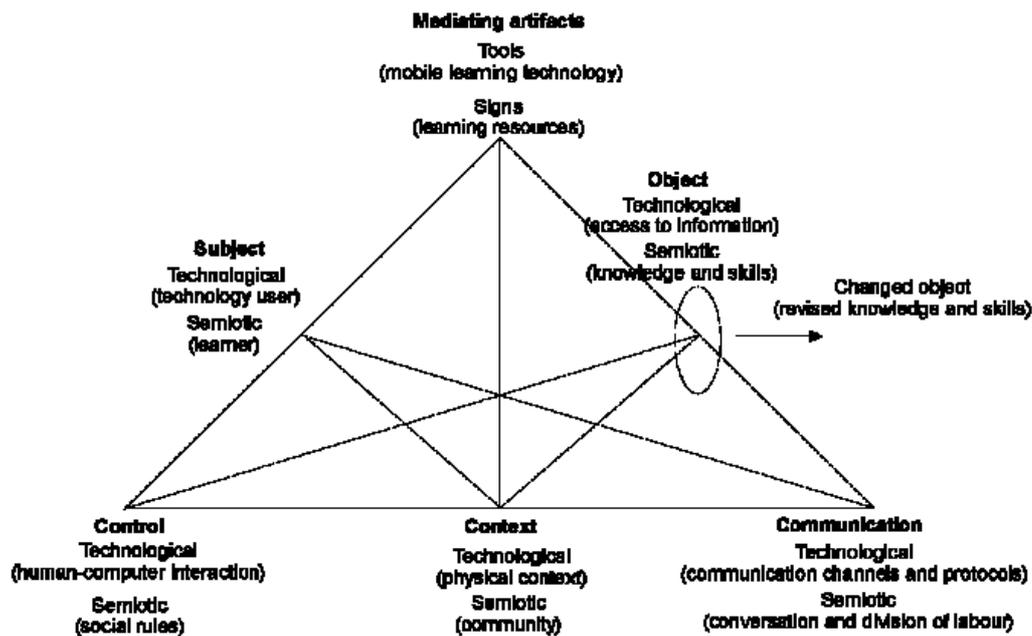


Figure 9: A Framework for analysing mobile learning (Sharples et al., 2007, p. 12)

The above mentioned layers can be separated from each other in order to be able to discuss with educators from a semiotic framework perspective on the one hand and to discuss software with developers and engineers from a technological perspective on the other hand. The holistic system comprising both layers at the same time can be used to describe and discuss the interaction between people and technology.

Sharples et al. (2007) see learning embedded in socio-cultural system, “within which many learners interact to create a collective activity framed by cultural constraints and historical practices” (p. 12).

Waycott (Scanlon, Jones, & Waycott, 2005; 2004) also used concepts of Activity theory to express how new learners appropriate mobile technology and how the technology has impacted on the learners how they do things, how they shape their actions and their environment. When people are faced with a new piece of technology, they analyse its possibilities and constraints and will then start to integrate the technology into their routines or change the technology. Thus, there is continuous co-evolution of human learning and technology (Bruckman, 2004; cited after Sharples et al., 2007). New models of interacting with technology, e.g. text messaging, as well as new patterns of learning, e.g. just-in-time learning, are developed at the same time. Each new development on the one side leads to innovation on the other side.

5.2. Design of mobile learning applications

The above described theories have obviously implications on the design of mobile learning activities. Some recommendations or guidelines directly result from theoretical considerations while others have resulted from mobile learning practices. The latter ones have in most cases been proved to be of benefit for the learners in some way, from a motivational point of view or from a learning gain perspective. Others surely have not been deeply analysed since some aspects are difficult to evaluate as mobile learning research has some constraints compared to other fields of learning.

In the following a summary of guidelines extracted from literature will be given that also has its influence on the design of the ComelIn platform.

Some of the guidelines refer both to mobile learning and to other forms of TEL. For instance, Sharples et al. (2007) argue that in the field of mobile learning designers have much to learn from interaction design research which offers some basic principles for human-computer interaction on mobile devices. These include creating quick and simple interactions, preparing flexible materials, making use of special affordances of mobile devices such as audio, and using mobile technology to enhance learning. They conclude that the design of mobile learning activities as all other kinds of learning activities should be driven by specific learning aims. Recommendations that are based on the conversational framework would suggest that instructional design should enhance conversations between learners to support each others, and between teachers and learners.

McKenzie (2002) claims that teachers should design contents in multiple formats to enhance accessibility so that learners with different needs, e.g. learners who are visually impaired, have access to the learning materials. Further learning materials should be based on various perspectives and ways of doing things.

To have materials in different formats also allows for flexible learning strategies, so that students can access materials according to their own preferences (Mayorga-Toledano & Fernández-Morales, 2004). Learners who prefer visual

materials and who from experience know that they are visual types of learners might want to access visual resources. Multiple formats allow the learner to link and to explore different modalities (Someren, Reimann, Boshuizen, & Jong, 1998).

Ally (2009b) recommends to make use of the possibility to create multimedia content and thus to make the learning experience more engaging.

McKenzie (2002) further postulates that all rules, norms, expectations and skills needed should be made explicit and the reasons for learning tasks shall be made transparent. In case support is needed by the students they should get the information where to get appropriate help including online resources.

All these issues mentioned by McKenzie however seem to apply to educational instruction in general no matter if it is supported by technological tools.

To be in control of the own learning and also of the learning technology to promote a sense of ownership and as motivator is mentioned repeatedly in literature (c.f. Jones, Issroff, Scanlon, Clough, & Mcandrew, 2006; Kukulska-Hulme et al., 2007; Ravenscroft, 2000). Besides these criteria, Jones et al. (2006) mention also fun, learning-in-context and continuity between contexts as affective aspects of mobile learning.

General recommendations that can be applied to the mobile learning field or even more that can be better covered via a mobile learning approach than with others include the following criteria for successful learning (Bransford, 2000): it is learner-centred, knowledge-centred, assessment centred and community centred. Individual skills and levels of knowledge are reflected in the learner-centricity, while knowledge-centricity regulates that the curriculum is based on state-of-the-art knowledge and effective teaching including inventive use of concepts and methods. Assessments shall match the ability of the learners, offering formative guidance beyond diagnosis. Lastly, the community-centricity is built up by successful learners who mutually support each others by sharing knowledge and supporting also less able students.

These criteria obviously rather match institutional aims than informal learning and thus can only partially applied to mobile learning which often takes place outside of institutional contexts.

Naismith and Corlett (2006) have identified success factors for mobile learning that have been extracted from projects published in the proceedings of the MLearn conferences between 2002 and 2005. These also reflect more institutional necessities than criteria that are needed in the informal mobile learning field. These are: *access to technology*, *ownership*, *connectivity*, *integration*, and *institutional support*. According to their analysis successful projects have provided learners with devices or have developed applications for their own devices. However, it was important to promote ownership of the device among the students. *Connectivity* includes wireless connectivity, but also connectivity between learners and between contexts. The mobile learning experience shall be *integrated* into the curriculum, the student experience or the daily life, or all of these. Further, successful projects need *institutional support* in terms of design of the content, staff training and technical support.

Also on a rather general level based on Activity theory, Taylor et al. (2005) give recommendations for successful learning, the so-called “3 C’s” of learning, i.e. construction, conversation, and control. Thus, learning design must be done in a way that learners are able to construct their knowledge involving problem-solving, and that they are able to converse with each others, with teachers, learners and with themselves. Also learners should be in control of their learning path and learning time.

Definitions of mobile learning as well as guidelines to develop a mobile learning environment sometimes overlap, as it is the case in the following. Traxler (2009a) gives an overview of conceptions of learning that can be supported with mobile devices, including personalised, authentic, and situated learning. However, the descriptions of these conceptions might also be understood as guidelines, thus which criteria have to be met to allow for these kinds of learning. Personalised learning is made possible when diversity, difference, and individuality have been taken into account in the design of the learning experience as well as in the delivery and the support available throughout. It recognises different learning styles as well as social, cognitive and physical differences. Increased participation by learners can be expected when situated learning is possible. This kind of learning occurs when it takes place in the course of an activity, in appropriate and meaningful contexts, for instance, in the field. When learners have to solve real-world problems and the outcomes of

their learning is relevant and interesting to them this kind of learning can be called authentic. Thus, tasks should be designed in a way that students are engaged in exploration and inquiry.

More concrete recommendations to designers of interactive learning experiences and thus also to mobile learning give Luckin et al. (2004): The focus should lie on an engaging activity with the concepts of the domain of the learning field, with regular reminders throughout the interaction. Only a limited set of functions available through the technology should be used for this activity to make it as clear and simple as possible. Support from peers and teachers shall be given throughout the learning activity, both face-to-face and online. Technical support might also be needed during the learning episodes, thus a technological support service should be established.

Syvänen and Nokelainen (2005) developed the so-called Components of Mobile Learning (CML) model for evaluating mobile learning practices based on extensive review of mobile learning materials and environments and came to ten criteria for pedagogical usability: learner control, learner activity, cooperative learning, goal orientation, applicability, effectiveness, motivation, valuation of previous knowledge, flexibility, and feedback.

Only limited amount of content can be provided on a mobile device screen and mobile learning happens on the move. Thus modules should be short, no longer than five to ten minutes according to Trifonova and Ronchetti (Trifonova & Ronchetti, 2003). Further, modules should be fun and imply added value. Similarly Ally (2005) proposes the following principles for mobile learning materials: Due to screen constraints instructional designers should develop an efficient strategy to present material. All information should be broken down into smaller pieces to facilitate processing and it should be organised in the form of a concept map identifying relevant concepts and their relations. If learning materials have the form of learning objects they bear the advantage of re-usability.

The screen size along with other characteristics of mobile devices are the greatest challenges for content design and constitute differences in design in comparison to the traditional web design in e-learning (Kadyte, 2004). Bradley et al. (2005) therefore recommend making more use of audio instead of text.

The Activity-Oriented Design Methods (AODM) has been developed to apply Activity theory to HCI (human computer interaction) research and practice. Mwanza (2001) has developed the so-called *Eight-Step-Model* which includes questions for the researcher to answer in order to know where on which step to focus.

Table 5: Eight-Step-Model (2002, p. 4)

Activity component	System	Question to ask
Activity		What sort of activity am I interested in?
Objective		Why is this activity taking place?
Subjects		Who is involved in carrying out this activity?
Tools		By what means are the subjects carrying out this activity?
Rules and regulations		Are there any cultural norms, rules and regulations governing the performance of this activity?
Division of labour		Who is responsible for what, when carrying out this activity and How are the roles organised?
Community		What is the environment in which activity is carried out?
Outcome		What is the desired outcome from this activity?

The most comprising guidelines were developed by O' Malley et al. (2005). Also based on Activity theory and on mobile learning case studies they have created helpful pedagogical guidelines for setting up mobile learning activities.

Table 6 summarises the most central recommendations.

Table 6: Guidelines for mobile learning activities (O'Malley et al., 2003)

Guideline	Description
Guideline 1: Costs	Research cost model for infrastructure, technology and services: Analyse where costs lie, with the user or the institution (depending on push or pull-model of learning), use technology available or provide new one. Choose between high-end and thus greater-range of functionalities device or low-cost with minimal functions device.
Guideline 2: Usability/System Design	Collect user requirements of all participants (i.e. learners, teachers, content creators) to assure acceptance.
Guideline 3: learner control	Allow the learners to review (e.g. via backwards paging) and to quit and come back later. When there are movies or audio allow the learner to pause, repeat or skip them. When movies are longer than 10-20 sec provide also the options of fast-forward and rewind control. If learners have various skills provide alternatives that suit them.
Guideline 4: Input (screen buttons)	Only small amount of buttons on screen, if more are necessary use menu instead. Provide feedback to confirm and provide status information.
Guideline 5: Input (menus)	Keep the choices in a menu simple and if more levels are required use only a few.
Guideline 6: Input (hyperlinks)	Balance text to read with text hyperlinks. Ensure that text to read does not confuse the user due to highlighting.
Guideline 7: Output (general)	Put control options (e.g. next page) at the bottom of the screen. Aim for simplicity and clarity in design.
Guideline 8: Output (text)	Paging is favoured over scrolling.
Guideline 9: Output (graphics and animations)	Use pictures and graphics only for important and relevant information, etc.
Guideline 10: Output (video)	Video clips should not be longer than 20-30 sec. Global controls (e.g. for programme navigation) should still be accessible during video playback.
Guideline 11: Output (sound)	Provide control functions of audio and make general controls accessible also during playback.
Guideline 12-14: Questioning	Guidelines for the design of multiple choice questions, for the design of completion or cloze questions, and questioning in general
Guideline 15: Choice of technology	Assess suitability of device/technology for learning task; examine advantages and disadvantages of each technology before deciding.
Guideline 16: Roles	Assign /assume necessary roles for initiating and thereafter supporting mobile learning
Guideline 17: Equipment management	Develop procedures and strategies of equipment when provided by the institution
Guideline 18: Support for teachers	Provide training and ongoing technical support to the teachers to enable them to use mobile technologies
Guideline 19: Admin	Consider the use of mobile technology for student administration tasks
Guideline 20: Collaboration	Consider the use of mobile technology for collaborative learning
Guideline 21: Services/applications	Discover and adopt suitable applications that match the needs of the learners and map directly to the curriculum
Guideline 22: Security/privacy	Ensure security and privacy for all end users

In the above table the guidelines that refer to video format and thus are more relevant to the Comeln platform have been highlighted.

In summary, most of the guidelines are of technical nature and are directed to system designers, only a few are relevant for instructors.

In general, the published guidelines found in academic literature seem to be on a rather general level, only a few can be broken down to very concrete recommendations. Most are more relevant in the context of formal learning than informal learning. "Research literature about the effective design of educationally useful material for delivery via handheld technology is extremely limited" claimed Churchill et al. (2008, p. 882) and this synthesis of published guidelines confirms this statement.

Nevertheless, the Comeln approach will later be contrasted against the described guidelines to see whether the platform reflects all requirements that are listed above.

5.2.1. User requirement analysis

In cases where concrete guidelines are not available or they are not specific enough the analysis of user requirements might be useful to understand what users that match the target group of the “intervention”, the mobile learning applications, need.

As Lenz (2005) postulates education providers should be well informed about the social and individual conditions of potential participants. This is especially true in the field of mobile learning where solutions cannot be formulated according to pre-existing disciplinary matrices and learning design principles but have to reflect practical problems specific to the location and the learner (Nyíri, 2002).

User requirement elicitation ensures the acceptance of the developed system by the user and make sure that their needs are met. Those technologies turn out to be successful which are in line with the end users' needs (Shneiderman, 2002).

In the user requirement elicitation potential users are in general involved, they are asked to fill in a questionnaire or answer questions in an interview or discuss with each other in focus groups. User requirement analysis might also be complemented with literature analysis. While the methods vary the aim of a user requirement analysis is to come to very concrete recommendations that drive the technological development. These recommendations can be that specific that they can not be applied to other target groups or they can be on a more general level that makes the system to be developed usable by different kinds of users.

Baber et al. (2004), for instance, published a set of requirements on a quite general level. They see as basic requirement the following which they have extracted from discussions with people in the educational and/or technical realm: adapt functionality for learner characteristics and learning context; discover, access, evaluate, store, retrieve learning objects; monitor, utilise, evaluate learning outcomes; assist in the recovery of breakdowns and errors during and due to learning; and support the learner's mobility.

Different methodologies and techniques to gather the user requirements have been published but only a few are specific to the field of mobile learning. From the field of HCI design, however, several can be applied to mobile learning; for instance, the common rating system MoSCoW, according to which user needs to decide about each requirement whether:

Must: must have this

Should: should have this if at all it is possible

Could: could have this if it does not affect anything else

Would: will not have this time, but would like to have in the future

6. Summary – Part I

The aim of part I was to base the work on a theoretical ground and to further take theoretical considerations into account for the upcoming steps of user requirement elicitation and development of the pedagogical approach in part II and answering research questions of this dissertation in part III.

The first two chapters, chapters 2 and 3, concentrated on the target group of the mobile learning based intervention, i.e. marginalised young people, and their role in the area of tension between digital natives and digital immigrants. Marginalised young people are, as the term already implies, at the margins of society and are at risk of being excluded. Marginalisation is a staged process which takes place over time and which is the result of risk factors that are interlinked and seem to form a vicious cycle which is difficult to break for the individual. Factors such as relations to reference persons or other social resources, education, institutional support, etc. protect against marginalisation but the more resources are cut, the more likely is marginalisation going to occur.

Marginalised young people, as their peers, have grown up in a digitalised world where digital skills are increasingly required in a very competitive employment market. They are, on the one hand, so called digital natives, as they have grown up with Information and communication technologies which were not available in the previous generation but on the other hand they lack behind their peers in terms of access to different ICTs and their ICT skills. Thus, they are affected by the digital divide as they have only randomly access to computers

and the Internet and are thus cut off from the rest of the digitalised world and the information rich. However, marginalised young people own personal mobile phones which nowadays are instruments that have more functions than purely communication functions. Mobile phones have turned into multimedia devices that allow for taking pictures, recording videos, accessing the Internet, etc. In several initiatives this fact has been taken into account as does also Comeln. Technologies are now being used to close the digital divide they once created. Chapter 4 started with defining the term “mobile learning” and overlapping concepts and outlining the rather brief history of the mobile learning field. The state-of-the-art as well as mobile learning practices have been analysed and categorised. The chapter shows that mobile learning, in spite of the rather short history, has been widely used and for very diverse purposes: in formal as well as in informal learning contexts, from learning in museums to learning on field trips or for language learning support. However, many mobile learning applications have not reached the stage beyond an explorative and investigative phase as sustainability is a crucial issue. Besides other purposes mobile learning has been used for inclusion. In sub-Saharan Africa, where neither computers nor fixed landlines are standard in many areas, the opportunity of mobile phone in inclusion initiatives has gained attention. Thus, the approach of using mobile phones for inclusion purposes seems promising. Chapter 4 concludes with giving an overview of mobile learning theories that are slowly evolving. Theories from other related fields such as TEL are being imported and adapted to the mobile learning field and other theories are innate to mobile learning. Design principles are further investigated which will also be taken into account in the following part II.

PART II – THE PROJECT COMEIN

In part II the project Comein shall be shortly described; the consortium working together in this EU funded project as well as the different project steps.

The user requirements will be investigated to understand the needs of marginalised young people that have to be reflected in the development of the online mobile learning platform and the resulting online platform will be presented.

Furthermore, the pedagogical approach applied to the mobile online community in the Austrian pilot will be described.

7. Introduction

The project Comein, Online Mobile Communities for Marginalised Young People, was funded by the European Commission within the 7th Framework Programme and lasted for 26 months, from September 2008 to the end of October 2010.

A multidisciplinary consortium consisting of seven partners worked along to develop the online mobile learning platform for the target group: ATOS Origin (Spain, Coordinator), VideoCells (Israel, technical scientific leader), Inclusion Trust (UK, social partner), Dramaworks GmbH (Germany, film industry), Styrian Association of Education and Economics (Austria, social partner), Fondazione IARD (Later Metodi, Italy, evaluation) and Zentrum für Soziale Innovation (ZSI, Austria, socio-scientific partner).

The work was organised in nine work packages that involved several partners at the same time (c.f. www.comein-project.eu):

- WP 1 Project Coordination

The objectives of this work package are the administrative management, the technical co-ordination and the quality assurance activities of the whole project.

- WP2 Socio-scientific research and analysis of marginalised young people

The aim of this work package is to analyse characteristics of marginalised young people, their socio-economic background, behavioural attributes, and

psychological states and needs and finally to come to different profiles of marginalised young people. The results of this work package are based on literature review, expert interviews and focus groups with marginalised young people.

- WP3 Exploratory research towards defining online community for mobile devices

This work package investigates characteristics of online communities that can be transferred to mobile online communities and reviews the current online communities tailored to marginalised young people.

- WP4 Content design and interface for online communities for mobile devices

Work package 4 describes all specifications needed for the user interface and the content design.

- WP 5 Cellular Platform Infrastructure

The aim of work package 5 is to research and develop a software platform that receives videos from various sources and offers it to marginalised youth users with mobile handsets.

- WP6 User Interface and User Modelling

Specifications from work package 4 will be combined with widely accepted guidelines for development of mobile services user interfaces.

- WP7 Assessment and Evaluation

The main goal of this work package is to evaluate the online mobile communities' tools and services defining the state-of-the art technology for the provision of the service.

- WP8 Recommendations and Future Activities

The main goal of work package 8 is to produce a future research agenda in the field of ICT aimed at facilitating social inclusion of marginalised young people.

The work is based on literature review, workshops with consortium members and online video conferences with an established advisory board.

- WP9 Dissemination & Exploitation

The objective of this work package is to carry out dissemination of the project results by establishing and maintaining the project website, attending conferences, distributing leaflets, etc.

As project leader for ZSI, with the support of two other researchers, I was responsible for the work packages 2 and 8 and led the evaluation in WP7 in Austria. Additionally I in collaboration with my team worked on a pedagogical approach that could be applied to the scope of the project (which was not foreseen in the project plan) and conceptualised workshops for moderators of the platform and for participating young people.

As already mentioned in the introduction, synergies between my dissertation and the ongoing project evolved. I had the possibility to integrate my own studies into the project in terms of data collection, for instance data for the social network analysis (which was not the scope of the project) or for the statistical analysis of the log data. Thanks to the dissertation I had the possibility to explore some issues further which were only touched or were not part of the project such as the theoretical foundation in mobile learning. The project has surely benefited from my ongoing dissertation as has my dissertation from the project or even further, my dissertation has been made possible because of the project.

For the dissertation however I rely mostly on my own work which I introduced to the project but of course I also build on the work of colleagues at the same time who, for instance, were responsible for the technological development of the platform.

8. User Requirements

In order to develop a platform that suits the needs of the target group, user requirements were gathered in the framework of the project that were then translated into technical specifications.

In this subchapter however, more general user requirements that reflect the needs of the target group in relation to the intervention in general besides technical requirements will be analysed. Thus, these requirements shape also the pedagogical approach and concept of the intervention which have been developed for the pilot in Austria.

As research indicates, the media consumption by disadvantaged young people differs from their peers in their preferences of use and navigation, in their reading, writing and visual comprehension skills and differs (as recurrently

found) in the use for information versus entertainment purposes (c.f. Niesyto, 2009). Furthermore, similar to other products which are targeted to specific customers, the Internet is oriented towards a specific audience too. When offers in the Internet allow for specific use or is fed with specific contents which are not relevant for disadvantaged groups these are excluded due to their different media use and specific content preferences. Thus, it is clear that the intervention as well as the platform have to be specific to their needs and have to reflect these findings. Interventions need to be based on target specific concepts which match their aesthetic preferences. Therefore the intervention should meet marginalised young people where they are and attract their interest by offering them something they already know but at the same time bring them to the next level by challenging them and offering them new learning possibilities.

Any intervention that makes use of an online environment must be complemented with offline and online training as not the same skills among marginalised young people can be expected as among their peers (c.f. Niesyto, 2009). Studies such as the PEW, Internet & American Life Project, found that young people with lower educational level are less aware of privacy issues. Thus, how to deal with privacy issues must be an essential part of the training before going online.

Many marginalised young people have made negative experiences at school. According to researchers such as Parry (2006), they describe school in wholly negative terms and school “career” as a phase in their lives with negative and lasting effects on their self-perceptions. Negative experiences at school have led these young people to be disengaged at school, to play truant or to leave school early. School leavers furthermore criticize that school has only tried to teach them things which were not relevant to their lives. Learning as such which is associated with school has gained a very negative connotation.

Thus, it becomes clear that the intervention has to be conceptualised in a manner that is fundamentally different from school or at least different from how the young people have perceived school and learning.

Not only should the use of the term “learning” be very carefully adopted to make sure that the young people do not become disengaged right from the beginning of the intervention or lose their motivation early. Challenges and learning

opportunities must be relevant to their lives and as concrete as to apply directly to their everyday life (Du Bois-Reymond, 2005). According to Stoppacher (2010) a learning setting is required which is oriented towards the direct application of the learning outcomes, and which meets the concrete needs and is of direct use for the participants.

The roles of the adults in the intervention, the “teachers”, must be carefully designed and these must be trained to fulfil their role according to the pedagogical concept. Adults should not resemble the traditional teacher role; adult reference persons engaged in the intervention should not act like the “sage on the stage” but rather incorporate the role of a guide and facilitator, in line with Freire’s pedagogy.

If trainings are offered to marginalised young people, than these have to be conceptualised in a way that they not remind the participants of a school setting. Relevant issues should be explained in an interactive and playful manner and atmosphere.

The mobile learning based interventions needs to provide for new positive learning experiences which potentially stimulate “flow-experience” increasing one’s self-esteem (c.f. Jahnuainen, 1998). In the best case, these new positive learning experiences raise the awareness of the value of knowledge and education as an instrument which could contribute to a changed personal attitude towards learning in general.

As the OECD (2007) postulates institutions or training system which offer lifelong learning opportunities must be sure to create entry points for those with few initial qualifications, thus only basic (digital) skills shall be required by the participants in the intervention.

Marginalised young people need particular support for developing perspectives. Therefore information needs to be given in advance to allow for building up long term perspectives. At the same time excessive demand by a plenitude of choices should be avoided.

The content as well as the challenges offered to them must catch their interest and also need to have the potential to keep them engaged during the whole period of the mobile learning based intervention.

Content must be “hip”: This can either be achieved through an attractive design, content or the person to convey the challenge. This person could be a teenager

for instance, speaking to his/her peers providing the content of the learning modules, thus from peer to peer, so that participants could identify with. All transported information should be short, simple, concise, immediate, relevant, clear, and as concrete as possible.

The video format seems to be a suitable format for a mobile learning based intervention as it is a format they already know and they can deal with as they prefer visual content over textual content. Video platforms such as YouTube are seamlessly popular among people with lower as well as higher educational level but the first ones make more use of all the offered functionalities such as rating videos, commenting on videos, recommending videos to others and uploading their own videos (Schorb et al., 2008). Challenge videos should be no longer than a couple of minutes at maximum as it is known that the attention span as well as their frustration tolerance level is somewhat limited. Thus, this has to be taken into account in any offer to marginalised young people not only in the formatting of the challenge videos but also in the design of the intervention in general and in the roles of the adult facilitators in particular as they are the ones to offer support.

Support by adult facilitators or moderators of the platform as well as support by peers is crucial throughout the intervention. Facilitators must encourage new desirable behaviour and show them that their opinion is desired and is important too. Conflict management might be necessary as many marginalised show troublesome behaviour. Social contacts seem particularly important for marginalised young people as many are isolated and should thus be fostered: e.g. contact to peers (e.g. peer tutoring or tasks that address a group) and to facilitators (e.g. the content or challenge provider should be part of the community and/or has to be accepted by them).

In the design of the intervention, engagement through incentives enhancing the extrinsic motivation should be reflected. For intrinsic motivation it is important to show the significance, the importance and the aim of the specific task as well as the benefit in their everyday lives.

Some requirements referring to the technological development of the online mobile learning platform seem to be relevant for all different kinds of users but are particularly relevant for the target group. For instance, that the technology developed works reliably, fast and is accessible at any time is important for

most people but it is even more crucial for marginalised young people as they get easily frustrated and are more likely to drop off because of technological challenges as literature suggests. Not only is social contact important in the offline life but also in the virtual environment during the intervention which can additionally offer the possibility to enhance contact, online and offline, to connect participants to their peers and facilitators.

Their preference of visual based media should also be reflected in the design of the platform and the user interface. Navigation based on symbols (instead of texts) is more accessible to them; symbols as well as other visual elements would further increase understanding.

Moreover, a logical structure of all content and functions of the platform is needed as the participants may lack certain media competencies such as structuring information or finding information following selection criteria. To be able to personalise the platform according to their own preferences and to give their profile an individual touch might nurture their motivation to be engaged in the intervention.

These are some general principals and requirements that have impacted on the technological development and that have guided the pedagogical conceptualisation.

9. Description of platform

Based on the user requirements and technical specifications the platform was meant to host a virtual online community and thus the typical community features had to be embedded, such as individual profiles, the option to share information, to send personal messages, to create groups (smaller communities with invitation-only members) and to subscribe to groups.

In contrast to many other available online communities the platform had to be designed for mobile phones, for diverse sets of mobile phones, and had to rely mostly on visual based communication and content as reading and writing constitute challenges for some marginalised young people. Thus, the community had to be based on a platform that hosts video streams. As disadvantaged young people have only limited access to computers and the

Internet, the community had to be tailored in a way that only a mobile phone was needed to access the community.

Videos could directly be recorded with the built-in camera of the mobile phone and when connected to the Internet uploaded to the online mobile community.

When accessing own videos or others' videos, then the video was streamed to the mobile phone without the need to download it.

During the pilot participants from the UK and Austria logged onto the same platform at the same time but the user interface was shown in English in the UK and in German in Austria.

The following screen shots of the mobile online community user interface shall illustrate the look-and-feel of the platform as well as its functions will be explained in detail.

The following screen shot shows the log-in user interface.

When users have registered to the platform, they could login with their chosen user name and their password. For the pilot study the community was limited to the participants in the UK and Austria who had signed a consent form (or a legal guardian). To secure a closed environment it was only possible for moderators of the platform to register participants, an email address was not required to register.

The login information can be stored in mobile phones, so there is no need to type in nickname and password every time of access.



Figure 10: Log-in user interface

The following user interface shows a profile of a (fake) participant. Next to the logo of the project a personal picture has been uploaded. Below the picture there are four symbols which, when clicking on, lead to different sites of the platform. The first one, the home button, leads to the welcome page which is the personal profile. The second icon, the little manikins, leads to the friends' list. The third one from the left, the film icon, leads to the list of the latest videos that have been uploaded. The last icon, the speech bubbles, leads to the list of groups.

The home page gives a good overview of latest news, own videos, subscribed groups and personal messages.

Under the title "Neuigkeiten" (news) the latest news can be seen. When somebody uploads a video or creates a group this appears here.

For instance, here we can see that the user "mig" has lately uploaded several videos to the platform.

When the user clicks on "Neuigkeiten" she or he accesses a longer list of news. Furthermore, it is possible for the user to click both on the nickname of the user

who is mentioned in the news as well as his or her uploaded video. Thus, other users' profile and their uploaded videos can directly be accessed from here as well.

The title "Meine Videos" (my videos) shows a short list of the own uploaded videos. When clicking on the title of the video (here for testing purposes the title consists only of numbers) it can be accessed and when clicking on the title the complete list of uploaded videos is shown.

Under the heading "Meine Gruppen" the names of groups the user has subscribed to appear. When clicking on the heading the complete list of subscribed groups is shown. Groups have the function of allowing users to create their personal space and share information with other people they have invited to join this space. When a user subscribes to a group his or her membership has to be authorised by the group creator. Only then can a user access the group's page. User groups were moderated by the participants themselves but also the adult moderators of the platform who were hired for the purposes of the pilot study created their own groups to upload challenge videos. These will be described in chapter 10.

Finally the last heading "Meine Nachrichten" (my messages) shows the latest messages sent to the person by other users. When clicking on the heading a complete list of messages appears. These messages are textual and similar to an ordinary text message are limited to 160 characters. They are personal, thus they cannot be accessed by other users including the adult moderators of the platform.

When clicking on another user's profile only part of the information given on one's own profile is disclosed. Other users' profiles show their uploaded profile picture, their list of uploaded videos and their list of subscribed groups.



Figure 11: Profile page

Figure 12 shows the video page which appears when a user clicks on a video title (e.g. in the list of videos or on a friend's profile). It shows the title of the video (Folge 1) and below there are two blue icons: the play-button on the left to watch the video and the reply-button on the right to upload a reply video that is

than associated with the video “Folge 1” and is shown than on the video page under “Wer hat auf mein Video geantwortet” (Who has replied to my video).

The video can be added to one’s favourite videos (zu meinen Favoriten dazufügen; it appears then on the personal profile page).

Furthermore, the video can be rated (Bewerten) with one to five stars by simply clicking on the number of stars and pressing “senden!”. The average value (Durchschnitt) of all ratings is shown above (in this case it is 0 as no one has rated the video so far).

Additionally, the box at the bottom of the video page the list of all persons who have watched the video (Wer hat mein Video angesehen) is revealed. In this case it was only one person (Elisabeth). Again the user can directly access the other’s user profile by clicking on his or her nickname.

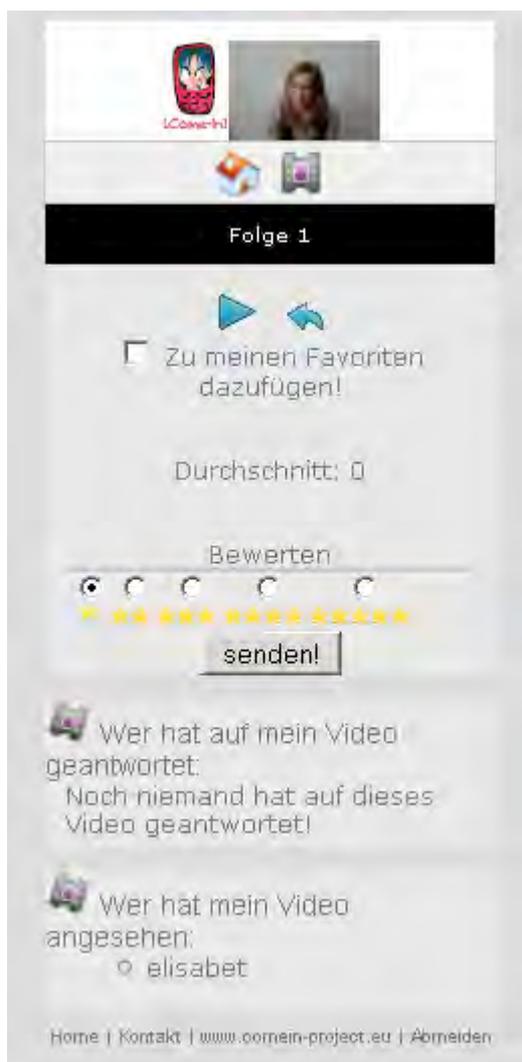


Figure 12: Video page

Figure 13 shows the group page named “Max lmal-Folge 1”. The icons above the name of the group indicate the following:

The first one from the left, the speech bubble with the plus symbol, allows creating a new group when clicking on it. The second one, the speech bubble with the cog wheel allows the user to subscribe to other groups. The other icons are to be found also on the profile page and have already been explained above.

Under the name of the group a short description of the group is given (Beschreibung) and the nickname of the moderator is revealed (in this case Elisabeth). Furthermore, the group page contains the list of videos that have been added to this group (in this case there is one video that has been added: Folge 1 by Elisabeth). Below the list of members is shown (in this case the group has four members: andrea, cervi, Elisabeth and Hallo). When clicking on the names, their profile pages again can directly be accessed.

In the empty box at the bottom of the group page messages can be entered and sent to the group. These can only be accessed by group members and appear on the group’s page in the very bottom (here these messages have been cut).

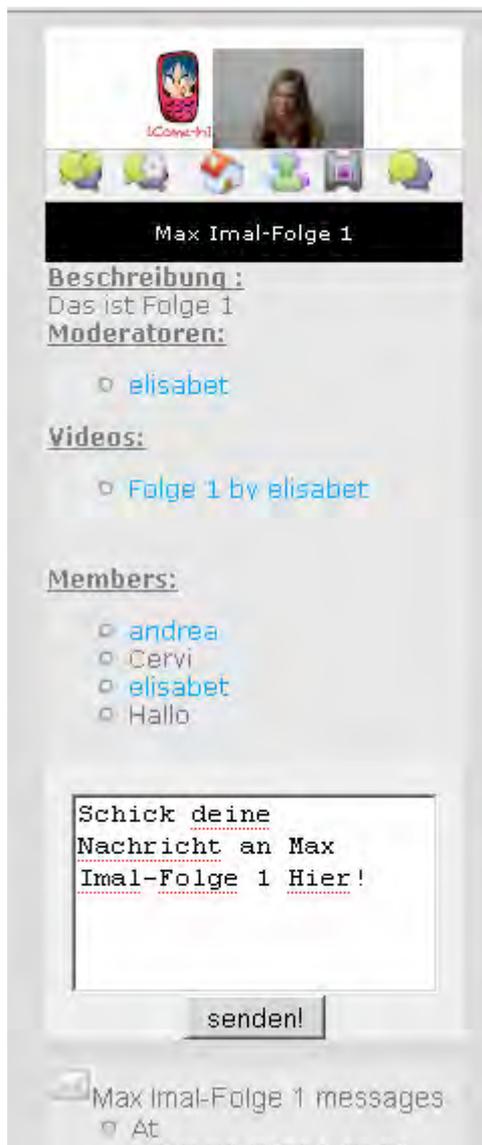


Figure 13: Group page

The illustration below, Figure 14, shows the list of groups that are available to subscribe to. When the user has been authorised by the moderator of the group, he or she can access the group's page.



Figure 14: Subscribing to groups

Figure 15 gives an overview of groups one has subscribed to and other groups (Alle Gruppen).



Figure 15: Overview groups

Thus, interactive features that may contribute to the development of a virtual community on the platform are: sending personal messages to specific persons, sharing videos with specific others or with the whole group, rating others' videos, reacting to others' videos by uploading reply videos, creating groups to discuss topics of interest with invited members, and sending messages to these groups.

10. Pedagogical Concept

Learning goals defined within the Comeln study comprised training employment skills and learning skills of the young participants, who were neither in employment nor enrolled in any educational activity, by means of the online mobile learning community in order to prepare them for the labour market or to motivate them to continue with education.

While for the whole pilot study in Austria and the UK moderators of the platform were installed who had a similar role in both countries, i.e. to supervise the activities on the platform and to offer support to single participants, for the pilot study in Austria additionally specific content with tasks were created to be solved on a volunteer basis by the participants.

In the pedagogical approach that was developed specifically for the Austrian pilot the following pedagogical concepts were taken into account:

According to Vavoula (2007) a productive pedagogical vision recognises the cultural emergence of innovative educational practice following Bakardjieva concept of appropriation or "technology-in-use-in-social situations", and what by other researchers is often named as "learner-generated context". Thus, participants could generate their own learner context as they learnt where they were and created situations, e.g. for shooting videos to share on the platform, they wanted to use. The pedagogical approach further allowed for appropriation as young people could use the platform not only for learning purposes but for self-defined purposes, such as showing their interests, communicating with others, reflecting on their daily activities, etc. which then in turn could represent learning materials for other participants as they had the option to learn from each other and not only by means of the given challenges.

The following pedagogical visions and philosophies of learning, which have been earlier explained, can be associated with the Austrian pedagogical approach: constructive learning, situated learning, communities of practice, conversational learning and learning in-context.

It is based on constructive learning in the sense of Dewey and Vygotsky. Dewey postulates that teaching should take into account student's actual experiences and that it should emphasise active learning. Thus, for the pilots challenges have been formulated that build on experiences of the participants and that require solely basic skills, which give them the opportunity to learn but do not overstrain them. Vygotsky believes that through interaction and cultural mediation children "internalise" rules and the habits in their culture, from speech patterns to symbolic knowledge. According to his notion, the "zone of proximal development", which describes the next stage as potential of human cognitive development, can be reached with guidance. This acknowledges that the outcome of learning is greater when it does not happen in isolation but rather in social interaction. This has been taken into account by allowing the participants to collaboratively solve challenges by enhancing interaction between them. The moderator of the platform served as guide in this learning path to the "zone of proximal development".

In the constructive learning approach the transmissive model of teaching has been omitted in favour to a constructive or sociocognitive model with the learner at the centre of activities. The focus lies on learner control; learners decide on their learning path depending on their level of knowledge and needs. In our study challenges are offered to the participants but they are not forced to solve them but do not have to quit if they do not make use of this opportunity. In this sense, it is "self-service" education as the learners choose what they want to learn but might also need support which is offered to them by the moderators.

In the radical form of constructivism no content is provided at all but the users create the content. In this case, a (mobile learning) course starts only with the communication facilities but without any content (Taylor et al., 2005). Learners decide which content they want to share while teachers act as facilitators. This radical form of constructivism has been followed in the pilots in UK where no challenge videos were given to the participants. Participants themselves shared videos of interest on the platform and created groups to discuss topics that were

of actual relevance to them. Therefore, they learnt mainly from each other but were also supported by facilitators on the platform.

In Austria, the pilot was also based on a constructive learning approach but not in this radical form. Challenge videos were regularly uploaded to the platform as provided content. Additionally, the Austrian pilot participants had the same opportunities on the platform as in the UK, i.e. share videos or discuss relevant topics and thus to learn from each other.

According to the situated learning theory an active learner moves from a “newcomer” to an “oldtimer” within their learning community, the so called “Community of Practice”. Situated learning is learning that takes place in the same context as it is applied and knowledge is the product of a social process whereby knowledge is co-constructed. This is made possible as the context of learning is defined by the learner as it takes place mobile. The Communities of Practice (CoP) in opposition to traditional learning environments lack hierarchy since all members interact as peers. The emphasis lies on inventiveness, evolution of ideas and direction of community. The lack of hierarchy has been reflected in the design of the role of the moderators of the platform which did not have the function of a sage on the stage but rather the function of supervision and offering support.

The study is furthermore based on conversational learning as it enhances conversations between learners to support each others, and conversations between teachers and learners.

Besides these pedagogical paradigms that are reflected in the pedagogical approach of the study learning happens in-context in the sense of Jones et. al. who argue for fun, learning-in-context and continuity between contexts as affective aspects of mobile learning. This has been realised by a playful approach and by learning which is mobile.

In terms of content McKenzie (2002) claims that teachers should design contents in multiple formats to enhance accessibility for learners with different needs. Further learning materials should be based on various perspectives and ways of doing things. Ally (2009b) recommends to make use of the possibility to create multimedia content and thus to make the learning experience more engaging. All these recommendations have been taken into account when

developing the challenge videos. As the video format was the format of choice it is multimedia content; several different challenge videos have been created for each single learning step to allow for different perspectives.

Researchers further claim that to be in control of the own learning and also of the learning technology to promote a sense of ownership and as motivator (c.f. Jones et al., 2006; Kukulska-Hulme et al., 2007; Ravenscroft, 2000) are important. Thus, the participants of the study were all equipped with their own mobile phone which they could also keep after the end of the pilot study.

To enhance interaction and to allow users to react to the challenge videos as well as to other videos, the so called ping-pong approach has been developed by the Comeln project. Following the ping-pong-structure every video (“ping”) can be related to by uploading a reply video (“pong”) and this in turn can further be related to with still another uploaded video.

Thus as Figure 16 shows, the Austrian moderators of the platform could upload a challenge video, participants could react to the challenge video by uploading an answer video and then other participants could comment on that answer video by uploading other videos relating to the reply video and moderators could upload a feedback video.

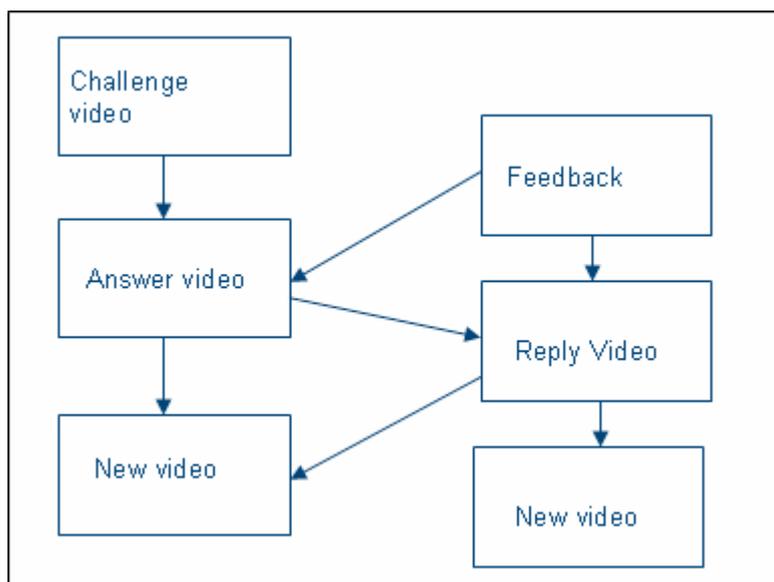


Figure 16: Ping-pong approach

The ping-pong approach was developed as reciprocity concept to enhance interactivity on the platform and to stimulate contributions of pilot participants.

The pedagogical concept was in detail developed with the moderators of the platform in the framework of several workshops. The role of the moderator was defined and new moderators were trained before the pilot start to best fulfil the role.

The main learning goal for the participants was to train their basic skills relevant for the employment market, for getting a job but also for keeping the job and be at the same time aware of the own rights and duties.

Together with the moderators learning steps with several different challenges relating to each learning step were created that help to reach the learning goal.

The final learning steps were the following:

Table 7: Learning steps

1	Self introduction
2	Self organisation
3	Motivation
4	Job portraits
5	Finding jobs
6	Job application
7	Job interview
8	Keeping a job, job routine
9	Difficulties at the job
10	Social norms and rules at work
11	Strategies and future steps
12	Help and support

At the beginning of each week, moderators would upload several challenge videos and than at the end of the week upload feedback videos. The learning steps were sequenced in a way to become more complex from week to week.

The challenge videos were created to stimulate participation of the young people but did not have a mandatory character. Neither was the way of the answer videos predefined. The participants could create answer videos on their own, collaborate with others, simply speak into the camera, “act” or record something.

Learning step 1 had the aim to make the participants aware of their own strengths and to be self-confident about the own skills. Learning step 2 deals with self organisation, time management, orientation in the city or the

surrounding. In learning step 3 participants should reflect upon self-motivation and incentives that they use to motivate themselves. Step 4 has the aim to make participants aware of different job opportunities, in step 5 about how to find a job and in step 6 how to apply for a job. In step 7 participants should ask themselves how best to prepare for a job interview. Learning step 8 should make participants reflect upon which rights and duties are associated with employment, which routines are required and thus, how to keep a job. Step 9 deals with difficulties that may arise at work. Step 10 deals with social rules and norms at work and how to react to conflicts. In learning step 11, participants are asked to think about their future and to set goals and next steps they would like to achieve. Finally, in step 12, participants would be asked to think about where to get help and support in case of difficulties.

For each learning step several challenges with different formats have been prepared. One format was realised with hand puppets and the other two formats in group work with young people and other youth workers in Vienna and Styria. All challenge videos were taken with the same equipment as the young people had at their disposal during the pilot, i.e. a mobile phone with a built-in camera without later editing. The videos were shot based on a simple dramaturgy and a simple script which were elaborated in collaboration with the moderators of the platform. The length of the videos is not longer than 40 seconds.

In the following some still images of the challenge video with the hand puppets are shown. The ones with the young people and the moderators of the platform are not shown here due to data protection issues.

Step 1: Self introduction



Figure 17: Step 1

In this challenge video, the character of the story presents herself: Her name is Max Imal. She wants to get to know the participant and would like to know what he or she likes or does in his or her spare time. Max Imal invites the participant to take the mobile phone and shoot a video in collaboration with others or alone.

Step 2: Self organisation



Figure 18: Step 2

Max Imal (in front of the metro time table) has a job interview tomorrow and asks the participant to give her some advice how to reach the destination in time.

Step 3: Motivation



Figure 19: Step 3

Another puppet, the frog, notes that Max Imal looks rather unmotivated and starts a discussion what to do on a lazy day if he is not eager to go to work. At

the end they ask for advice, what else could be done in such situations to enhance one's motivation.

Step 4: Job portraits



Figure 20: Step 4

Max Imal meets Jenny (in front of a manipulated computer) and asks her about her job. She is a system technician and tells Max Imal about the things she likes about her job. At the end Max Imal asks into the camera which other jobs could be interesting.

Step 5: Finding jobs

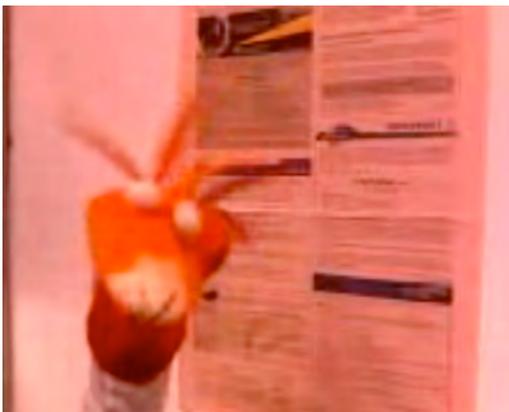


Figure 21: Step 5

Max Imal (in front of job advertisements) has decided that she wants to become a system technician too but she does not know how to search for an apprenticeship positions. Thus, she asks into the camera, how to best search for a job or an internship.

Step 6: Job application



Figure 22: Step 6

Max Imal (in front of her picture and a computer screen with her Curriculum Vitae) points to her picture and says that it is the picture for her Curriculum Vitae, that she has given her best look for the picture. Finally she asks into the camera for advice what to think of when preparing a CV.

Step 7: Job interview



Figure 23: Step 7

Max Imal (in the bath room, in front of a mirror) has a job interview and is really nervous about it. She asks at the end how she shall dress herself and what other things she should keep in mind.

Step 8: Keeping a job, job routine



Figure 24: Step 8

Max Imal (with scarf around her neck and different medicines around her) has obtained an apprenticeship position to become a system technician. She is so happy about it that she does not want to risk the job for any reason and so she takes different medicines in order to stay healthy. The other puppet warns her not to overdo it and says that she simply needs to respect basic principles that are relevant at work. He asks into the camera which principles these might be.

Step 9: Difficulties at the job



Figure 25: Step 9

Max Imal is happy about the job but she doesn't like the many extra hours and a colleague always being late. She asks then into the camera what to do in such situations and invites participants to share own experiences.

Step 10: Social norms and rules at work



Figure 26: Step 10

Max Imal in the meantime complained about her colleague to her boss and now the colleague is angry about it. The frog recommends Max Imal to go to speak to the colleague directly. Max Imal asks into the camera what rules are important in collaboration with others.

Step 11: Strategies and future steps



Figure 27: Step 11

Max Imal is still doing well at work. In about three years she will have completed the training and then she would like to become self-employed and then she would build her own house and then maybe go to university and and and. The frog reminds her that they should have met an hour ago to prepare for an exam. Max Imal concludes that she needs to concentrate on the next and immediate steps and asks into the camera what ideas participants have about their future.

Step 12: Help and support



Figure 28: Step 12

Max Imal is angry because one of her colleagues is treated unfairly. She does have to do the dumbest jobs and nevertheless she is being criticised all the time. Some days she has already been away sick and once Max Imal found her crying. Max Imal would like to help but does not know how.

The above descriptions aimed at illustrating the character of the challenge videos.

The moderators of the platform had predefined roles. Youth workers and social workers with a long experience in working with marginalised young people were engaged as moderators of the platform. In Vienna there were three moderators, in Styria two and in the UK two.

In Vienna the moderators alternated each week so to have always one responsible moderator.

The tasks of the moderators were the following: They needed to upload the challenge videos and the feedback videos on a weekly basis. Also it was their responsibility to set interventions if needed: to speak to the participant, to call the participants or to send messages.

Interventions were necessary when inappropriate content was uploaded to the platform, when technical problems aroused (which then needed to be communicated to the research team), when somebody needed support, and in general to facilitate the participation by all.

11. Summary - Part II

In part II the project ComelIn is briefly described as well as the differences on the one hand and the synergies on the other hand between the dissertation and the project. The project ComelIn is an EU funded project with seven partner organisations who have worked together for 26 months to realise an online mobile learning platform hosting uploaded videos and streaming these to mobile handsets.

Within this dissertation own research could be combined with work that has been carried out in the framework of the project.

User requirements are discussed in chapter 8. Some marginalised young people, for instance, experience challenges in reading and writing. Thus, the platform as well as the learning material and the interaction on the platform were based mainly on visuals. For many marginalised young people “learning” and “school” are negatively connotated. Therefore, the pedagogical approach had to be fundamentally different from school.

These as well as many other user requirements were translated into technical specifications for the development of the platform and guided the development of the pedagogical approach.

The platform and its functions are described in detail in chapter 9.

Interactive features that contribute to the development of a virtual community on the platform are: sending personal messages to specific persons, sharing videos with specific others or with the whole group, rating others’ videos, reacting to others’ videos by uploading reply videos, creating groups to discuss topics of interest with invited members, and sending messages to these groups.

The pedagogical approach realised for the purposes of the pilot allowed for appropriation as young people could use the platform not only for learning purposes but also for self-defined purposes. The following pedagogical visions and philosophies of learning can be associated with the Austrian pedagogical approach: constructive learning, situated learning, communities of practice, conversational learning and learning in-context.

The focus lies on learner control; learners decide on their learning path depending on their level of knowledge and needs. In our study learning tasks in form of challenge videos are offered to the participants but they are not forced

to solve them and do not have to quit if they do not make use of this opportunity.

The lack of hierarchy has been reflected in the design of the role of the moderators of the platform which did not have the function of a “sage on the stage” but rather the function of supervision and offering support. Youth workers and social workers with a long experience in working with marginalised young people were engaged as moderators of the platform. In Vienna there were three moderators, in Styria two and in the UK three. Interventions by the moderators were necessary when inappropriate content was uploaded to the platform, when technical problems aroused (which then needed to be communicated to the research team), or when somebody needed support. Together with the moderators learning steps with several different challenges relating to each learning step were created that help to reach the learning goal.

At the beginning of each week, moderators would upload several challenge videos and then at the end of the week upload feedback videos.

The main learning goal for the participants was to train their basic skills relevant for the employment market, for getting a job but also for keeping the job and at the same time be aware of the own rights and duties.

PART III – EMPIRICAL PART

In part III all research questions to be investigated empirically shall be answered.

Part III begins with a description of the pilot study in Austria and the UK and the description of the participants, the sample of the pilot study. Later the methodologies used will be described, i.e. the statistical analysis of the collected log-data as well as the social network analysis. The quantitative analysis will be used to understand use patterns of the participants on the platform and to test difference and correlation hypotheses. Social network analysis will be relevant to explore community aspects. An overview of the research questions is given in chapter 1. Part III concludes with a summary and conclusion of the empirical part.

12. Pilot description

The definition of the target group in the project was young people between the age of 14 and 21 who were neither in education nor in employment and were thus economically and educationally disadvantaged in comparison to their peers. Obviously as the literature review reveals disadvantages are interlinked and clustered, thus these disadvantages are only two of those they have to struggle with.

The participants were selected according the definition of the target group in the project. In Vienna all participants were young people who visited the same youth organisation and also the Viennese moderators of the platform were youth workers and social workers working for this organisation.

Before the pilot start researchers had prepared a consent form which was distributed by the youth workers to interested young people. Only when the consent form was signed by a legal guardian or by themselves in case they were above the age of 18 they could take part in the pilot study. The consent form contained information about the project, its framework conditions (length, data collection), and benefits for the participants (no costs).

The pilot was supported by three face-to-face meetings with the Vienna research team. During the whole period of the pilot the youth workers were available for face-to-face contact as well.

The kick-off of the pilot started with so called “Welcome workshops”, at half time of the pilot an intermediate workshop took place and finally the pilot concluded with a farewell party and debriefing.

Welcome-workshops were organised in Austria and in the UK in smaller groups with around eight young people each. These sessions differed somewhat from location to location. Thus the following descriptions refer to the workshops carried out in Vienna.

In Vienna, welcome-workshops had the following structure. After a short fun game to get to know each other, the project and the pilot study were introduced to the participants within a presentation. This presentation comprised information about the schedule of the pilot, the aim of the pilot (participants were invited to join the pilot study as co-researchers to help the research team to develop the platform further), and the ping-pong-approach. Rules such as netiquette issues, which needed to be respected on the platform, as well as limit of costs for the mobile phones, were discussed with the group in an interactive manner. Netiquette rules that were particularly relevant were: Treat others with respect on the platform, be aware of your own privacy, be careful with your words and your videos, support others and share your knowledge and your experience with others. From the research team confidentiality and anonymity of the data was secured.

As incentives for their participation served the free use of the platform, the mobile phones which would be given to them as a gift after the end of the pilot (if they had not dropped out) and a certificate about their successful participation.

Additionally the participants were asked to sign an agreement that contained their rights and duties. Also they were asked to fill in a questionnaire that was needed for the social network analysis.

After a break (lunch), the participants were gathered in smaller groups where they finally received the mobile phone and in interactive session the participants accessed the platform and got to know all its functionalities. During these

smaller workshop sessions single participants were called for individual short interviews.

The intermediate workshop after the first half of the pilot had the purpose to gather first impressions by the participants and the moderators. Only some of the participants with striking use patterns were invited to take part (participants with high versus low participation rates). Focus groups and interviews were carried out in the framework of these workshops.

The farewell party and debriefing session took place at the end of the pilot. All participants and moderators were invited to take part. After a short introduction, participants were again asked to fill in the second social network analysis questionnaire. Then three small focus groups with 8 people each were arranged. After a break (coffee and cake), the highlights of videos participants had uploaded during the pilot and mishaps when shooting the challenge videos were shown. At the end the certificates as well as the mobile phones were ceremonially handed them over.

For the selection of the mobile phones for the pilot some criteria had to be taken into account, most importantly, they had to be capable of accessing the 3G Internet and they had to be equipped with a camera.

For the pilot in Vienna the Nokia E71 was chosen, for Styria the Sony Ericsson W595. In the UK the participants were equipped with the following handsets: Nokia E63, Nokia XpressMusic 5530, Nokia E52, and Nokia N97.

While initially we had thought of relying on the mobile phones of the participants which they already had and provide them with prepaid cards to take part free of costs, this idea had to be given up in favour to new mobile phones. Their mobile phones would have been very difficult to technically support and also not all of them would have met the technical requirements.

As the mobile phone given to them should not simply be the “research mobile phone” but should become their personal device during the pilot they received a high credit to spend: calls, text messages and data were free of costs for them (with quite high limits).

13. Data protection

Data protection has been secured to the participants during the pilot and consent forms have been signed by the legal guardians which informed them about the handling of the data.

Data privacy is a particularly sensitive issue in evaluation processes of mobile learning applications as intrusion in a private sphere of a learner may occur, for instance, when log data are taken into account.

In the framework of this dissertation, neither real names of participants are revealed, nor will the organisation young people visited be named as such. Neither pictures of the participants nor still images of the videos they have taken have been integrated in this work. Furthermore, the nick names they have chosen to log onto the platform have been switched.

Log data of the user traces of the platform saved statistical data only. No personal messages or groups created by the participants could be accessed by the researchers.

14. Sample description

In this chapter the whole sample as well as a more detailed description of the Austrian and in particular the Viennese and the Styrian sample will be given. It is important to keep in mind that some of the analyses take into account the whole sample in case data from the whole community was available while other analyses have to build only on the Austrian part or the Viennese part of the sample. This is due to the fact that not in all regions the same data collection plan was followed. Data that serves as basis for the dissertation at hand was specifically gathered for this purpose and was not part of the Comeln project.

Thus, the log files are available for the whole community as it is an automatic storing of traces of users on the Comeln platform. All other data refer only to the Viennese sample.

However, in the various chapters it will always be mentioned to which portion of the sample the analysis refers to.

In total there were 95 young people and 7 moderators who finally took part in the Comeln project.

Around half of them took part in Austria and half of them in the UK; within the two different countries the participants were living in different regions as displayed in Table 8.

Table 8: Sample in Austria and UK

Austria		UK	
region	n	region	n
Vienna	24	London	16
Styria	23	South West	8
		East of England	8
		North West	5
		Midlands	11
Sum	47	Sum	48

The gender composition was rather balanced within the whole sample with 56.3% males and 43.8% females. However, there were significantly more male participants among the Austrian sample with 18 females and 30 males.

The age span of the participants ranged from 13 to 22 years (c.f. Table 9) while around 47% were between 13 and 16 years old and 53% between 17 and 22.

Table 9: Austrian and UK sample by age

Age	Austria	UK	Sum
13	0	2	2
14	0	4	4
15	8	13	21
16	12	6	18
17	9	10	20
18	11	5	16
19	2	6	8
20	3	2	5
21	1	0	1
22	1	0	1

Not all participants could start on the same date because Welcome-workshops needed to be arranged in different regions one after another and because of technical problems that lead to a delay of the pilot start in Styria and the United Kingdom. Other reasons for a later start among some participants were due to personal reasons such as cases of illness.

The first welcome session took place on the 5th of February 2010 and the pilot ended at the end of April.

To get more insight into the evolution of the pilot over time some data will be analysed according to the different weeks of the pilot, from week 1 to week 12. However, it has to be taken into account that for an easier handling of the data week 1 and week 12 have been accumulated. Since the Kick-off of the pilot took place already on Friday, the 5th of February and not on Monday under week 1 also the date of the Kick-off and the weekend were added. Thus, week 1 is actually not 7 but 10 days. Similarly, week 12 ended already on Friday, the 30th of April and thus does comprise only 5 instead of 7 days.

An overview gives Table 10.

Table 10: Weeks of the pilot

Week 1	Feb 5-14
Week 2	Feb 15-21
Week 3	Feb 22-28
Week 4	Mar 1-7
Week 5	Mar 8-14
Week 6	Mar 15-21
Week 7	Mar 22-28
Week 8	Mar 29- Apr 4
Week 9	Apr 4-11
Week 10	Apr 12-18
Week 11	Apr 19-25
Week 12	Apr 26-30

Due to the different reasons mentioned around 70% of all participants could be registered in week 1. Until the end of week 2, already 90% were registered, and the sample was complete in week 6 as Table 11 reveals.

Table 11: Registration of participants

	n	%	cum %
week 1	67	70,5	70,5
week 2	6	6,3	76,8
week 3	12	12,6	89,4
week 4	2	2,1	91,5
week 5	1	1	92,6
week 6	7	7,4	100

In the course of the pilot there were several drop-outs. One participant of the Viennese sample quit already after a couple of days because he did not want to participate anymore. Already in the interview during the welcome-session the participant showed hesitations against the project and told the researchers that his mother had forced him to take part but that he himself was not interested in the project. This person was replaced on the 3rd of March by another participant.

Of the Viennese sample two other persons lost their mobile phone towards the end of the pilot, on April 16th and 20th, respectively.

These two people could therefore not take part anymore. The exact date of the drop-out is difficult to tell since one of them just told several days later after the actual loss. One person entered the wrong pin three times in a row and thus could not turn on her mobile phone anymore. She only told the moderator two weeks later who gave her the puk to unblock the mobile phone. This person could then again take part after two weeks of not being able to participate. The most likely reason for these late notifications was that the participants felt ashamed according to the moderators.

Of the Styrian sample three mobile phones were stolen or got lost. Of these one was replaced and thus, did not lead to the drop-out of the participant. The remaining two phones could not be replaced and the two young people had to leave the project on 8th of March and 14th of April.

Among the British participants three mobile phones got stolen or were lost. Two were replaced, in one case one was replaced only a month later. Thus participation in this case was not possible for that time (Feb 17th-mar 17th). This person lost the new mobile phone then again on 5th of April. The third person continued accessing the platform via PC.

Figure 29 shows the total number of participants that has been reached by week 6 and the number of participants when drop-outs are taken into account. These include permanent drop-outs (that lead to an exclusion from the pilot) as well as short-term drop-outs (that are not available for some time).

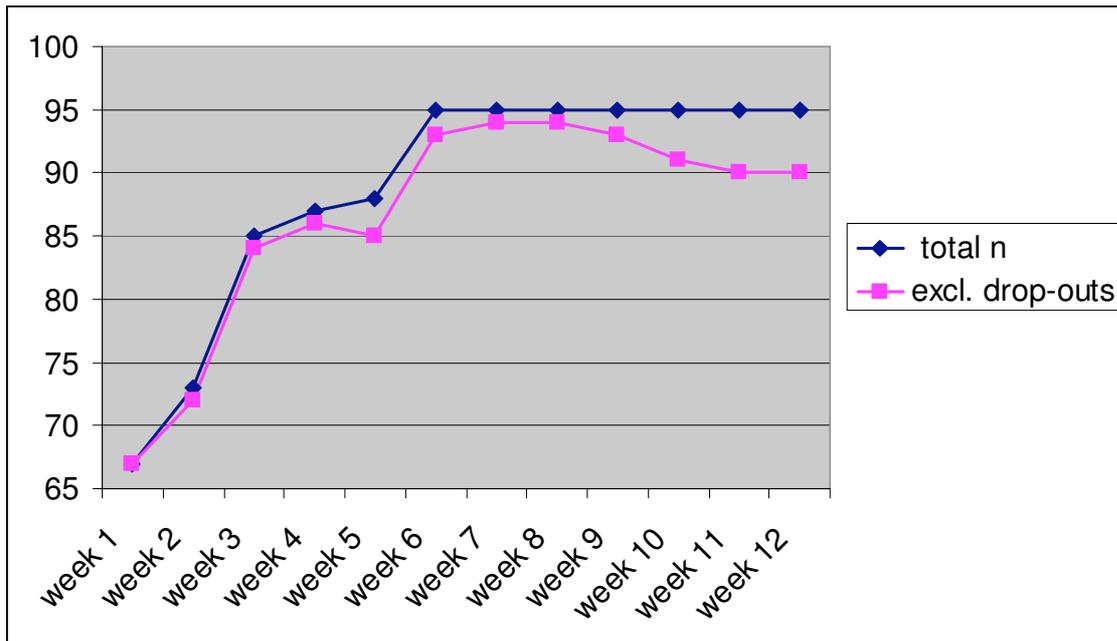


Figure 29: Total number of participants and drop-outs during pilot

Because the number of the participants is not constant over all weeks of the pilot when possible average numbers as relative measure will be given.

The total amount of participation in terms of time spent online on the platform or number of uploaded videos could even have been higher if drop-outs had not occurred. For instance, if there would have been enough devices to substitute the lost ones. Thus, the numbers might represent a slight underestimation of the potential participation.

However, the pilot represents the real picture as also in other interventions probably not endless number of devices would be available.

14.1. The Austrian sample

The Austrian sample comprises 30 male and 18 female participants.

This skew distribution of the two genders in Austria seems to reflect the actual situation of young marginalised people in the country. Male youngsters who are at the risk for marginalisation are more visible than their female counterparts who often carry out typical female attributed roles in the family household. Male at-risk youngsters sometimes show violent behaviour or other behaviour to make others notice about their state and this might be a reason why males are overrepresented in Austrian initiatives that aim at inclusion for the target group.

Table 12: Austrian sample by region, gender and age group

region				Age class		Sum
				13-16	17-22	13-16
Vienna	gender	male	n	7	11	18
			% of Sum	28	44	72
		female	n	2	5	7
			% of Sum	8	20	28
	Sum	n	9	16	25	
			% of Sum	36	64	100
Styria	gender	male	n	5	7	12
			% of Sum	21,7	30,4	52,2
		female	n	6	5	11
			% of Sum	26,1	21,7	47,8
	Sum	n	11	12	23	
			% of Sum	47,8	52,2	100

As can be seen in Table 12 the overall age distribution in the Styrian sample was well-balanced with nearly half of the participants below the age of 16 and the other half among that age. In the Viennese sample the age group of 17-22 was slightly overrepresented with 64%. In the overall Austrian sample the ratio was 42% to 58% of the younger to the older age group.

In Styria there were two moderators of the platform, while in Vienna there were three.

14.1.1. The Vienna sample

Of the original 24 participants one had to be replaced because he chose to quit after one week.

The three moderators as well as the young participants in Vienna were all from the same youth organisation. This organisation aims at introducing young marginalised people to the first employment market through apprenticeships. Young people with learning disabilities and developmental delay receive training at the organisation and different company cooperation partners. This training together with psychological counselling and social support and cognitive training should prepare them for a specific job.

The three Viennese moderators are youth workers at this organisation. All three of them have been working in the field for several years.

To get some additional information on the Vienna sample at the beginning of the pilot individual interviews with all participants were carried out.

Of the 24 participants, 58% had a lower secondary education degree (Hauptschule). The others had either dropped out of school after completing compulsory school age or had attended special schools (Sonderschule). None of them was currently engaged in formal educational activities. In average, they were 1.5 years out of school, being 5 years the maximum and 1 month the minimum. The majority, around 70%, had not actively searched for a job or sent an application in the previous three months.

In relation to the use and access to ICTs, the results indicate that around 70% were already members of a social network platform. Facebook and Netlog were most frequently mentioned in the interviews. All of them had a mobile phone; eight had a Nokia mobile phone, nine had a Samsung, five a Sony Ericsson and only one a Siemens and one an LG mobile phone. More than 70% said that they were very interested in high-end mobile devices. A few people had advanced knowledge about mobile phones currently on the market. This became obvious when they were asked which mobile phone they would like to possess and they mentioned the iPhone along with Blackberry or specific Nokia models. More than two thirds of the sample claimed to have often access to a computer, while the remaining third had only occasional or rare access. When asked which software or tools they used, games were mentioned most often followed by search engines such as google, as well as word processors and spreadsheet editors. Also programmes to listen to music, watch movies and to look at pictures, and programmes for emailing were named. Most stated that they had a computer at home, two of them said that they personally owned a PC or a laptop.

Frequent access to the Internet was mentioned by 45%, 33% had occasional and 17% rare access, while the place of access was in most cases also at their homes or at the Internet café.

Among the Vienna participants there was one illiterate person. Some young people were diagnosed with psychological and psychiatric disorders. Most of them came from socially difficult families. Thus, all of them, besides being

economically and educationally disadvantaged were faced with other challenges in their lives as well.

14.2. Moderators on the platform

In total there were 7 moderators on the platform, 2 in the UK and 5 in Austria, 3 of these in Vienna and 2 in Styria. Two were females and the rest were male moderators.

15. Methodology and results

This work relies mostly on quantitative analysis of the log data and social network analysis of log data and two specifically created surveys that were completed by the participants in Vienna.

In general the questions to be answered in the empirical part are the following:

(1) Do and if yes, how do the participants of the study, i.e. marginalised young people, make use of the developed mobile learning application? (2) How do they interact among each other and with youth workers acting as moderators on the platform? (3) What effect does their participation in the pilot have in terms of interaction with others and in terms of gained understanding and insights?

These main research questions comprise several more specific and detailed research question. The following list gives an overview:

(1) How do the participants of the study, i.e. marginalised young people, make use of the developed mobile learning platform?

→ Statistical analysis of log-data

Pattern of use:

- How much time do they spend online?
- How does the use of the platform evolve over the period of the pilot?
- How often do the participants log onto the platform?
- How much time do they spend per session?
- How many videos and reply videos have the participants uploaded?

- How many videos have they accessed on the platform?
- How many videos have they rated?
- How many groups on the platform have they created and to how many did they subscribe to?
- How many messages did the participants send?
- Which platform feature is used most and least often by the participants?
- How did moderators make use of the platform?

Difference hypotheses:

- Do participants from Austria and the UK differ in their use patterns of the platform?
- Do regional differences between the participants in Vienna and the participants in Styria in their use of the platform exist?
- Do gender differences exist in the use of the platform?
- Do the age groups differ in their use of the platform?

Correlation hypotheses:

- How does the use of different platform functions correlate?
- Can a typical use pattern be identified?
- Does the platform pattern of use correlate with the use of the mobile phone?

(2) How do the participants interact among each other and with youth workers (moderators) on the platform?

→ Social network analysis

1. Does the online mobile community resemble real life relations?
2. Does the online mobile community foster real life relations?
3. Can different roles in the community be identified?
4. Do subgroups develop in the virtual community?
5. Do the different groups mix in the virtual community?
6. What role do the moderators on the platform play?

(3) What effect does their participation in the pilot have in terms of interaction with others and in terms of gained understanding and insights?

→ Statistical analysis of log-data, social network analysis and results from qualitative research

Research questions 1 will be answered by means of statistical analysis of the gathered log-data of the users on the platform. It is important to understand what patterns of use have evolved over the whole duration of the pilot and how they have differed between different subgroups.

Social network analysis will be applied to answer research questions 2 to analyse interactions on the platform between participants, between participants and moderators and between participants from different locations. This is line with the Activity theory (O'Malley et al., 2005) which claims that individual and group actions can only be understood in relation to an interwoven system of activity and that every activity system is multi-voiced.

To answer the last research question a combination of methods will be used: statistical analysis of log-data, social network analysis and results from qualitative research. The latter one will not be an explicit method used in this work but as results from interviews and focus groups are available they will be fed in where suitable. The limitation to mostly quantitative methods has been chosen in order to have a clear focus in this work.

16. Use patterns - Statistical analysis of log-data

Log files of traces of all the users on the platform can be used to get quantitative data to describe their behaviour.

Data stored in the system comprises the following variables:

ID and nickname: Every nickname complies with an ID number. The pilot participants when first registering chose their nickname and their password. The nickname is stored in the system, while the password is not.

First log in and last log out: reveals the date and the time of day when a user has logged in and logged out respectively in a certain period. This period can be changed when retrieving the data.

Time online: Sum of time spent on the platform in minutes.

Number of sessions: indicates how often in a period a user has logged in and out again.

Uploaded videos: Number of own uploaded videos.

Response videos: Number of uploaded response videos. These are videos on the second level following a specific first level video, usually a challenge video.

Received response videos: Number of videos that have been uploaded on the second level following a first level video uploaded by the person.

Accessed videos: Number of accessed videos. Due to technical problems, the number gives just an estimation of how many actually have been watched as many video clips could not be retrieved after trying to access them.

Rated videos: Number of videos which the user has rated. Ratings are given with one to five stars.

Received ratings: Number of received ratings for the own uploaded videos.

Subscription to groups: Number of groups a user has subscribed to.

Created groups: Number of groups the user has created.

Sent messages: Number of messages a user has sent to other platform users. These are personal messages that can be accessed only by the receiver of the message.

Sent messages to groups: Number of messages a user has posted in a group and that can be viewed by all group members.

All these data can be retrieved per participant.

Besides these data relational data is stored that will be later needed for the social network analysis.

In the following sections the data refers to the whole community excluding the moderators of the platform. When the data is split according to country or region this is explicitly mentioned.

16.1. Log-data during the pilot

All 95 young people together in the three months of the pilot duration have uploaded 550 own videos and 35 response videos and have received 23 response videos on their own videos. In sum the community accessed 3,759 video clips and gave a rating in 508 cases. The received ratings to own uploaded videos were slightly higher with 510 ratings. The difference is due to the reason that also moderators of the platform had the possibility to rate one's video and specifically used this tool to encourage higher participation and also to give feedback. The 95 participants created 66 groups by themselves and subscribed to them 639 times. 1,983 messages were sent by the 95 youngsters to other participants of the platform. Additionally, 722 messages were sent to groups.

In the following values for the distribution of the different activities in sum as well as over the period of the pilot will be given.

Time online

As can be seen in Figure 30 the total online time on the platform varies to a significant degree between the participants. Most participants, 75 out of 95, spent between 0 and 500 minutes online on the platform over the whole period of the project. There are two outliers, who spent far more time online than the average user, with 3,849 min and 6,774 min respectively. The latter one equates to around 113 hours or 4.7 days (!). So it is possible to distinguish between excessive users and active and inactive users of the platform.

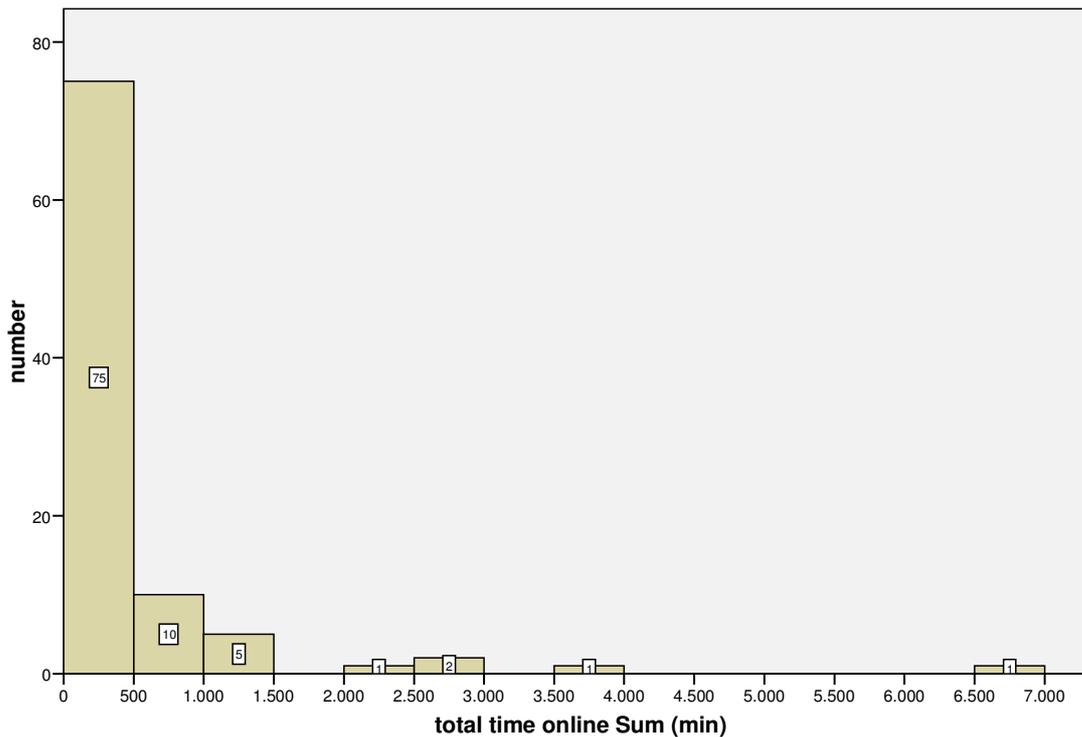


Figure 30: Distribution of total online time

The average online time (Median) is 138 minutes over the three months of the pilot. When differentiating according to the twelve weeks it becomes obvious that after an initial phase of heavy use the participation on the platform declined drastically. Although in the first few weeks not all participants had been registered to the platform the average participation was higher. From 74 min in week 1, the online time dropped down to 11 minutes in week 2, then to 7 minutes in week 3 and 4, and in the following weeks 5 to 8 between 3 and 1 minutes to finally reach the bottom with an average of 0 minutes online on the platform in last few weeks (c.f. Figure 31).

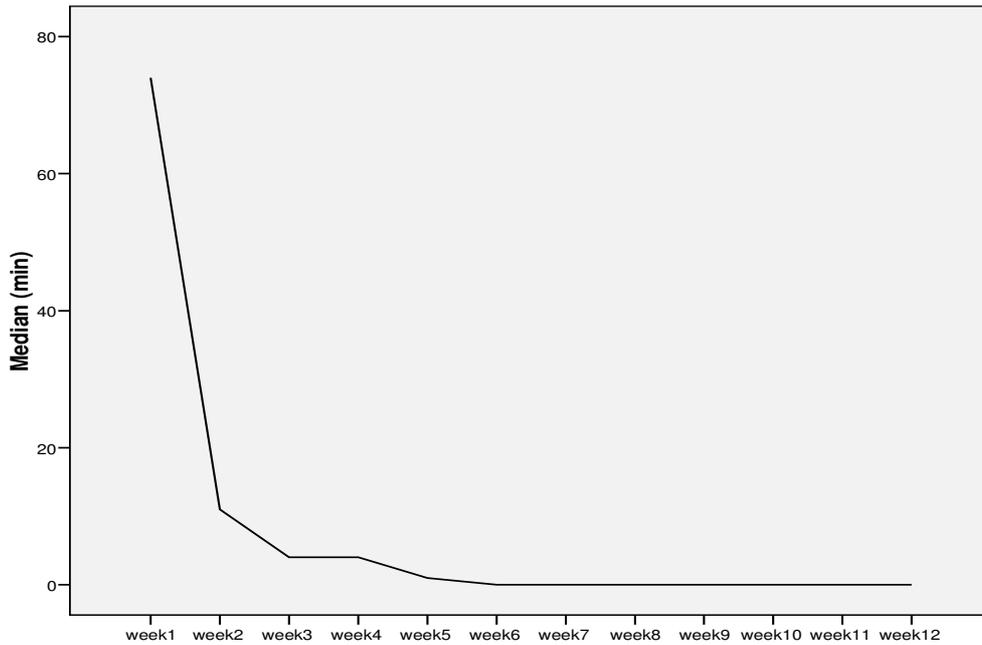


Figure 31: Average online time according to weeks

The decrease of participation might be due to technical problems as the platform still needed to be refined in the first few weeks and even then the platform did not turn out to be perfectly reliable. Other reasons given by the participants in the interviews and focus groups were lack of time or that they were not allowed to use the mobile phone at work (in case they had started an internship). However, also in the last few weeks there are still active users on the platform with a maximum of 264 minutes, when an active user is defined as someone who has spent more than 0 min on the platform. However, as shown in Figure 32 the number of inactive users platform increases over time, but active users are to be found until the end of the pilot.

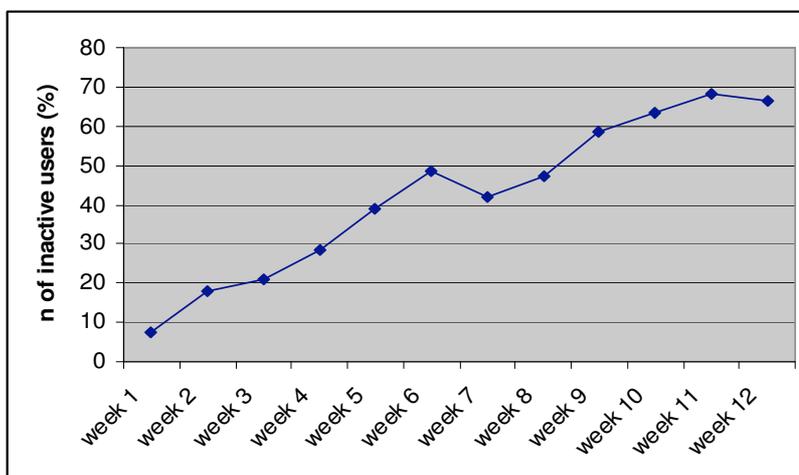


Figure 32: Percentage of inactive users in community per week

Sessions

Similarly the average number of sessions (median) decreases in the course of the pilot. Initially the number of accesses among the participants varies to a great extent as the variance conveys but over the weeks of the pilot the use of the platform in terms of access becomes similar among all and the variance decreases significantly. Towards the end of the pilot outliers are not to be found anymore. The maximum value of 99 dropped down to 16 accesses per week.

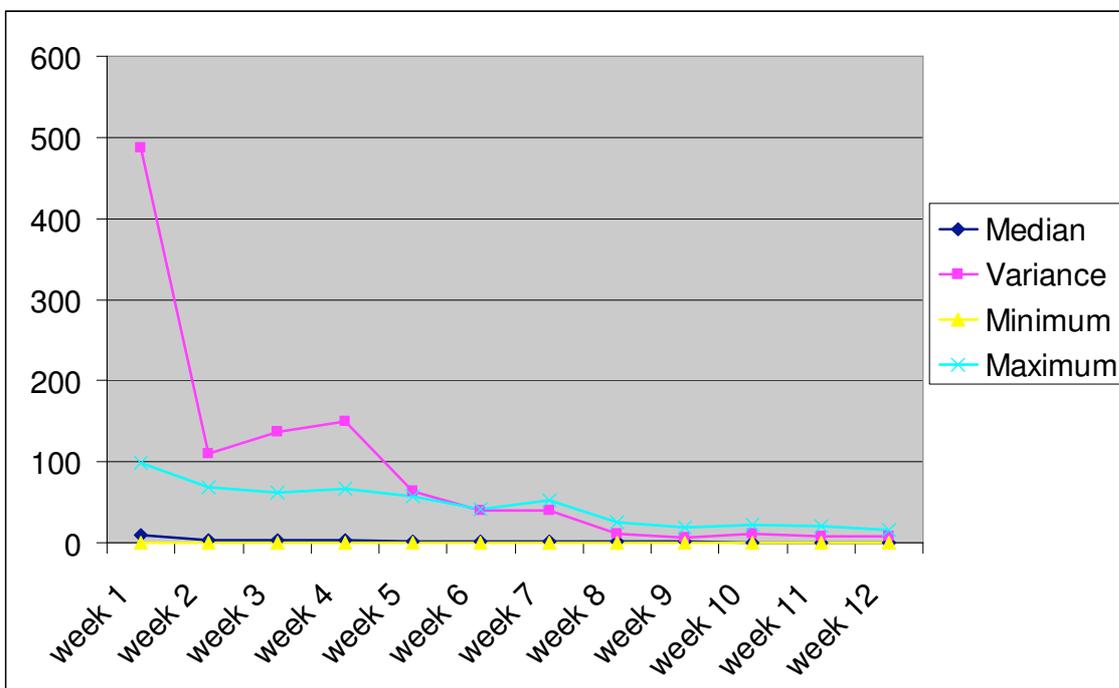


Figure 33: Number of session during pilot

The following figure (Figure 34) shows the variety of the total number of accesses in the course of the pilot per participant. The majority (above 50%) accesses the platform up to 40 times within the three months of the pilot. However, there is nobody in the community who did not at least once access the platform. Four participants accessed the platform only one time, and 13 young people accessed the platform more than a 100 times.

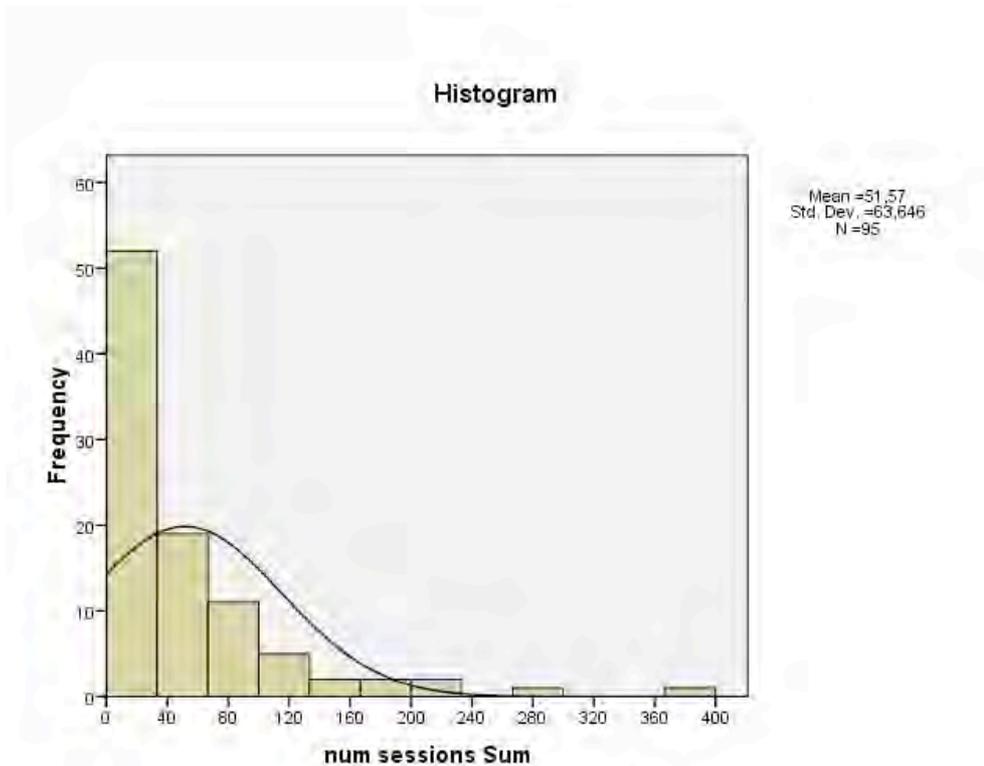


Figure 34: Total number of sessions per participant

Average time per session

The average time per session results from the division of total online time by total number of sessions. As shown in Figure 35 the majority, around 80%, of the users spend up to 15 minutes per session on the platform. Two outliers can be found in the sample that spent considerable more time online per session with an average of 158 min and 93 min per session.

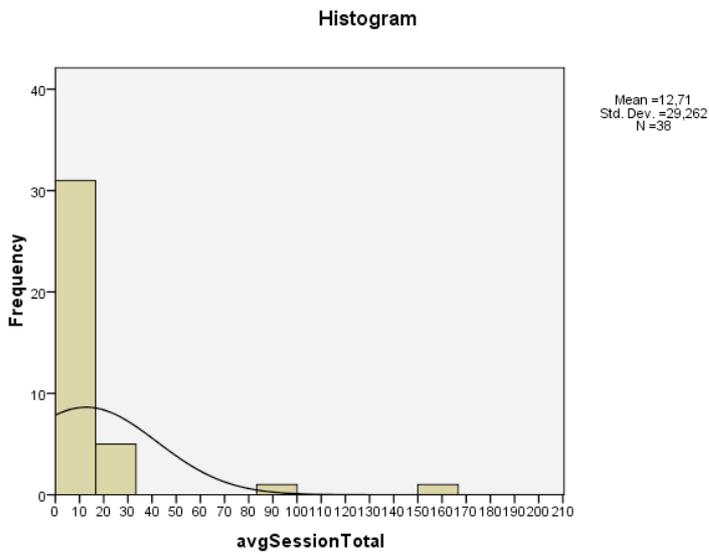


Figure 35: Total average time per session per participant

The average time spent online per session is quite constant over all twelve weeks. From an average 8 min per session in week 1, in the rest of the weeks users spend between 2 and 3 minutes online per session. Interestingly the variance, i.e. the differences between the users, does rather increase than decrease over time and is particularly high in week 7 and 11. The maximum amount of time spent per session varies between 17.5 min in week 5 to 158 min in week 11 (c.f. Figure 36).

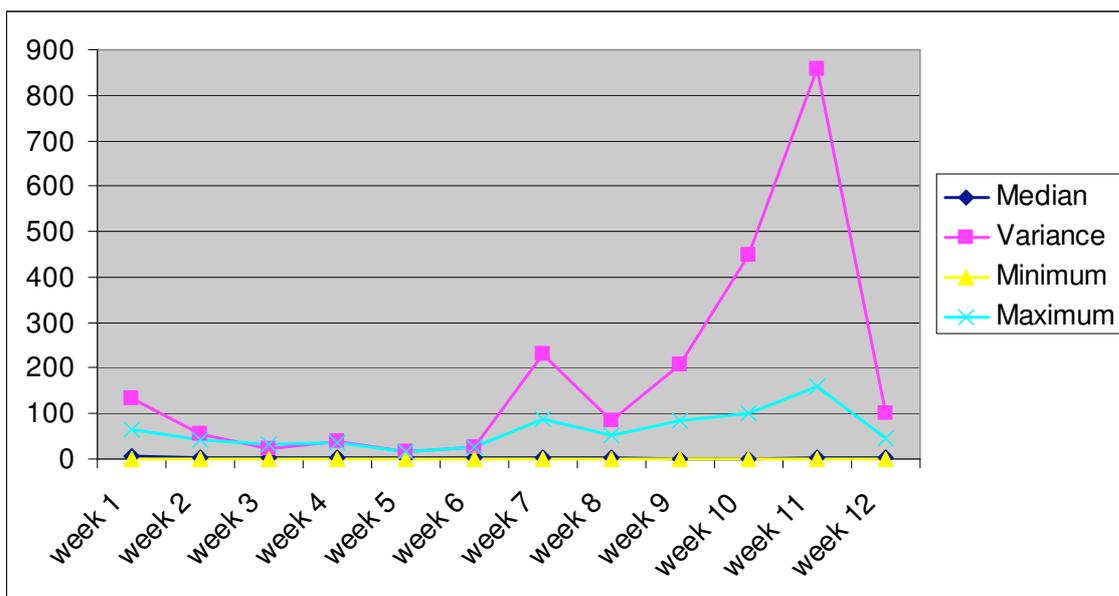


Figure 36: Average time per session

Uploaded videos

Around 23% of the 95 participants have uploaded no video during the whole length of the pilot. Another quarter of the sample has uploaded either 1 or 2 videos, another 34% have uploaded between 3 and 9 videos, 10% of the sample between 16 and 25 videos and finally the remaining 3% have uploaded between 41 and 55 videos each (c.f. Figure 37).

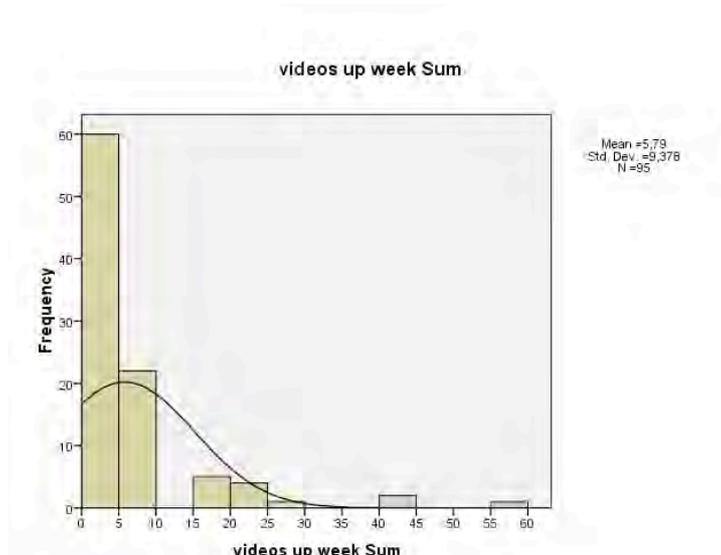


Figure 37: Total number of uploaded videos per participant

The average number of uploaded videos per person remains rather constant over the time of the pilot with an average of 0 to 1 video per person. Similarly, also the maximum and the minimum of uploaded videos among the participants remain constant. The highest numbers of uploaded videos per week was 33 in week 1, the rest ranges between 3 and 8 videos uploaded.

As can be seen in Figure 38 the whole community created and uploaded the most videos in week 1 with 192 videos, followed by 58 and 53 videos in week 2 and 3. For the remaining weeks the number of uploaded videos remains fairly constant with between 14 videos (uploaded in the last week) and 43 (in week 7). Initially the use pattern of the participants was more characterised by trial and error and exploration of all the functions. Also in terms of video quality the later ones were better, while in the beginning many videos were try outs.

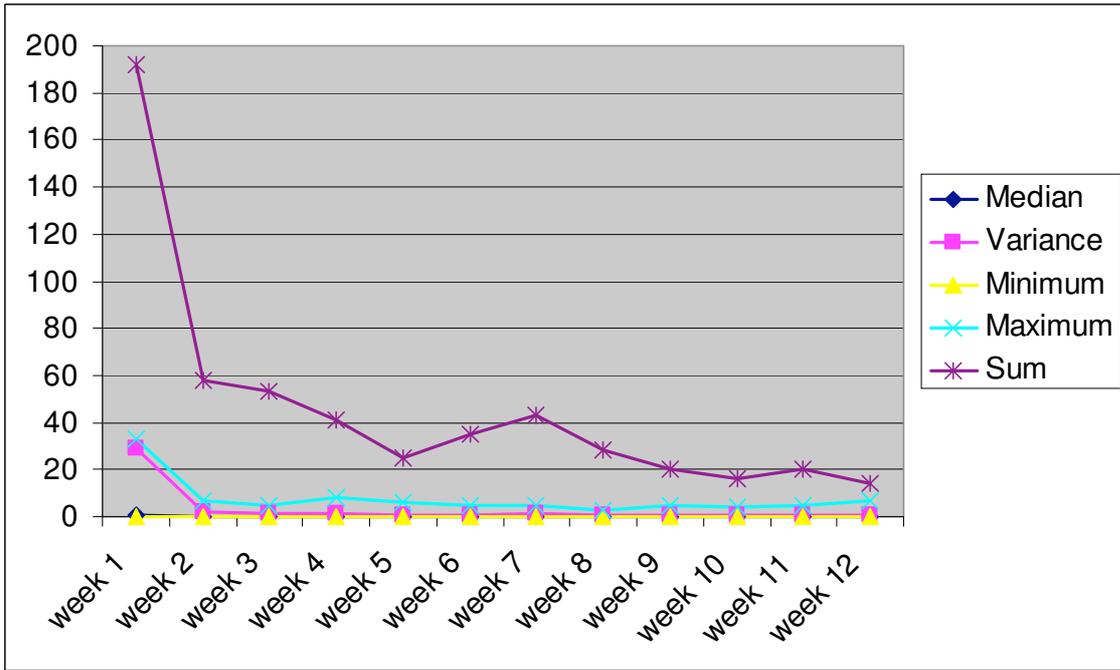


Figure 38: Uploaded videos per week

Reply videos

Compared to the uploaded videos in general, the uploaded answer videos, which are uploaded as a reply video to a specific video, are rather insignificant. In total there were only 35 answer videos. Around 85% have not uploaded any video that could be identified as a reply video by the platform, 8% have uploaded 1, and the remaining 6% of the community members have created and uploaded 2 and 6 reply videos each (c.f. Figure 39).

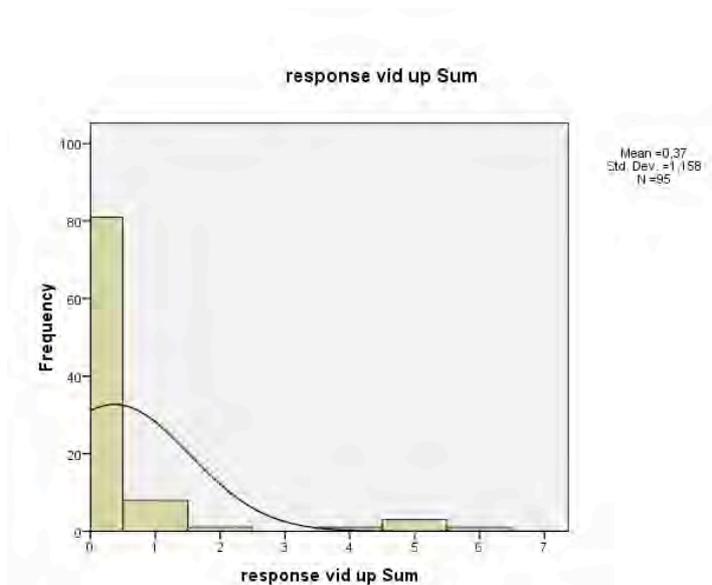


Figure 39: Total number of uploaded reply videos per participant

The median per participant over all weeks was 0 with a maximum of 3 uploaded answer videos per participant in week 6. The most videos were uploaded in week 7 and in week 11 with 6 videos per week uploaded by the whole community (c.f. Figure 40).

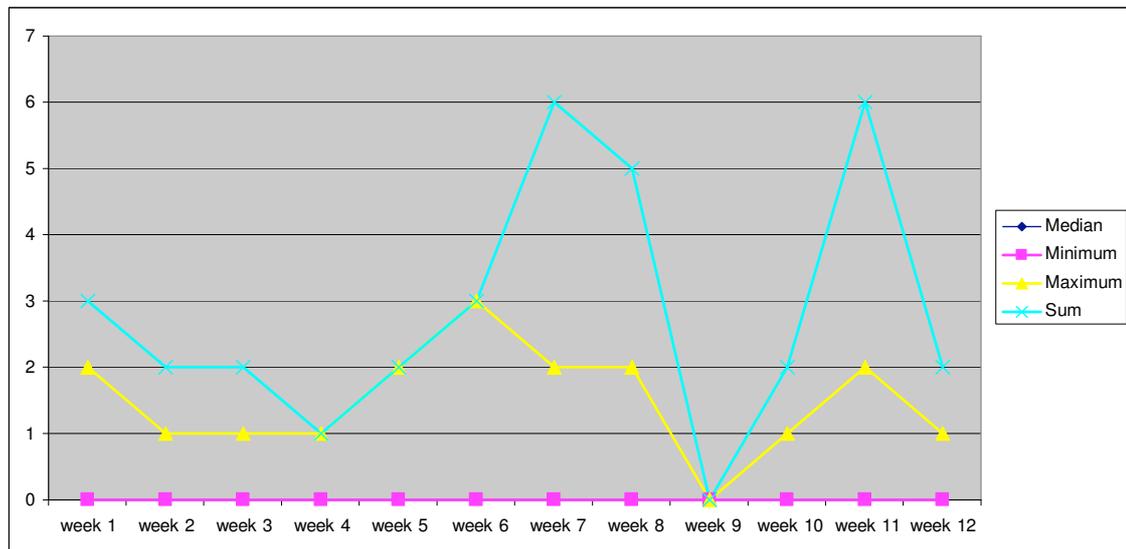


Figure 40: Number of uploaded reply videos per week

Uploaded reply videos include those that were reply videos to challenge videos and those which were reply videos to videos uploaded by other participants.

The reasons for this rather insignificant number of uploaded reply videos include technical problems and motivational challenges among the pilot participants. At the beginning of the pilot the option to upload answer videos was not available and once it was available the participants did not make much use of it. Also in terms of usability uploading an answer video was the greatest challenge in comparison to other features of the platform which could be used more intuitively. Thus, even when an answer video was recorded it was sometimes not uploaded as an answer video but as ordinary video under their own profile.

Received reply videos

Similarly the received reply videos to videos pilot participants themselves have uploaded were only marginal with a total value of 23. Thus, 16 persons received a feedback on their video in form of another video uploaded by somebody else,

two of them received 3 reply videos, 1 received 2 reply videos and 13 got 1 reply video (c.f. Figure 41).

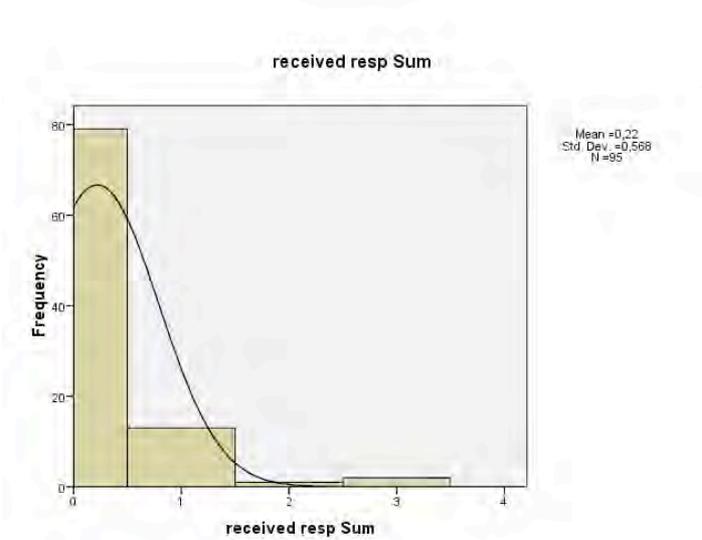


Figure 41: Total received reply videos

The median of received reply videos was 0 per week; the maximum was 1 or 2 videos per participant over the 12 weeks of the pilot.

Accessed videos

Two people out of 95 did not access any videos, a quarter of the sample did access between 1 and 10 videos in the lifetime of the pilot, around 50% accessed between 11 and 46 videos, and the remaining quarter between 49 and 398 videos (c.f. Figure 42).

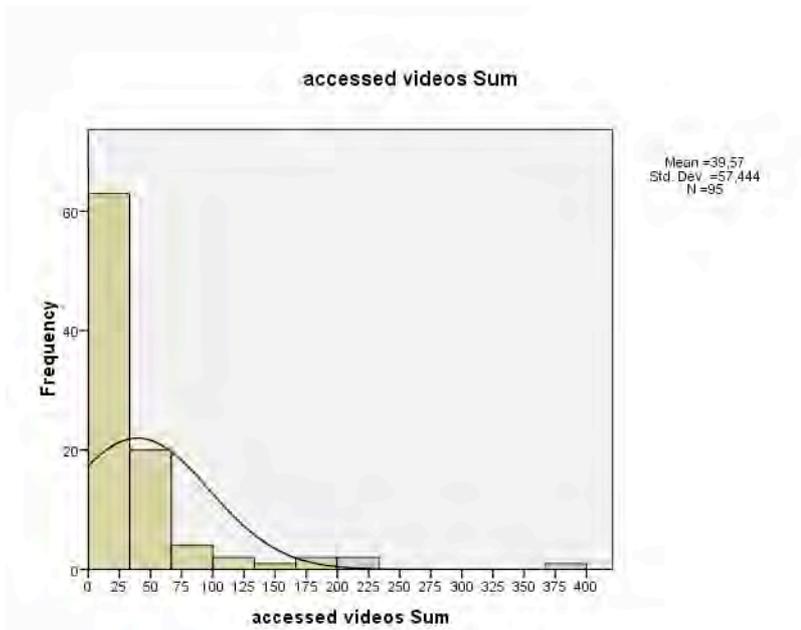


Figure 42: Total number of accessed videos

As can be seen in Figure 43, in sum most videos have been watched in the first week of the pilot with a total of 1,471 accesses. The number of total accesses dropped down to 484 in the following week and further decreased in week 3 to week 5 from 433 to 172 accessed videos. In the remaining seven weeks of the pilot the number of accessed videos stayed between 72 (in week 10) and 188 (in week 6).

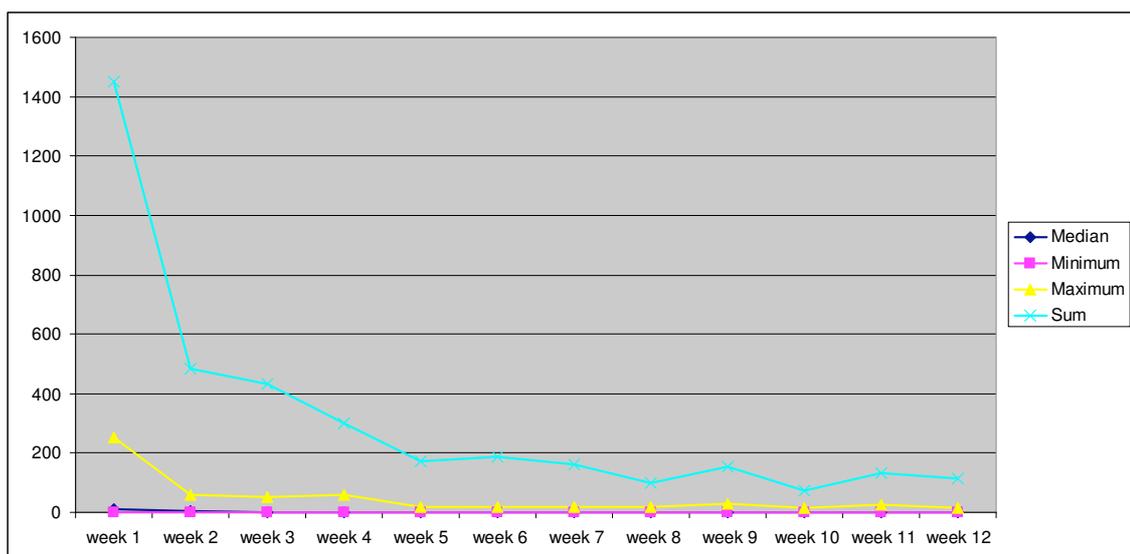


Figure 43: Number of accessed videos

In average a user has accessed between 11 videos (week 1) to 0 videos per week (weeks 5 to 12), while also in this variable a great variance can be noted.

For instance in week 1, the maximum value of accessed videos was 251 and the minimum value was 0.

Rated videos

During the lifetime of the pilot about 38% of the participants did not make use of the opportunity to rate others' or their own videos. About 44% rated videos occasionally (between 1 and 10 times), 12% rated more frequently with 11 to 28 ratings in total, and the remaining 4% rated videos 30 and 43 times (c.f. Figure 44).

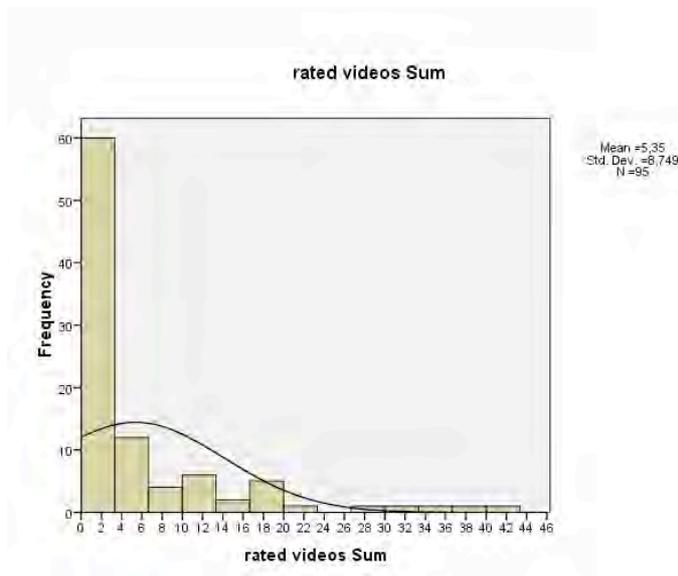


Figure 44: Total number of rated videos

Interestingly the number of rated videos does not follow the same pattern of decrease to a rather constant level as in other variables over the course of the pilot but peaks and rises are displayed in Figure 45.

The overall highest number of rating was achieved in week 1 with 146 ratings, followed by 81 ratings in week 2 and 75 ratings in the last week. In average, users of the platform have rated no videos at all. The maximum number of ratings per user ranges between 4 and 22 ratings.

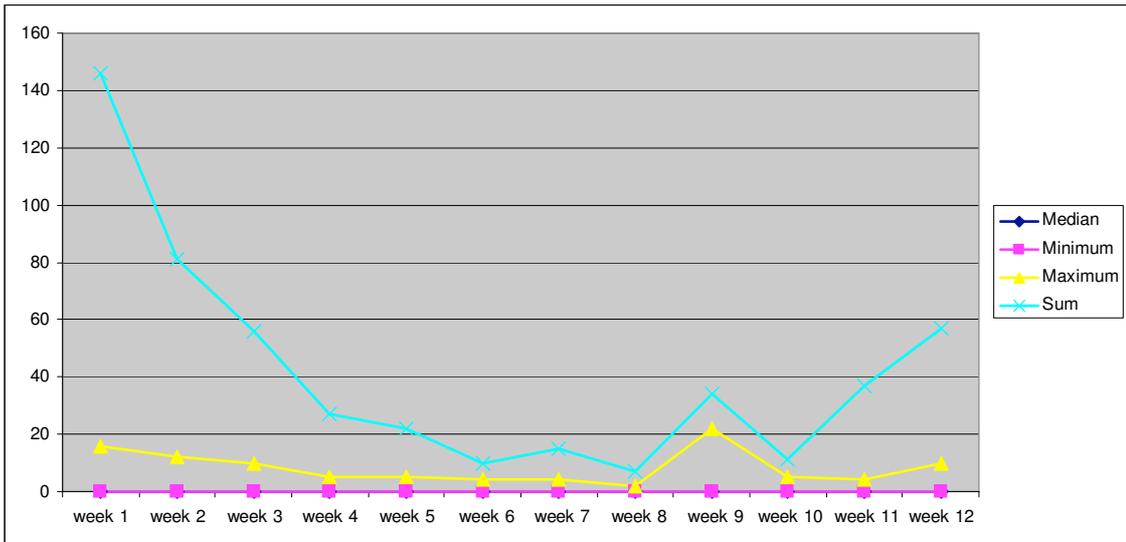


Figure 45: Number of rated videos

Received ratings

In average, users have not received any ratings of their videos. In this variable however it is not taken into account whether they have uploaded any. About 38% of the sample did not receive any ratings to their own videos. Another 50% received between 1 and 10 ratings over the whole period of the pilot and the remaining 14% got 12 and 65 ratings on their videos.

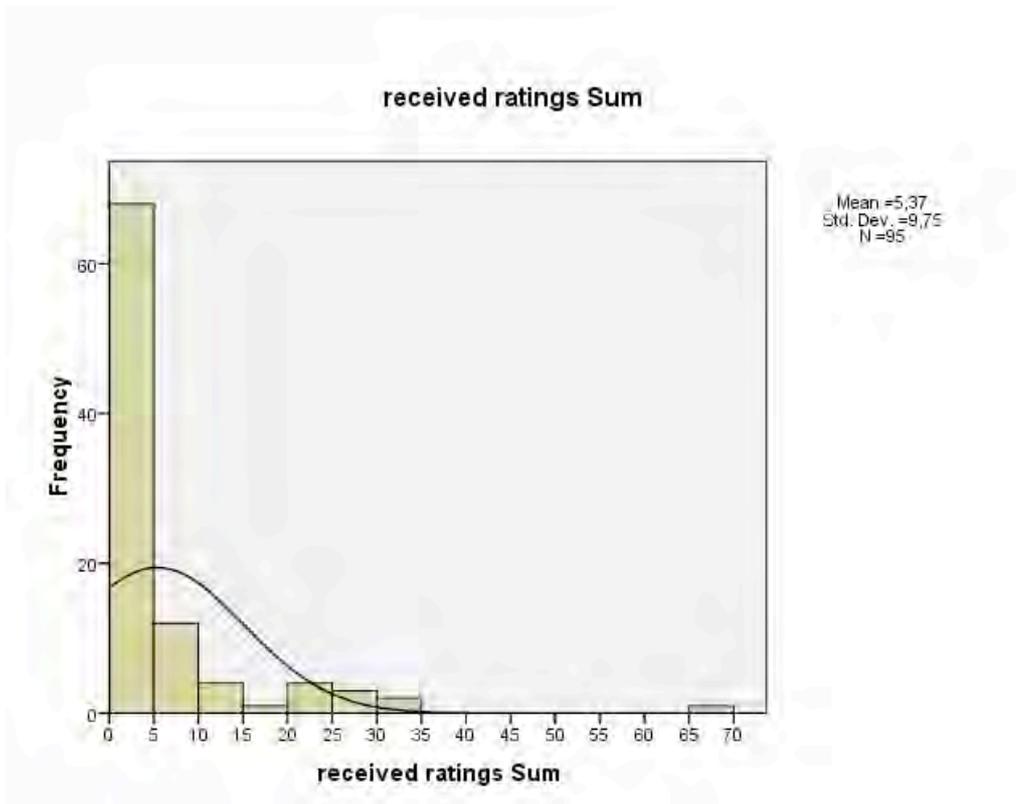


Figure 46: Total number of received ratings

Users' received ratings to own uploaded videos ranged between 0 and 22 ratings per week (c.f. Figure 47).

In sum, the whole community received the most ratings in week1 with 141 ratings.

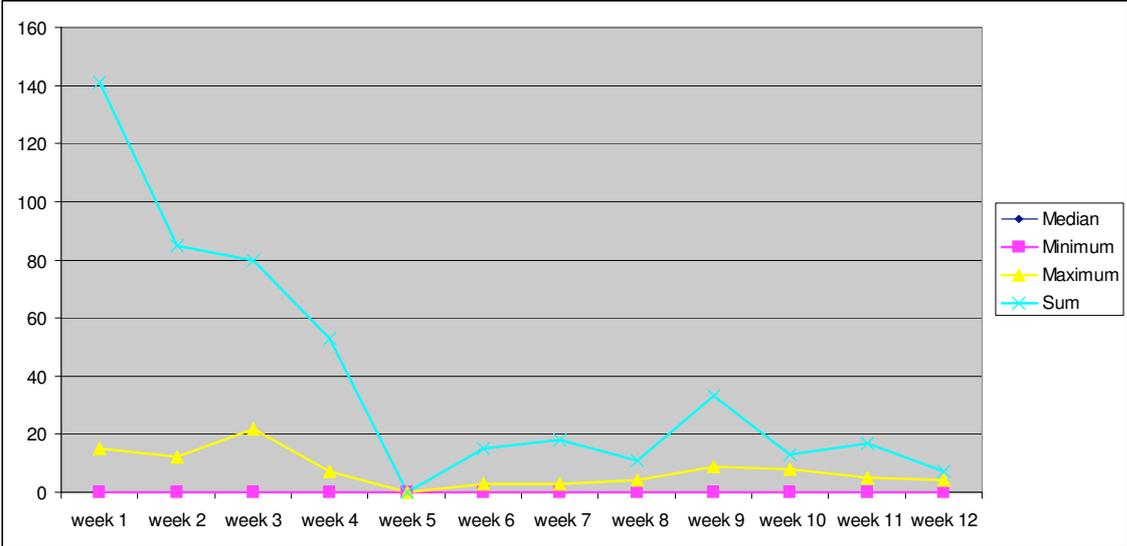


Figure 47: Number of received ratings of own videos

When the number of videos one has uploaded is taken into account in average every user who created a video received at least one rating.

Created groups

The pilot participants created 63 groups within three months. As can be seen in Figure 48, the average user (68%) created no group, 21% created one group, and 14% created between 2 and 8 groups in total.

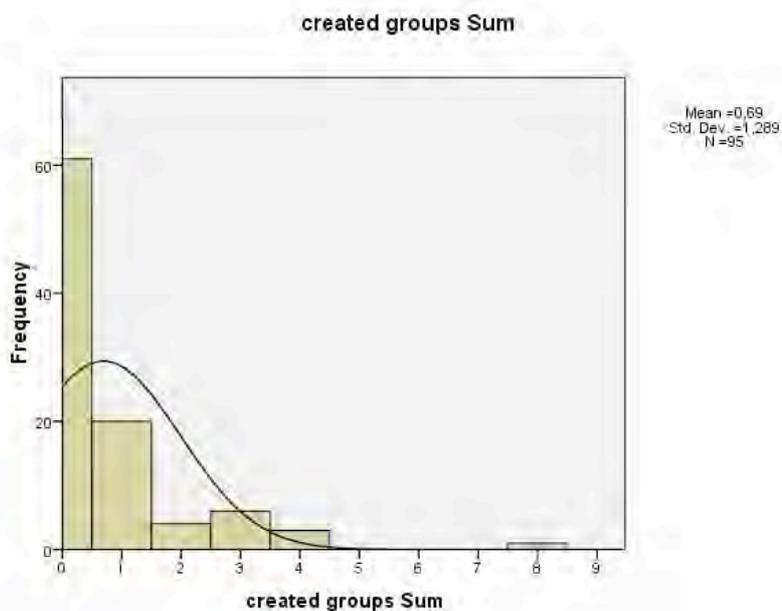


Figure 48: Total number of created groups

The highest number of created groups per participant was achieved in week 3 with a maximum value of 5 created groups as can be seen in Figure 49. In sum, most groups have been created by the community in week 1 and in week 3 with 21 and 16 created groups.

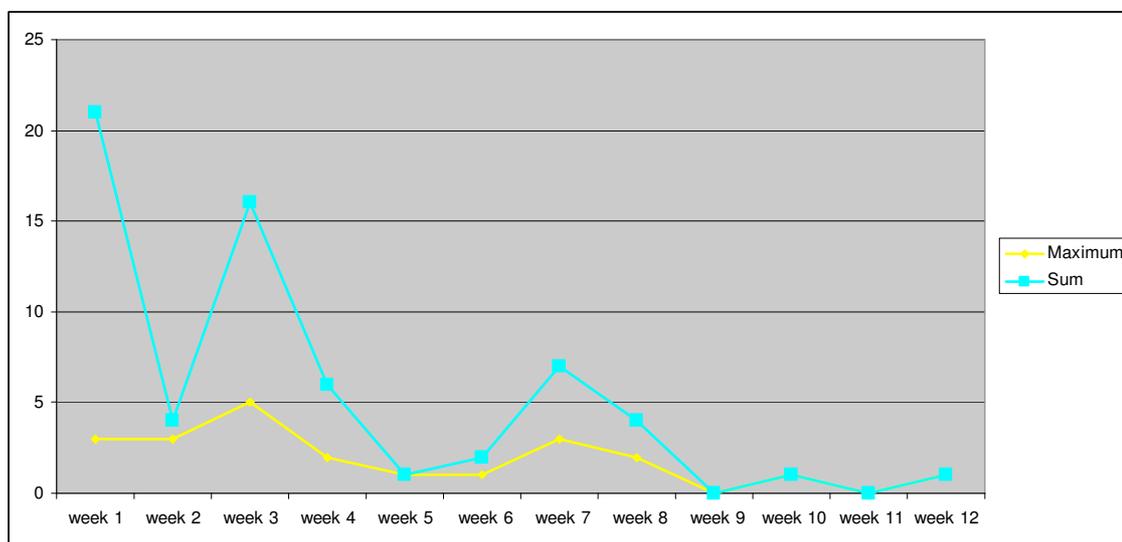


Figure 49: Number of created groups

Subscription to groups

Within the pilot everybody subscribed at least to one group (22%), about 62% subscribed to 2 to 8 groups, and 9 to 38 groups subscriptions were carried out by 24% of the pilot sample (c.f. Figure 50).

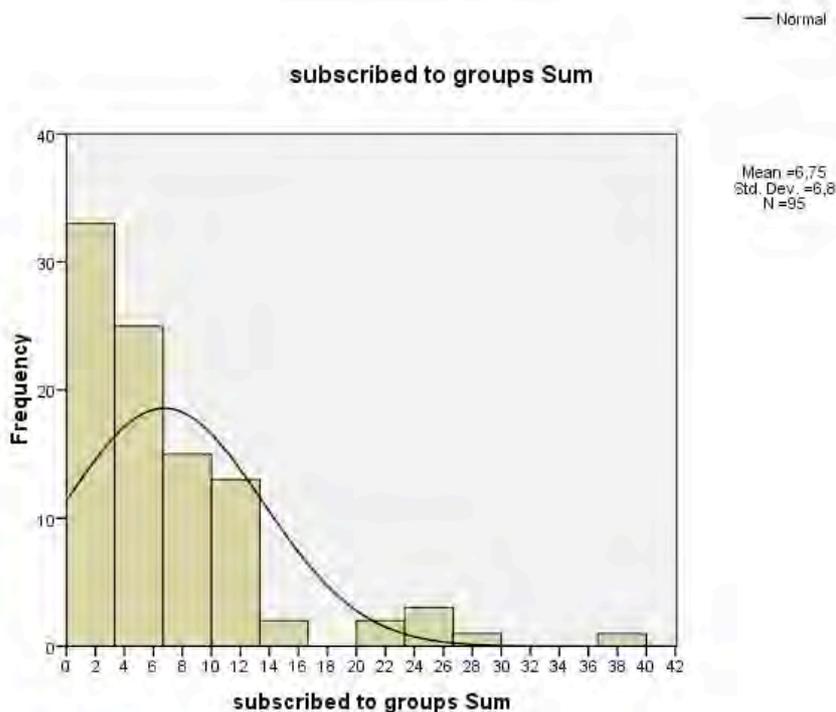


Figure 50: Total number of subscribed groups

In total, the 63 created groups by users have been subscribed to by the community 639 times with an average of 0 to 1 subscription per week per participant. The maximum values of subscribed groups per participant were 33 (week 3) and 27 group subscriptions per week (week 1). The most groups subscribed by the whole community were in week 1, week 3 and week 11 with 151, 118 and 102 subscriptions (c.f. Figure 51).

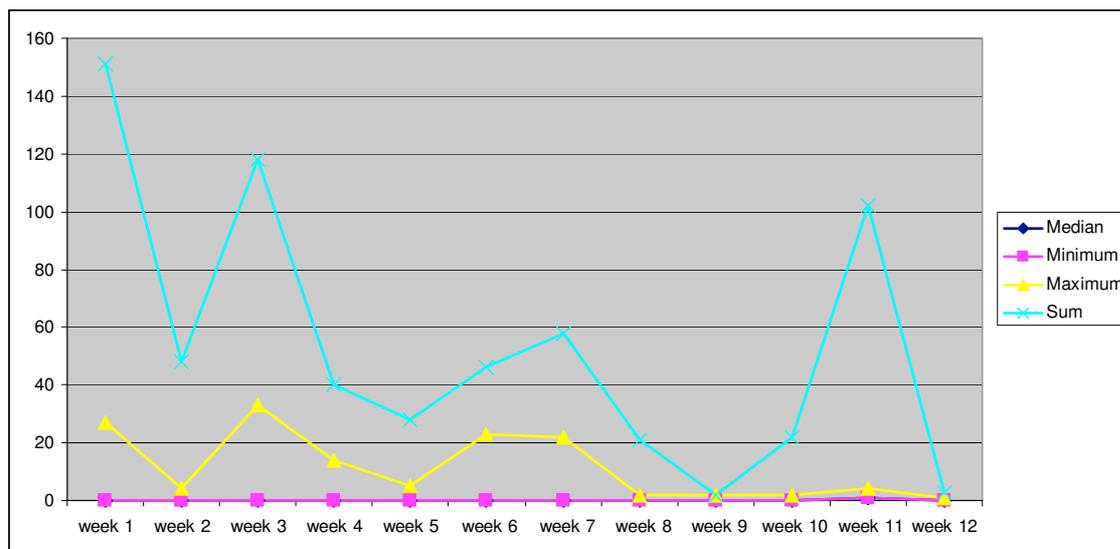


Figure 51: Number of subscribed groups

Names of groups, which have been created by the participants, to give some examples were the following: Kids Having Kids!, Lustig Kochen, facebook/bebo/hotmail, boys, i hate mondays, ideas 4 comein project, Frauen regieren die Welt, michael jackson fans, stop crime start living.

Groups were used to discuss and exchange ideas about these topics. Most of the group titles were self-explicatory. Topics of interest that were relevant to them dealt with different difficult life situations such as teenage mothers, or crime; others were more fun oriented. One group collected ideas for the Comeln project which was particularly interesting for the research team.

Sent messages to groups

In total, the youth participants have posted 741 messages in group forums. Around 54% did not post any messages in groups (see Figure 52). Around 25% sent 1 or 2 messages within the three months of the pilot. A moderate number of 3 to 9 messages were posted by around 6%, and more heavy users (around 14%) of the message function sent between 16 and 139 messages to different groups.

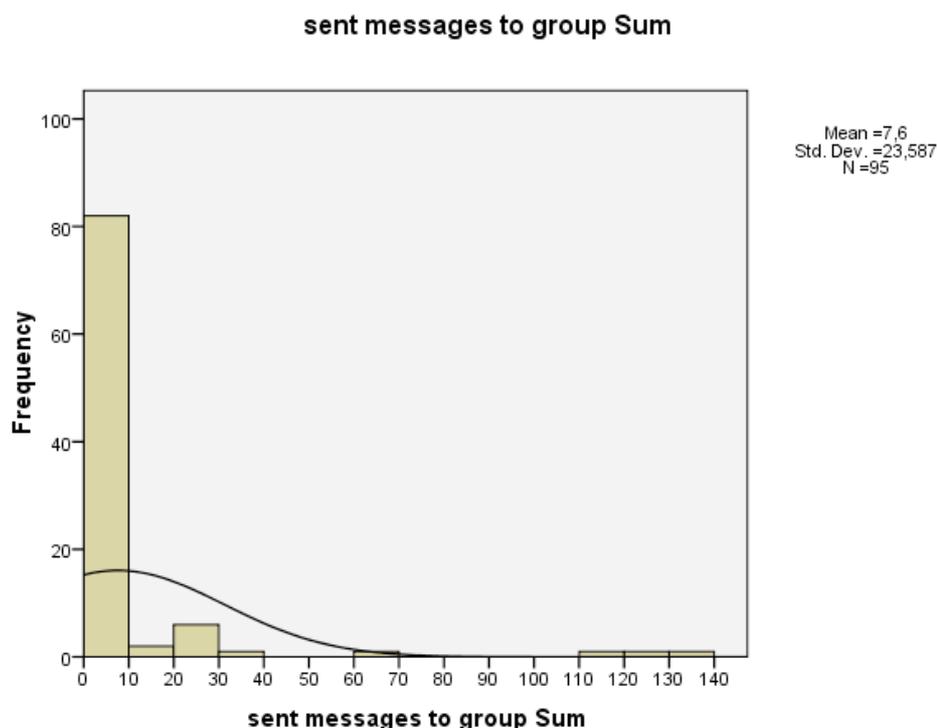


Figure 52: Total number of sent messages to groups

The average value per participant and week is 0 with a maximum number of 85 sent messages to groups in week 3. As Figure 53 reveals, over the course of the pilot the most messages in groups were also exchanged in the same week with 289 messages, followed by week 4 with 135 exchanged messages in groups.

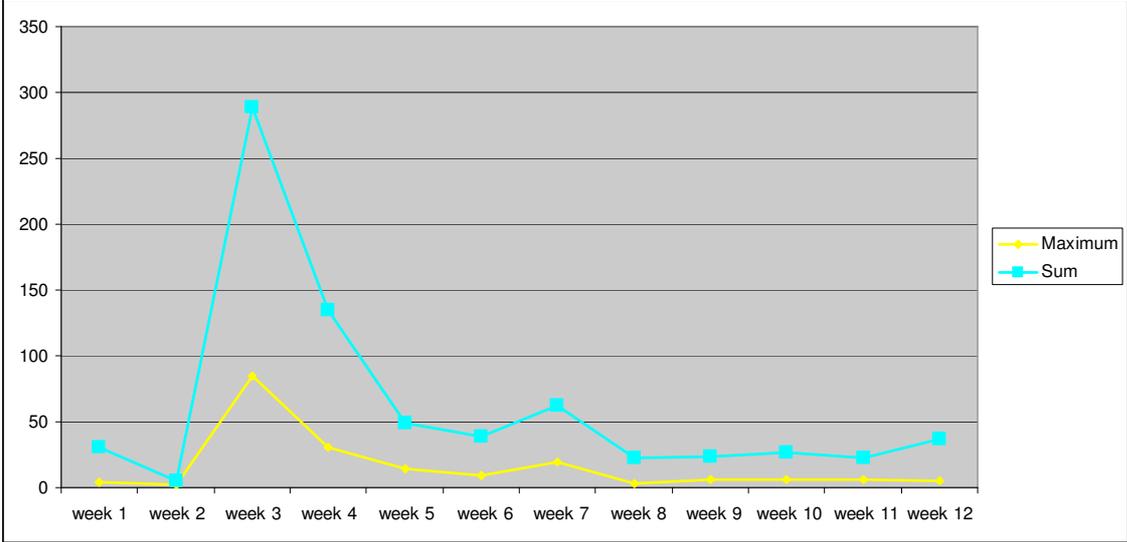


Figure 53: Number of sent messages to groups

Sent messages

The community of the young people exchanged 1,987 messages between them. These messages are private messages, thus are sent to a specific person and can only be read by this person in contrast to messages sent to groups which can be read by all group subscribers.

Overall, 19% did not sent any messages to other users, 63% sent up to 30 messages, around 9% sent between 30 and 60 messages and the remaining 8% sent between 64 to 444 messages, while the user with 444 is an outlier by far as displayed in Figure 54.

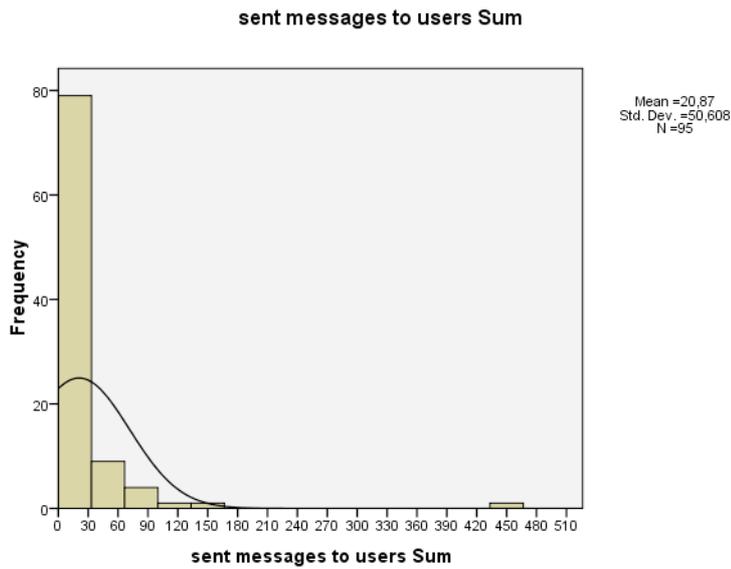


Figure 54: Total number of sent messages to users

The average youth sent between 0 and 2 messages per week. The maximum was 385 sent messages by one user in one week (week 1, c.f. Figure 55). The total amount of sent messages decreased significantly after week 1 from 1,108 messages to 109 messages to rise again to 186 and 227 messages in week 2 and 3 and then decreased again to a value below 100 in week 4 and remained under 100 messages until the end of the pilot.

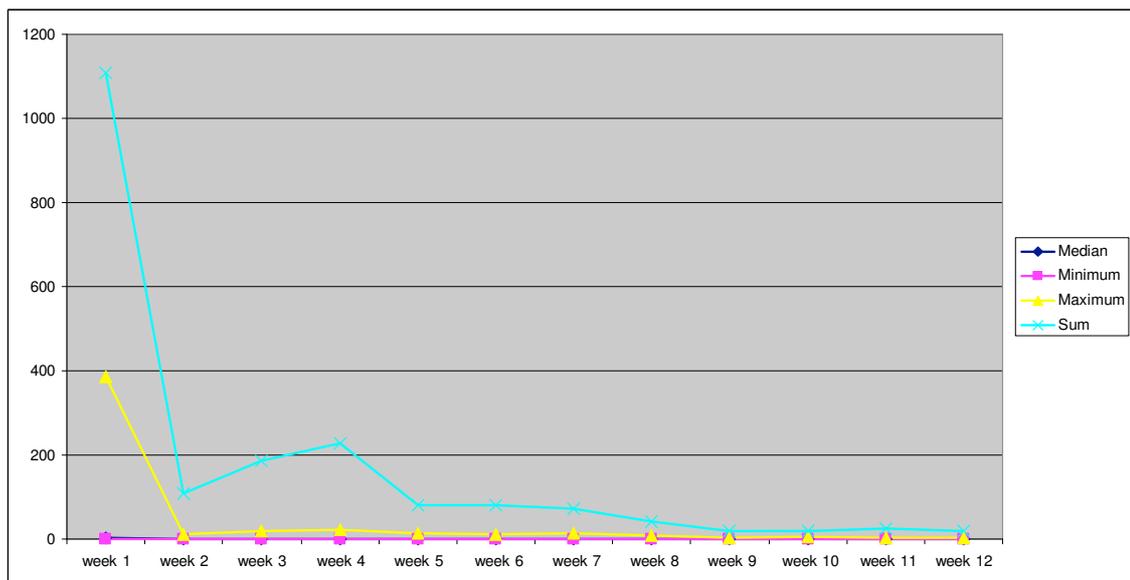


Figure 55: Number of sent messages

16.2. Log data after the end of the pilot

When the pilot ended in month 3 participants could keep the mobile phone provided by the research project but the contract ended, thus they could not access the platform anymore from their mobile phone free of charge. However, it was still technically possible to access the platform both from a mobile phone on their own credit or from a computer with Internet access.

A few people made use of this option. One month after the pilot, 22% of the participants logged in at least once and also two months later, still 6.3% logged in.

In the first month after the end of the pilot, the time spent online ranged between 0 and 4,195 minutes (~70h) and 0 and 79 sessions. Thus, some users still made excessively use of the platform while the majority did not further use the platform.

In the second month after the pilot, the use of the platform finally faded. Six users still logged in and spent 1 and 906 minutes on the platform.

16.3. Mobile phone variables

Besides the statistical data that is revealed by the log-data also the “mobile phone variables” will additionally be taken into account. These result from the monthly bills of the provider which included besides the actual costs per phone the following information per mobile phone user:

Number of online sessions: This includes all accesses to the Internet independently from which sites have been accessed, the platform or other sites.

KB: sum of kilobytes spent online

Telephone minutes: sum of telephone calls in minutes, it includes calls to mobile phones as well as land lines.

MMS: sum of sent multimedia messages

SMS: sum of sent text messages

These data are only available for the Austrian participants, thus in the following the analysis refers only to the Austrian sample.

The analysis reveals besides the use of the platform how the mobile phone has been used within the three months of the pilot.

Number of online sessions

In average (Md) the Austrian participants have logged onto the Internet from their mobile phones 265 times in sum (compared to 52 accesses of the platform in the same period) with a minimum of 11 and a maximum of 4,071 accesses of the Internet.

Over the three months of the pilot the number of online sessions decreased considerably from initially 160 accesses in average in the first month, to 57 accesses in the second and finally 47 in the last month.

Thus, not only has the use of the platform decreased over time but also the number of accesses to the Internet from the mobile phone in general. Interestingly, the participants have used the mobile phone also to surf on the Internet.

Consumed Kilobytes

In average a participant consumed 277,141 Kb over three months. A similar decrease in spent kilobytes can be observed, from nearly 70,000 Kb in February to 33,800 Kb in March and around 15,500 Kb in April. Thus, not only the access of the platform has decreased but also the access to the Internet in general.

Telephone minutes

The average a user consumed 884 minutes (14,7 h) of outgoing calls in sum with a range from no minutes at all up to 5,383 minutes (89,7 h).

Compared to the use of the Internet, the use of other mobile phone functions remains rather constant with an average of 253 minutes in month 1, 268 minutes in month 2 and 207 in month 3.

MMS

The Austrian participants did not make much use of the option to send multimedia messages. In average (Md) it was 0 with a maximum of 37 sent multimedia messages in total.

SMS

Sending text messages was far more popular among the Austrian participants with an average of 297 messages (compared to 20 messages in average on the platform). Some participants did not send any text messages, while others sent up to 2,901 messages in total. Over the course of the pilot the average number of sent messages was similar in each month (69, 95 and 55 text messages in month 1, 2 and 3).

16.4. Difference hypotheses

While the descriptive data have been used so far to describe the use patterns, these will now be tested concerning differences. The question is whether participants from the UK differ in their use patterns from the participants in Austria, whether the two Austrian groups differ in the use of the platform and whether differences in use can be found between the two genders and age groups.

16.4.1. Country differences

Mann-Whitney U-Tests have been carried out to test for differences between the participants of the two countries Austria and the UK. According to the results, as indicated in Table 13, only in 4 out of the 14 variables the differences are significant (these are marked in bold). Both groups spent the same amount of time online, as well as the number of sessions and all data that referring to videos are fairly equal between the two groups. The Austrian group differs however from their British peers in terms of number of created groups and sent messages, both in messages sent to groups as well as to other people. With the number of U-tests referring all to the same hypothesis, the false positives (alpha error), i. e. the probability to refuse the null hypothesis by mistake, increases (Bortz & Döring, 2006). Thus, an alpha adjustment has to be carried out.

The corrected alpha-level results from:

$$P(x \geq 1) = 1 - \sqrt[k]{1 - \alpha}$$

For 12 tests for significant differences the adjusted alpha is:

$$\alpha' = 1 - (1 - .05)^{1/12} = .004$$

Table 13: U-Test to compare Austrian and UK sample

	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
total time online Sum	1039	-0.663	0.508
num sessions Sum	944.5	-1.366	0.172
videos up Sum	971	-1.181	0.238
reply video up Sum	925.5	-2.447	0.014
received resp Sum	1020	-1.237	0.216
accessed videos Sum	838	-2.159	0.031
rated videos Sum	1106.5	-0.165	0.869
received ratings Sum	959	-1.290	0.197
subscribed to groups Sum	681	-3.354	0.001
created groups Sum	589	-4.710	0.000
sent messages to users Sum	714.5	-3.092	0.002
sent messages to group Sum	603.5	-4.281	0.000

In total, the Austrian participants created only 8 groups in comparison to the 58 groups created by the British participants. Similarly, the UK participants sent more messages to groups, in average 1 versus 0 (Md) and in total, 20 versus 702 (!) messages. In average, the British adolescents sent also significantly more personal messages: 10.5 versus 3. However, in sum the Austrian sample outnumbers the British one with a total number of 1,151 messages compared to 832 messages, i.e. among the Austrian participants there are more outliers.

The found differences between the two countries are caused by technical challenges in the UK to a high probability. At the beginning of the pilot, in the UK it was not possible to watch videos, thus in order to make use of the platform the participants could only make use of the text functions, i.e. send messages and exchange ideas in groups.

In the course of the pilot similar trends can be identified among both county sites. As Table 14 shows, a decrease in many variables can be noted, the time spent online decreases considerable in both countries, similarly, the number of sessions.

The significant differences have been marked in bold in this table.

Table 14: Average values (Md) of both samples over time

	Feb	Mar	Apr
AU: online time	120	18	3
UK: online time	83	38.5	12.5
AU: num session	19	7	2
UK: num session	14	15	5.5
AU: accessed video	25	7	2
UK: accessed video	8	3	1
AU: videos up	2	1	0
UK: videos up	1	0	0
UK: sub. to groups	3	1	1
AU: sub. to groups	0	0	1
UK: created groups	0	0	0
AU: created groups	0	0	0
UK: messages to groups	2	0	0
AU: messages to groups	5	5	1
UK: messages to users	0	0	0
AU: messages to users	0	0	1

16.4.2. Regional differences

As a major part of the analysis relies on the data collected in Austria and particularly in Vienna, also regional characteristics in the use of the platform will be explored. An analysis of regional differences in the UK has not been undertaken due to rather limited sample numbers per region.

Interestingly, the regional differences within Austria are seemingly higher than the international differences (c.f. Table 15).

The corrected alpha level here is $\alpha'=.004$.

Table 15: U-Test to compare Vienna and Styria sample

	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
total time online Sum	75.5	-4.267	0.000
num sessions Sum	59.5	-4.609	0.000
videos up Sum	150.5	-2.694	0.007
reply video up Sum	208.5	-1.938	0.053
received resp Sum	244	-0.955	0.340
accessed videos Sum	105	-3.640	0.000
rated videos Sum	199.5	-1.680	0.093
received ratings Sum	136.5	-3.023	0.002
subscribed to groups Sum	187.5	-1.899	0.058
created groups Sum	230	-1.691	0.091
sent messages to users Sum	84.5	-4.151	0.000
sent messages to group Sum	189	-2.423	0.015

In average (Md), the Vienna sample spent considerable more time online (376.5 min vs. 70 min), accessed the platform more often (53 vs. 12 times), accessed more videos (52 vs. 18 videos), and received in average also more ratings on their own videos (4.5 vs. 1).

When the participants in Styria and Vienna are compared in terms of their use of the mobile phone no significant results can be found.

16.4.3. Gender differences

When the two genders are compared in terms of usage data no significant results can be found as Table 16 shows.

The corrected alpha level here is $\alpha'=.004$

Table 16: U-Test to compare the two genders

	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
total time online Sum	1054	-0.442	0.658
num sessions Sum	1069.5	-0.326	0.744
videos up Sum	862.5	-1.896	0.058
reply video up Sum	1101	-0.146	0.884
received resp Sum	969.5	-1.655	0.098
accessed videos Sum	901	-1.589	0.112
rated videos Sum	839.5	-2.115	0.034
received ratings Sum	879	-1.798	0.072
subscribed to groups Sum	830.5	-2.134	0.033
created groups Sum	956	-1.381	0.167
sent messages to users Sum	1043	-0.527	0.598
sent messages to group Sum	989.5	-1.015	0.310

Even in the course of the pilot when the variables are compared per month than no significant differences between the two genders can be found.

Thus, the platform does encourage participation of both genders to an equal extent. This is very interesting when having in mind gender specific differences of marginalised young people regarding their behaviour. Put in very simple terms, females tend to be overseen and tend to hide themselves, male marginalised young people in contrast make their surrounding aware of their state of mind by showing “difficult” behaviour. Similarly, based on gender research one would expect the female participants to exchange more text messages and the male participants to make more use of the video function for self-publicising purposes. But neither of these hypotheses have been confirmed based on the usage data, which means that the platform does not foster gender differences.

The two genders do also not differ significantly in the use of the provided mobile phone, i.e. males and females sent in average the same amount of text messages and made as many outgoing calls.

16.4.4. Age differences

As Table 17 reveals, three out of the 12 variables differ significantly between the two age groups, i.e. the 13 to 16 year olds and the 17 to 22 year olds.

The corrected alpha level is $\alpha'=.004$.

Table 17: U-Test to compare the two age groups

	Mann-Whitney U	Z	Asymp. Sig. (2-tailed)
total time online Sum	858	-1.990	0.047
num sessions Sum	788.5	-2.509	0.012
videos up Sum	1048.5	-0.576	0.565
reply video up Sum	1044.5	-0.974	0.330
received resp Sum	1101.5	-0.270	0.788
accessed videos Sum	896	-1.707	0.088
rated videos Sum	973.5	-1.165	0.244
received ratings Sum	1099	-0.199	0.842
subscribed to groups Sum	629.5	-3.723	0.000
created groups Sum	999	-1.102	0.270
sent messages to users Sum	954.5	-1.277	0.202
sent messages to group Sum	826	-2.444	0.015

The older age group accesses the platform more often, 45 versus 19 times in average, subscribes to more groups, 7 versus 3 subscribed groups and sends in average 1 versus 0 messages to groups.

When differentiating according to the three months of the pilot with one exception no significant differences can be identified, i.e. the number of subscribed groups differs significantly between the two age groups in February.

No significant differences result when comparing the use of the mobile phone in terms of outgoing calls, sent text messages, etc. of the two age groups.

16.5. Correlations hypotheses

The correlation hypotheses are tested with the Austrian sample only as the variables related to the used mobile phone are solely available for this group. Of particular interest is the question whether the use of specific features of the platform correlate with each other, i.e. whether the use of one function increases also the probability to use another. Furthermore, to compare the use pattern of the platform and the use pattern of the mobile phone correlations between platform variables and variables that refer to the mobile phone use are calculated.

Since not all variables are interval-scaled bivariate correlations (Kendall's Tau) are carried out.

16.5.1. Correlations between platform variables

The following table gives an overview of correlations between the different platform variables. Those platform variables, which describe the usage of the platform, that are significant on an alpha-level of .05 are marked in bold.

Table 18: Correlations (Kendall's Tau) between platform variables based on Austrian sample

	Number sessions	videos up week	reply video up	received resp	accessed videos	rated videos	received ratings	subscribed to groups	created groups	sent messages to users	sent messages to group
total time online	0,793	0,547	-0,054	0,143	0,681	0,411	0,636	-0,016	0,378	0,527	0,336
num sessions		0,523	-0,015	0,174	0,707	0,385	0,606	-0,059	0,326	0,510	0,326
videos up week			0,187	0,130	0,627	0,460	0,720	-0,098	0,255	0,217	0,303
reply video up				0,542	0,106	-0,034	0,100	-0,028	-0,199	-0,165	-0,176
received resp					0,195	0,044	0,143	-0,023	-0,191	-0,110	-0,169
accessed videos						0,505	0,617	-0,046	0,283	0,342	0,324
rated videos							0,508	0,027	0,340	0,125	0,390
received ratings Sum								-0,106	0,312	0,294	0,350
subscribed to groups Sum									0,404	0,098	0,060
created groups Sum										0,410	0,085
sent messages to users Sum											0,309

Based on Table 18 several significant correlations can be found.

The number of sessions is moderately correlated with the number of uploaded videos, the number of accessed and rated videos, received ratings and sent messages to users are marginally correlated with the number of rated videos. Thus, the more often a user has accessed the platform, the more likely she or he has also uploaded videos, accessed others' videos, received ratings on their own videos, etc.

Similarly, the more videos one has uploaded the higher is the probability to access other videos and to receive ratings.

The number of accessed videos correlates positively with the number of ratings both given and received and slightly with the number of messages sent to groups. The more participants rated others' videos, the more they also received ratings on their own uploaded videos. The number of subscribed groups correlates positively with the number of created groups and correlates also marginally with the messages sent to other participants.

Interestingly, the number of subscribed groups does not relate to any use of other features of the platform.

16.5.2. Factor Analysis of platform variables

A factor analysis was carried out to identify clusters of variables that all refer to the different uses of the platform. It resulted in three different factors making use of Principal Axis Factoring as extraction method and Varimax with Kaiser Normalisation as rotation method. The fact that the Kaiser-Meyer-Olkin criterion is rather high ($KMO=.730$) and that the resulting three factors explain about 66% of the total variance indicate the appropriateness of the extracted factors.

In the following Table 19, the loadings of the different platform variables on the three factors are displayed.

Table 19: Factors - use of the platform

Rotated Factor Matrix

	Factor		
	1	2	3
received ratings Sum	,940		
accessed videos Sum	,823		
videos up week Sum	,748		
rated videos Sum	,689		
sent messages to users Sum	,412		
created groups Sum		,819	
sent messages to group Sum		,743	
subscribed to groups Sum		,704	
received resp Sum			,668
reply video up Sum			,662

The first factor can be called “one-to-one communication and rating”; the second factor “group activity” and the third one “reply videos”. Thus, these three different activities are typically clustered on the platform and represent typical use patterns.

16.5.3. Correlations between mobile phone variables

To explore the patterns of use of the mobile phone provided by the research project to the participants, these variables are correlated with each other. The variables that stand for the mobile phone use result from the monthly invoice sent by the provider.

To perform the correlations sums of the above described variables over the three months of the pilot have been calculated. Significant correlations for a better overview have been marked again in bold.

Table 20: Correlations (Kendall's Tau) between mobile phone variables based on Austrian sample

	KB	Telephone minutes	MMS	SMS
Online sessions	0,642	0,318	0,286	0,336
KB		0,332	0,186	0,295
Telephone minutes			0,174	0,554
MMS				0,347

As Table 20 shows, as expected, that the number of online sessions correlates positively with the consumed kilobytes in the three months. The highest correlation can be found between outgoing calls in minutes and sent text messages, i.e. the more a person has made outgoing calls, the more text messages has she or he sent. Thus, persons who communicate to others use the different communication channels (calls and text messages) at the same time.

All other correlations are rather moderate.

16.5.4. Correlations between platform variables and mobile phone variables

To understand the relation of mobile phone use and platform use the different variables that refer to these have been correlated (significant correlations are marked in bold).

Table 21: Correlations (Kendall's Tau) between mobile phone and platform variables based on Austrian sample

	Online sessions	KB	Telephone minutes	MMS	SMS
total time online	0,400	0,318	0,103	0,140	0,155
num sessions	0,382	0,291	0,184	0,090	0,164
videos up	0,303	0,223	-0,002	0,201	-0,011
reply videos	-0,091	-0,072	-0,004	0,002	-0,027
received resp	-0,002	-0,026	0,123	0,175	0,127
accessed videos	0,343	0,274	0,147	0,134	0,079
rated videos	0,200	0,223	0,063	0,054	0,063
received ratings	0,395	0,330	0,059	0,136	0,103
subscribed to groups	0,056	-0,027	-0,004	0,022	0,221
created groups	0,287	0,305	0,080	0,160	0,266
sent messages to users	0,156	0,142	0,076	0,021	0,210
sent messages to group	0,165	0,049	-0,148	-0,102	-0,103

As Table 21 shows, the use of different functions of the platform does only moderately correlate with the use of the mobile phone in some variables. The consumed kilobytes as well as the number of online session in general correlate positively with the time spent on the platform and the number of sessions on the platform. When having a closer look at the correlations it becomes obvious that the mobile phone data that refer to online data, i.e. number of online sessions and KB spent, relate to the use of the platform but not the other kinds of mobile phone data such as outgoing calls, sent text messages or multimedia messages. Thus, participants who have sent many text messages have not necessarily also exchanged messages on the platform. Communication that has taken place using the mobile phone in terms of its typical functions as calling somebody or sending text messages is not correlated with the communication behaviour on the platform.

16.6. Moderators' log data

So far only the use patterns of the young participants have been analysed. However, also the use patterns shown by the moderators are of interest for this work.

Moderators of the platform spent in average 1,258 min on the platform in sum (compared to the youngsters' average of 130 min). Not only among the young participants but also among the moderators the variance in most variables is considerable. For instance, the total online time ranges between 415 min and 5,323 min.

The moderators accessed the platform in average 127 times in the course of the pilot (youngsters' average=51 times). Each moderator accessed at least 84 up to 1,265 videos, in average it were 272 videos (in contrast to youngsters' average of around 40).

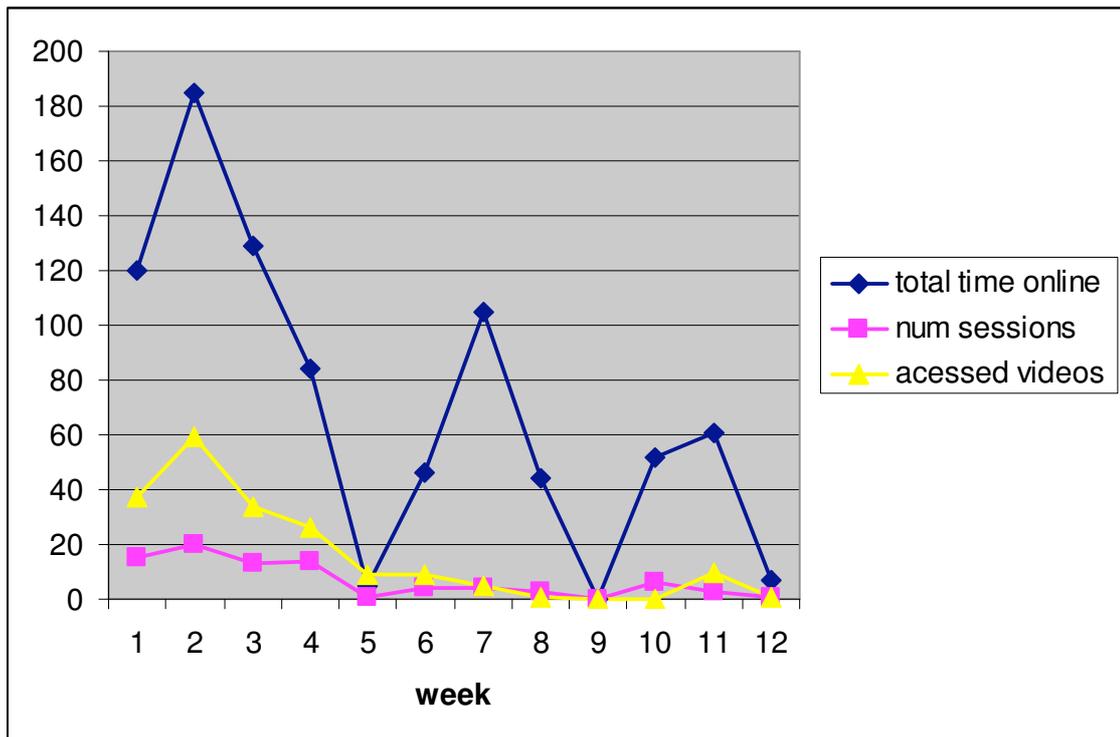


Figure 56: Average numbers of online time, sessions and accessed videos over time of moderators

Moderators uploaded between 2 and 96 videos to the platform with an average of 13 uploaded videos.

The behaviour pattern of the moderators on the platform was not constant over the course of the pilot as can be seen in Figure 56, with a peak in online time in week 2 and week 7 and low levels of participation in week 5 and week 9. This is partly explained with holidays (e.g. Easter in week 9). Interestingly, the use pattern of the young participants does differ (c.f. Figure 31) from the moderators' behaviour with a decrease in the first few weeks to a rather constant level in the remaining weeks of the pilot.

The moderators used also the features differently. They rated the most videos in week 3 and received the most replies in week 10 (c.f. Figure 57).

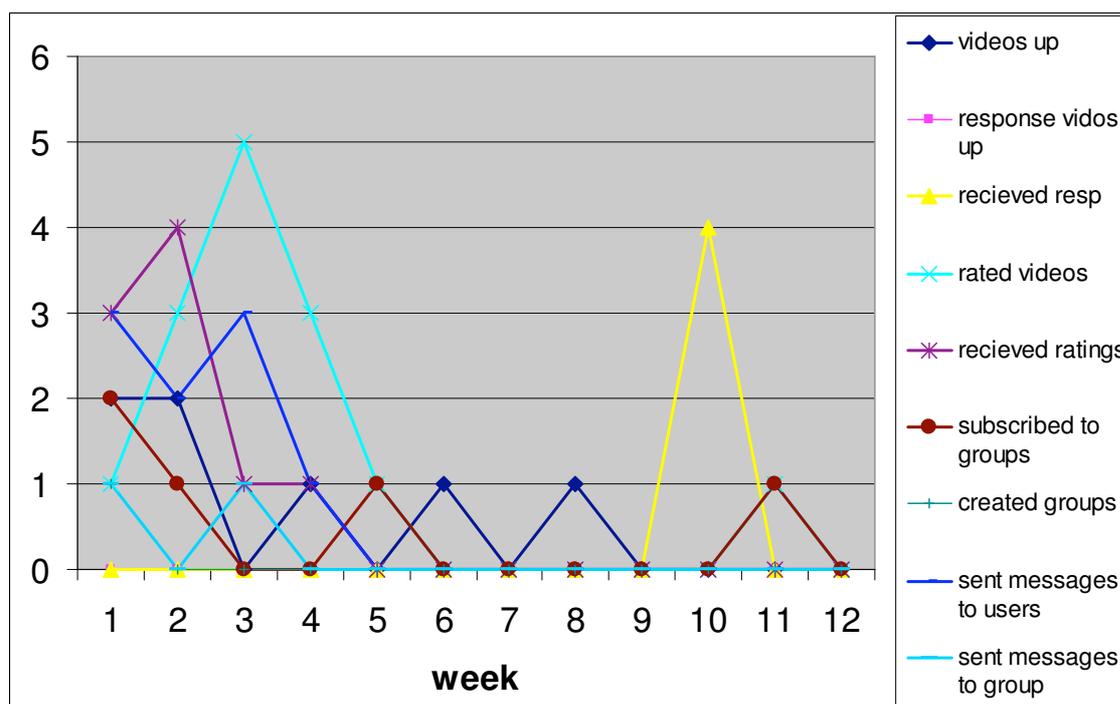


Figure 57: Average numbers of different functions of the platform over time of moderators

The behaviour of the moderators on the platform correlates moderately with the behaviour of the participants of the platform (online time: Spearman $r=.365$, $p=.000$; number of sessions: $r=.296$, $p=.002$; uploaded videos: $r=.291$, $p=.003$; accessed videos: $r=.408$, $p=.000$; rated videos: $r=.361$, $p=.000$; subscribed to groups: $r=.260$, $p=.008$; created groups: $r=.305$, $p=.002$; sent messages to groups: $r=.245$, $p=.013$).

For instance, the more time moderators have spent online the more time also the participants have spent online. This applies to many variables of the platform, however not to all functions such as the number of reply videos uploaded and received and the number of sent messages to users which do not correlate between moderators and youths.

16.7. Summary and answers to quantitative research questions

Summarising the descriptive data analysis of the log-data a great variance of use among participants regarding every feature and functionality of the platform

can be noted. Excessive users can be identified who made much use of the platform and used the different functionalities to a great extent, all of them at the same time. However, there are also users who made much use of one function of the platform only but no use at all of other ones. For instance, there were participants who uploaded many videos but did not send one single message. This is the case for example for an illiterate participant who uploaded the highest number of videos but obviously could not send or read written messages. Thus, the platform obviously allows for different use patterns which can be appropriated according to the own preferences and capabilities. Other participants did not access the platform very often and rarely used any functions of the platform. However, there was not anybody on the platform who did not make use of any of the options the platform has to offer. The distribution of data in every single variable is considerable and thus, different patterns of use can be identified.

Some functions are seemingly more popular than others among the participants. An overview gives Figure 58: In average, accessing others' videos was the most favourite activity, followed by sending messages to other people and to groups. Uploading videos, rating videos, and subscribing to groups were moderately used and the options to upload answer videos, and create groups were the least to be used.

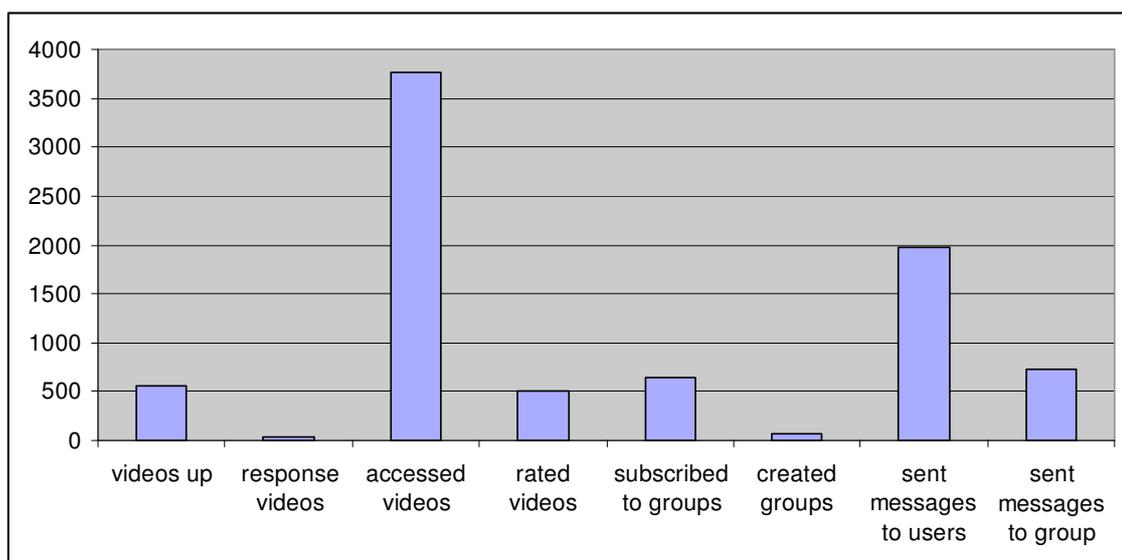


Figure 58: Number (sum) of use of different functions of the platform by the whole community over the length of the pilot

The popularity of these options remains rather constant with the same ranks over three months of the pilot as can be seen in Figure 59. All options are less

used over the course of the pilot with the exception of the option to rate videos. Thus, one functions of the platform does not substitute another. While the option to access videos and to send messages to other users decreases the most in terms of popularity, other options remain rather constant in terms of number of use.

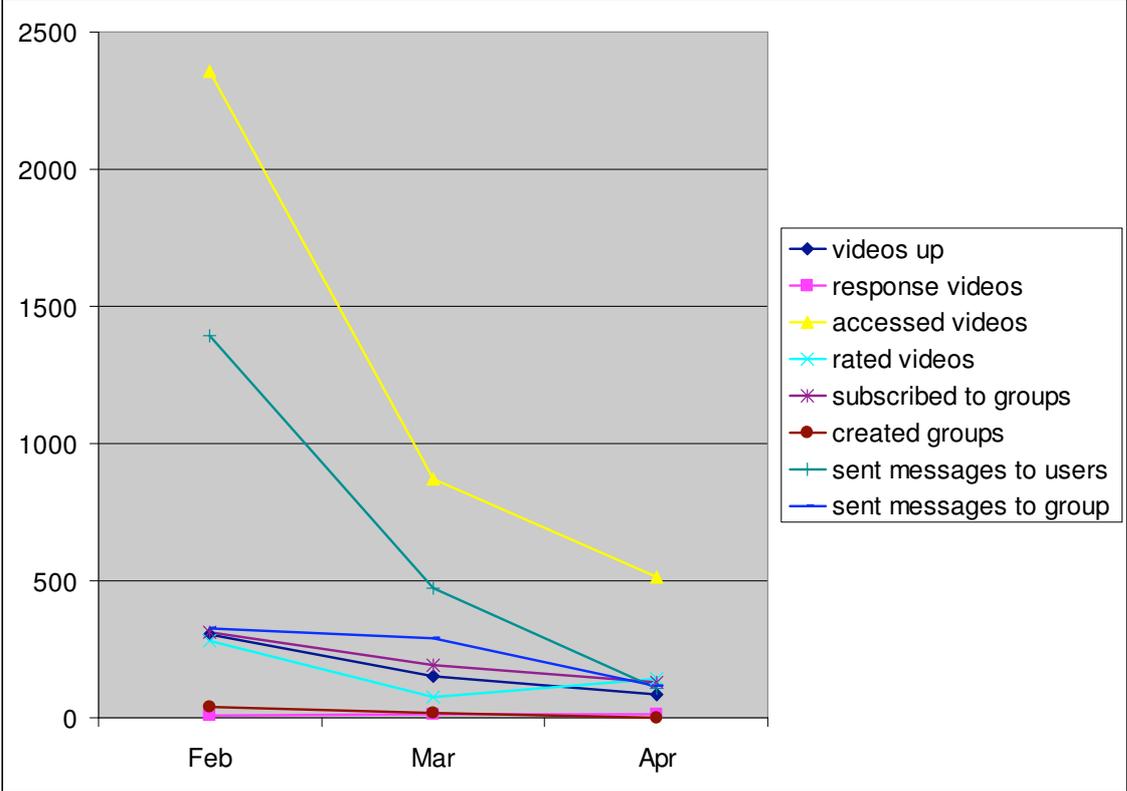


Figure 59: Number (sum) of use of different functions of the platform by the whole community by month

In general, participation decreases over the three months of the pilot. From an initial phase of excitement and trial, activities later on seem to be more directed and targeted. In the first weeks more exploration of the platform took place as well as trial and error. Later in the pilot also the videos looked more sophisticated and more thought through.

It is not unusual that when a technology or a technological application is introduced to a community that it is used to a greater extent in the very beginning until decreasing to a constant level because exploring times to get to know the different functions are needed only in the initial phase. After getting acquainted with the platform it can be used for specific purposes. The decrease of participation might also be due to technical problems as the platform still needed to be refined in the first few weeks and even then the platform did not

turn out to be perfectly reliable all the time. Some technical problems had to be solved from the platform developer's side, while others were in the hand of the providers which were therefore even more difficult to solve. The impact, technical challenges had on the motivation of the participants, is difficult to tell. Participants were informed already in the beginning that the platform partly still constituted work in progress and that the researchers were very happy to receive the feedbacks to enhance the platform further. Thus, some participants in their acquired role as co-researchers were excited about being part of the research cycle and to provide feedback. Other reasons for the decrease of participation given by the participants in the interviews and focus groups were lack of time or that they were not allowed to use the mobile phone at work (in case they had started an internship). Initial excitement and fascination by the technology has probably also played a role in explaining why the activity rates in the first few weeks have been particularly high.

However, also in the last few weeks there were still active users on the platform and given the rather low frustration tolerance levels expected and noted by the youth workers it is surprising that some were still very active. Also it has to be taken into account that not all activity rates on the platform dropped down. For instance, the average time spent online per session is quite constant over all twelve weeks, i.e. those who logged on did not spend less time online and the average number of uploaded videos per person remained also rather constant over the time of the pilot.

However, it becomes clear that long-term studies would be needed to come to more accurate data.

In contrast to other functionalities of the platform, the fact that the option to upload reply videos has not been used very often is rather striking, particularly when taking into account that the ping-pong approach and the elaborated pedagogical concept invited the participants to react to the challenge videos. The reasons for this rather insignificant number of uploaded reply videos are manifold. Partly again it has to do with technical problems while also motivational challenges among the pilot participants might have played a role. At the beginning of the pilot the option to upload answer videos was not available and once it was available the participants did not make much use of it. Also in terms of usability uploading an answer video was a great challenge in

comparison to the use of other features of the platform which could be used more intuitively. Even when an answer video was recorded it was sometimes not uploaded as an answer video but as ordinary video under their own profile. Also some participants stated in the interviews that they had not found the challenge videos and in fact, there was no structure available on the platform that would allow highlighting these videos. They were uploaded as ordinary videos like all others and could only be identified when going to the group's page of the moderators. Thus, the number of reply videos represents an under-estimation of the real number. For further refinement of the platform a better structure that would make the ping-pong approach intuitively clear allowing to easily find challenge videos and to upload answer videos would be essential.

The young participants besides using the video function made much use of the option to create groups and to subscribe to groups to discuss topics of their interest. Topics of interest that were relevant to them dealt with different difficult life situations such as teenage mothers, or crime; others were more fun oriented. One group collected ideas for the Comeln project which was particularly interesting for the research team.

Some young people were still active on the platform even after the end of the pilot which shows that some were interested to use the platform further as it had become an integral tool in their lives according to their interview statements.

The tested difference hypotheses resulted in rather insignificant differences between the participants in Austria and the UK in terms of use of the platform. The found differences between the two countries are partly caused by technical difficulties in the UK. At the beginning of the pilot, in the UK it was not possible to watch videos, thus in order to make use of the platform the participants could only make use of the text functions, i.e. send messages and exchange ideas in groups, which they made much use of. Thus, the platform could be called culturally fair as it allows young people from different countries to participate on the same platform.

The differences between the two Austrian groups are more significant in comparison to the country differences. A probable explanation might constitute the different availability of the moderators in the two pilots. In Vienna the moderators were available all the time throughout the pilot and set interventions to motivate the participants, as the young people regularly or at least

occasionally visited the youth organisation. In Styria the moderators were not available for face-to-face contact every day, only when problems occurred or when one of the workshops took place. This underlines the importance of the moderator role.

Furthermore the platform can be called gender fair as it encourages participation of both genders to the same extent and as no significant differences in the use patterns of the two genders were found. Literature review suggests that among marginalised young people gender differences are to be found, particularly in the sense females being less visible and being even less present in education and lifelong learning activities. Thus, having this fact in mind that the platform might provide for positive learning experiences for both genders (!) has to be particularly positively remarked.

Based on gender research one would also expect the female participants to exchange more text messages and the male participants to make more use of the video function for self-publicising purposes. But neither of these hypotheses have been confirmed based on the usage data, which means that the platform does not foster gender differences.

Slight differences in their use patterns can be found between the younger and the older age group. The latter one is slightly more active.

Many platform variables correlate. The factor analysis shows three typical use patterns. The first factor can be called “one-to-one communication and rating”; the second factor “group activity” and the third one “reply videos”. Thus, these three different activates are typically clustered on the platform and represent typical use patterns.

Communication that has taken place using the mobile phone in terms of its typical functions as calling somebody or sending text messages is not correlated with the communication behaviour on the platform. Thus, the communication on the platform has taken place complementary to the communication via mobile phone. One could interpret that the platform allows for communication which otherwise would not take place and that encourages participants to communicate who otherwise would not.

In line with their role moderators made far more use of the platform as it was their responsibility to safeguard netiquette rules and therefore to pay attention to uploaded videos. However, it seems that some moderators took their

responsibility not as serious as others as their activity rates differ to a high extent too. The behaviour of the moderators correlates moderately with the behaviour of the participants. Thus, the impact of the moderators' behaviour on the use pattern of the young participants is moderate but significant. The analysis shows that not all prepared challenge videos or feedback videos have been uploaded by the moderators. For some moderators it was difficult to fulfil their role besides their work as youth workers or social workers. Institutional embedment would therefore be required which gives the moderators sufficient time to do their jobs within their daily work routines.

17. Community aspects – Social Network Analysis

The method of Social Network Analysis (SNA) allows understanding group dynamic effects on a general level and roles and functions on an individual level.

On a group dynamic level group processes can be observed, such as whether the density of relations evolves over time, i.e. whether relations become more intense or not over a given period or whether the virtual community resembles real life relations or complements them, etc.

Further, with the means of SNA on an individual level, the reciprocity of relations can be analysed, i.e. whether relations are mono-directed to reciprocal, or whether people are popular or unpopular within the community, etc.

Key questions in this respect are (as introduced in chapter 15):

How do the participants interact among each other and with youth workers (moderators) on the platform?

1. Does the online mobile community resemble real life relations?
2. Does the online mobile community foster real life relations?
3. Can different roles in the community be identified?
4. Do subgroups develop in the virtual community?
5. Do the different groups mix in the virtual community?
6. What role do the moderators on the platform play?

To answer the first two questions, among the Vienna participants a survey prior to the pilot and one after the pilot have been conducted.

Question 1, 2, 3 and 4 will be answered based on the results among the participants of Vienna. The other questions will take into account the whole community, including participants in Styria and different regions in the UK.

In the following subchapters, besides the above formulated research questions common SNA measures will be applied to the community and its regional subgroups, whereby the focus lies on the Vienna community as there is more information on these participants available. As data basis serves a

questionnaire that has been handed to the participants in Vienna before and after the pilot as well as relational data from the log-database.

17.1. SNA survey – prae and post

To understand differences or similarities between social life within the Vienna group before and after the pilot as well as differences and similarities between virtual social life and “real” life, the participants in Vienna were asked to fill in a questionnaire before and after the pilot.

The questionnaire contained “relation questions” as well as “contact questions”. The relation questions comprised questions regarding different kind of relations, such as whether they knew each other, whether they were befriended or did not like each other. The contact questions were only answered in case participants had acknowledged acquaintance. Then they were asked how they cultivated their relation, physically, using the phone or the Internet while multiple answers in these contact questions were possible.

The questionnaire prior to the pilot was handed them in the framework of the “Welcome Workshops” when they were introduced to the project, the platform and the use of it. After the end of the pilot they were given the post-questionnaire during the debriefing session. The survey was explained in detail before it was distributed and the explanation was further supported through PowerPoint slides.

In the construction of the survey the main focus laid on usability and reasonability.

Firstly, the survey had to have an appropriate length as young participants were expected to have a limited attention span and limited motivation to stand still for a longer period of time since filling out the questionnaire was only a fraction of the total duration of the Welcome Workshops.

Secondly, as many of the young participants were challenged by reading texts the questionnaire had to be as visual as possible and nevertheless relatively self-explanatory.

For the purposes of the SNA it is essential to have complete data sets. Therefore, when a participant handed the questionnaire back to the workshop

organiser its completeness was cross-checked and in case some questions were still unanswered, participants were asked to answer those.

On the following page Figure 60 shows an extract of the SNA survey whereby obviously here for illustration purposes not the real names have been used.

On the top of the first page the participant was asked to fill in his or her name.

On the consecutive pages the participants had to mark per (other) participant whether they knew him or her, whether they were friends with and how they cultivated their relation. As can be seen in the illustration part of the questions are graphically represented to enhance usability of the questionnaire. So, participants had to mark one of the three emoticons to rate whether they were friends, were neutral in their relation or did not like the person. Similarly the contact questions were enhanced through the use of symbols.

The survey after the pilot had the same structure as the survey before the pilot with the only difference of added blank boxes where participants were asked to fill in nicknames of new acquaintances that they got to know on the platform.

KENNST DU?

ich bin....

Sasa Gabor	...kennst Du ihn?	...seid Ihr befreundet?	...wo tauscht ihr Euch aus?		
	<input type="checkbox"/> JA <input type="checkbox"/> NEIN	<input type="checkbox"/> ☹️ <input type="checkbox"/> 😐 <input type="checkbox"/> 😊 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TREFFEN 🖐️ oft <input type="checkbox"/> manchmal <input type="checkbox"/> nie <input type="checkbox"/>	<input type="checkbox"/> TELEFON 📞 oft <input type="checkbox"/> manchmal <input type="checkbox"/> nie <input type="checkbox"/>	<input type="checkbox"/> INTERNET 🖱️ oft <input type="checkbox"/> manchmal <input type="checkbox"/> nie <input type="checkbox"/>

Henri Mathieu	...kennst Du ihn?	...seid Ihr befreundet?	...wo tauscht ihr Euch aus?		
	<input type="checkbox"/> JA <input type="checkbox"/> NEIN	<input type="checkbox"/> ☹️ <input type="checkbox"/> 😐 <input type="checkbox"/> 😊 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> TREFFEN 🖐️ oft <input type="checkbox"/> manchmal <input type="checkbox"/> nie <input type="checkbox"/>	<input type="checkbox"/> TELEFON 📞 oft <input type="checkbox"/> manchmal <input type="checkbox"/> nie <input type="checkbox"/>	<input type="checkbox"/> INTERNET 🖱️ oft <input type="checkbox"/> manchmal <input type="checkbox"/> nie <input type="checkbox"/>

Figure 60: Extract from SNA survey

17.2. Log-database from platform

The log-database does not only comprise data necessary for the statistical analysis of the activities of the participants on the platform but it does also include relational data of all activities.

Thus, from the log-data can be traced who sent whom a message or who watched whose videos, etc.

Besides total values for the activity relations, for the manipulation of the data a differentiation of the data according to the month of the pilot, from month 1 to month 3, is possible.

The following activity relations on the platform have been stored in the log-database:

- Sent messages (who to whom)
- Rated videos (who rated whose)
- Video reply (who replied to whom via video)
- Video watch (who watched whose video)

17.3. Vienna Community

The following analysis is based on the social network of the participants in Vienna.

Firstly, standard SNA measures are applied to understand the nature of the community. Secondly, research questions 1 and 2 that analyse the relation between virtual and “real” life within the Vienna community will be answered. Thirdly, research question 3 which asks for different roles among the Vienna participants will be clarified.

17.3.1. The overall relation network in the Vienna group

Before single relations are analysed in more detail the overall network within the Vienna community shall be analysed consisting of different kinds of relations such as knowing each other, be befriended with, meet

regularly, send messages on the platform, watch others' videos on the platform, etc. Thus, the basis for the analysis is a matrix that sums up all different kind of relations prior to the pilot and after the pilot as well as all the relations during the pilot on the platform. The higher the sum, the higher is the number of relations two actors (participants) share. Thus, this kind of analysis reveals the overall strength of various bonds between actors. The more an actor is bond to another actor by different kinds of relations, the more unlikely is the tie going to break since in case of loss of one kind of relation there are still many other relations that link this person to the other one.

The following illustration shows the overall network of the Vienna community. The symbols represent the different participants; the labels reveal their nicknames, whereby females are represented by a circle and males by a triangle.

The lines between the symbols indicate the relation between the participants. The size of the line represents the number of relations that these participants share.

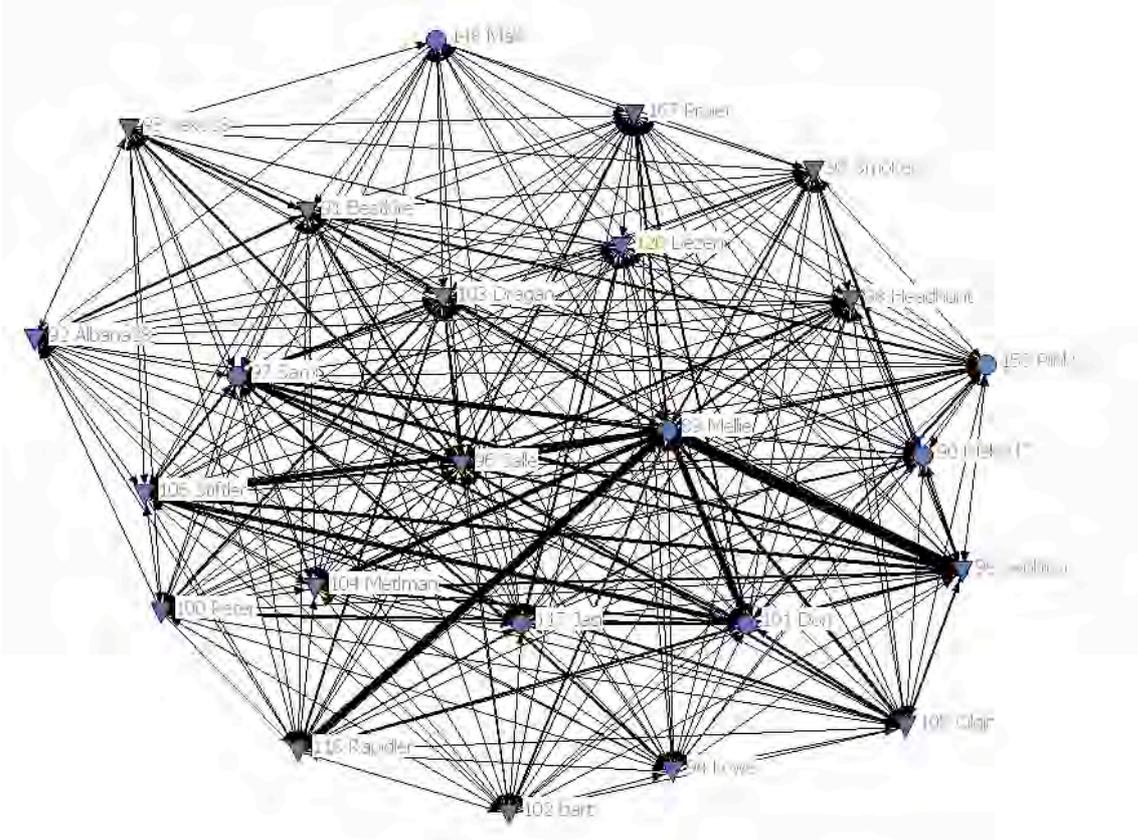


Figure 61: Overall network of Vienna community

The figure clearly shows that all participants are in some relation in touch with each other. However, there are participants with stronger ties than others; they share so called “multiplex relations” as they are linked via more than one relation to each other. There are, for instance, very strong ties between Mellie and Sephirot, Mellie and Rapidler and Mellie and Dori. Thus, Mellie in the overall network seems to have acquired an important role.

Relations in the overall network in the Vienna group have a relatively high reciprocity with a degree of .75, which means that 75% of all relations are reciprocal and only 25% are not reciprocal. The individual reciprocity level differs to a great extent between single participants from 0 (Jasi, Smoker, Liezen) to .3 (Bart). In the first case none of the given relations by one participant were reciprocal and in the second case 30% were reciprocal. Neither gender nor age seems to have an impact on reciprocity degrees as no significant differences between the two genders and the two age groups could be found.

The individual reciprocity degrees will be more closely analysed in chapter 17.3.3.1 when the different relation dimensions are taken into account.

The centrality of the overall network can range between 0 and 100%, while 0 stands for an egalitarian network and 100% for a network with a strong centrality that is directed at one or more persons. With a value of 12.5% the network is a rather egalitarian network, i.e. no central figures do evolve in the overall network in the Vienna group.

The individual centrality measures vary however from person to person: The in-degree as a result from incoming relations, which can be interpreted as popularity, varies between 1 (Maki) and 15.4% (Mellie). The out-degree as a measure for outgoing relations, which stands for gregariousness, ranges between .4 and 17%.

Although the younger age group tends to have more outgoing relations as well as incoming relations, the differences between the two age groups are not significant. Similarly, females are more connected with others by incoming and outgoing ties but the differences between the two genders are neither significant.

17.3.2. Network before and after the pilot

In the survey participants were also asked how they cultivated their relations, whether they met physically, got in touch virtually or via telephone.

The figure below (Figure 62) shows the multiplexity of the network before the pilot start, i.e. some people are more connected than others as indicated by the strength of the links. The thicker the line the more multiplex is the relation, i.e. connected people share more common activities, meet either virtually, physically or via telephone more often than the other participants.

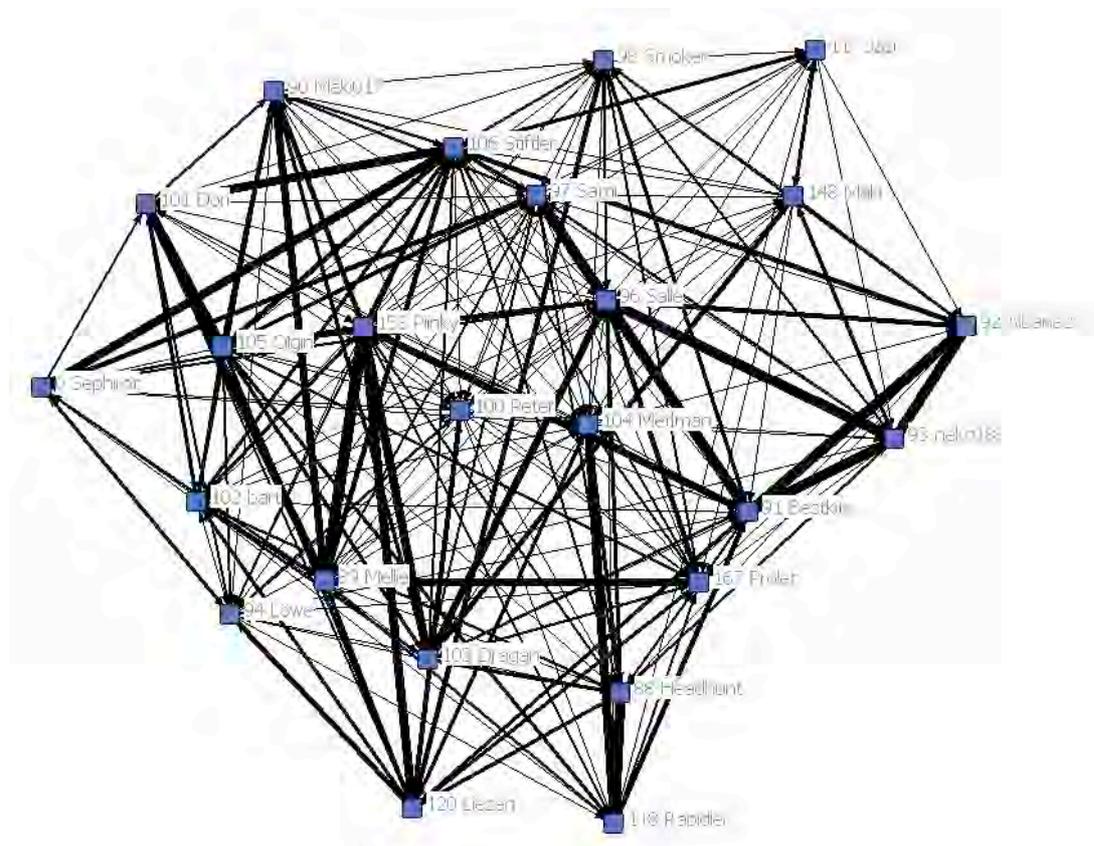


Figure 62: Multiplex relations between participants before the pilot

Below, Table 22 shows the distribution of the multiplexity degree among the participants at stage 1, before the pilot, on the left hand and at stage 2, after the pilot, on the right hand. The lowest degree is 0 and the highest degree is 8. When no relations between participants exist the value is 0. The value “8” is the result of a person who has stated to know another

specific person in the community (1 point), is friends with (1 point), and meets often physically, virtually and via telephone (2 points each).

Table 22: Distribution of multiplexity degree at stage 1 and stage 2

Multiplexity degree	Number at stage 1	Number at stage 2
0	240	182
1	170	188
2	59	90
3	30	24
4	27	30
5	8	10
6	8	12
7	3	2
8	7	14

The table illustrates that at stage 1 most of the community members are loosely linked to each other with only a few exceptions that obviously have strong connections to other community members.

When contrasting relations at stage 2 against stage 1 it has to be noted that the multiplexity of relations has increased: value levels “0”, i.e. no relation, have significantly decreased after the end of the pilot with a frequency of 182 versus 240 before the pilot. Almost all other values have increased which indicate that ties between the participants have become stronger.

17.3.3. Single relations in detail

In the following section single relation dimension will be analysed in depth in terms of reciprocity and centrality to observe relation specific dimensions and to observe also differences over time.

Starting with analysing relation dimensions and contact dimensions before and after the pilot, all activity dimensions on the platform will be examined.

17.3.3.1. Characteristics of the networks: reciprocity and density

In the following the various dimensions will be analysed regarding their reciprocity. The reciprocity degree can vary between 0 and 1. A value of

“0” means that no relation is reciprocal. This can either be the result of an outgoing relation that is not returned by the other person or be the result of an incoming relation that is not confirmed by the person her/himself.

The density of a network is defined as the sum of the values of all ties divided by the number of possible ties. If we have measured the ties among actors with values (strengths, closeness, probabilities, etc.) density is usually defined as the sum of the values of all ties divided by the number of possible ties. That is, with valued data, density is usually defined as the average strength of ties across all possible (not all actual) ties. Thus, density reveals details about the structure of the network, how dense it is in terms of ties between different participants.

17.3.3.2. Relations before the pilot

These relations refer to stage 1, before the pilot start.

Know-relation

The overall reciprocity degree in the Vienna community for the know-relation is .52, i.e. 52% of the participants stated both they knew each other. This value is rather low as one could expect that knowing each other is a reciprocal phenomenon but obviously this is not always the case.

The degree of reciprocity varies to a big degree: from .17 (Rapidler) to .76 (Stiftler). A low degree means that there is a high inconsistency between the people who they stated they knew and the people who stated knowing them in return. A high degree stands for a high consistency between these two relations. In all cases where the degree was very low it was due to the fact that the young people had declared more acquaintances which were not returned. As Figure 63 also shows the balance between knowing people and be known by them in return differs. Among Rapidler, Jasi, Bestkite, and Maki only a third (at maximum) of their stated acquaintance

is reciprocal. Sami, Albana28, Bart and Stiftler achieve the highest matches between these two relations.

One can only hypothesise about the reasons for these diverse reciprocity-values.

Probably participants with low reciprocity-values wanted to seem more popular or a lack of self-reflection as well as memory effects had influenced their statements.

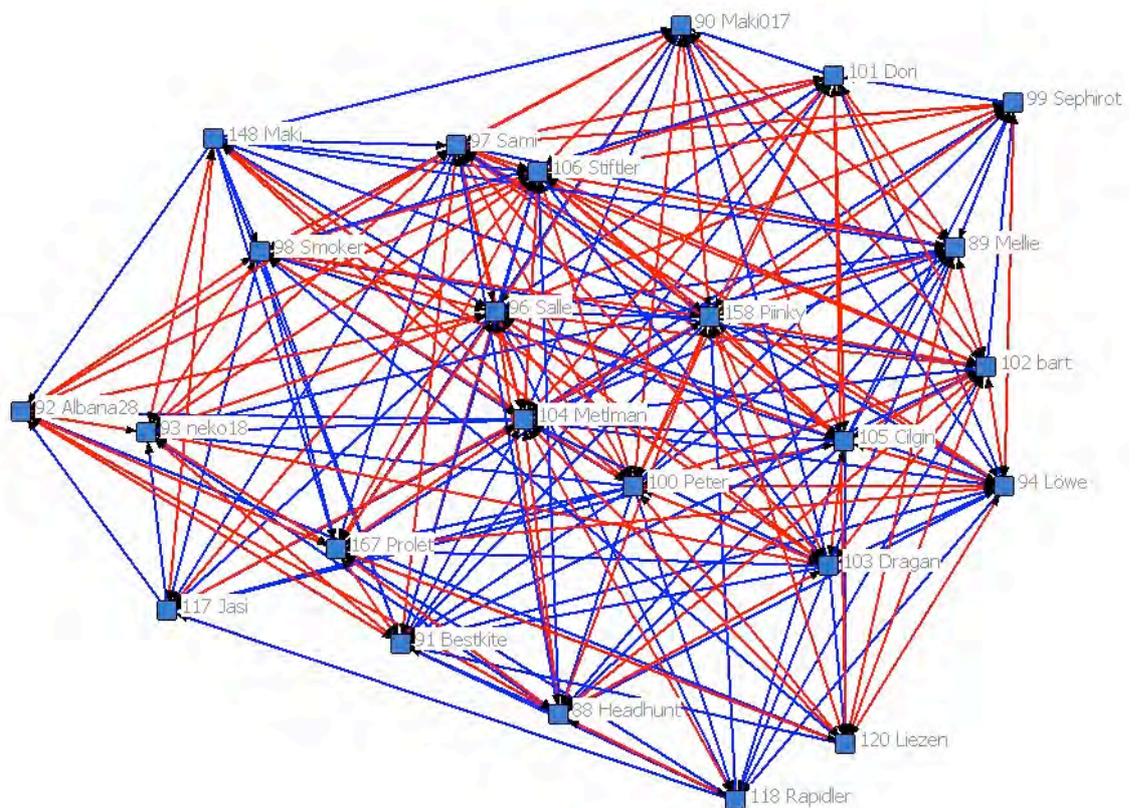


Figure 63: Reciprocity in Vienna participants regarding know-relation (red...reciprocal relation, blue...non-reciprocal relation)

The network shows an average density of .59. Thus, 59% of all possible know-ties have been realised by the participants.

Friends-relation

The overall reciprocity is average with a value of .42.

When the participants had to state who they were friends with of the ones they had claimed to know a slightly different pattern can be noted. The stated relations are obviously fewer compared to the know-relation and

one of the participants (Jasi) stands outside the group in terms of friendship. She does not disclose any friends among the group nor is she named as friend by anyone.

Again the symmetry of the friends-relation differs to a great extent between the young people. None of the friends-relations Löwe, Peter and Smoker have identified is reciprocal. For Liezen, Prolet, Bart, Pinky, Maki007, Metlman and Maki only up to one third of the friends-relations are reciprocal. A high convergence between the two relations can be found among Mellie and Salle.

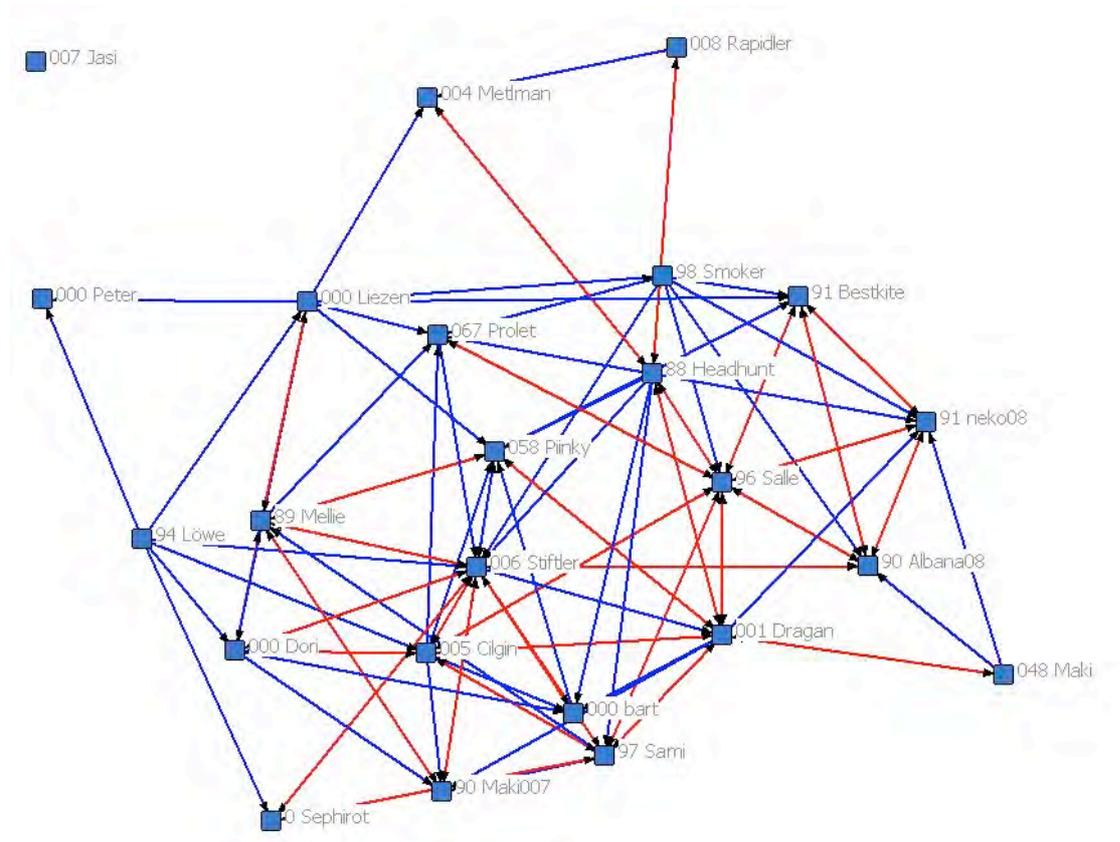


Figure 64: Reciprocity in Vienna participants regarding friends-relation (red...reciprocal relation, blue...non-reciprocal relation)

Interestingly, the reciprocity-values for “know” and “friends” do not correlate, i.e. people who have low reciprocity-values in the know-relation do not necessarily also have low levels in the friends-relation.

The density as also the Figure 64 shows is, unsurprisingly, lower than the know-relation network with a value of .20. Clearly not all people participants know within the Vienna group they would like to call friends.

Dislike-relation

In contrast to the previous two described relations the overall reciprocity for the relation that is based on disliking others is very low with a value of .13.

Already at first sight one can see in Figure 65 that many more relations are non-reciprocal, i.e. people who have stated that they dislike others in the group are not necessarily disliked by them as well.

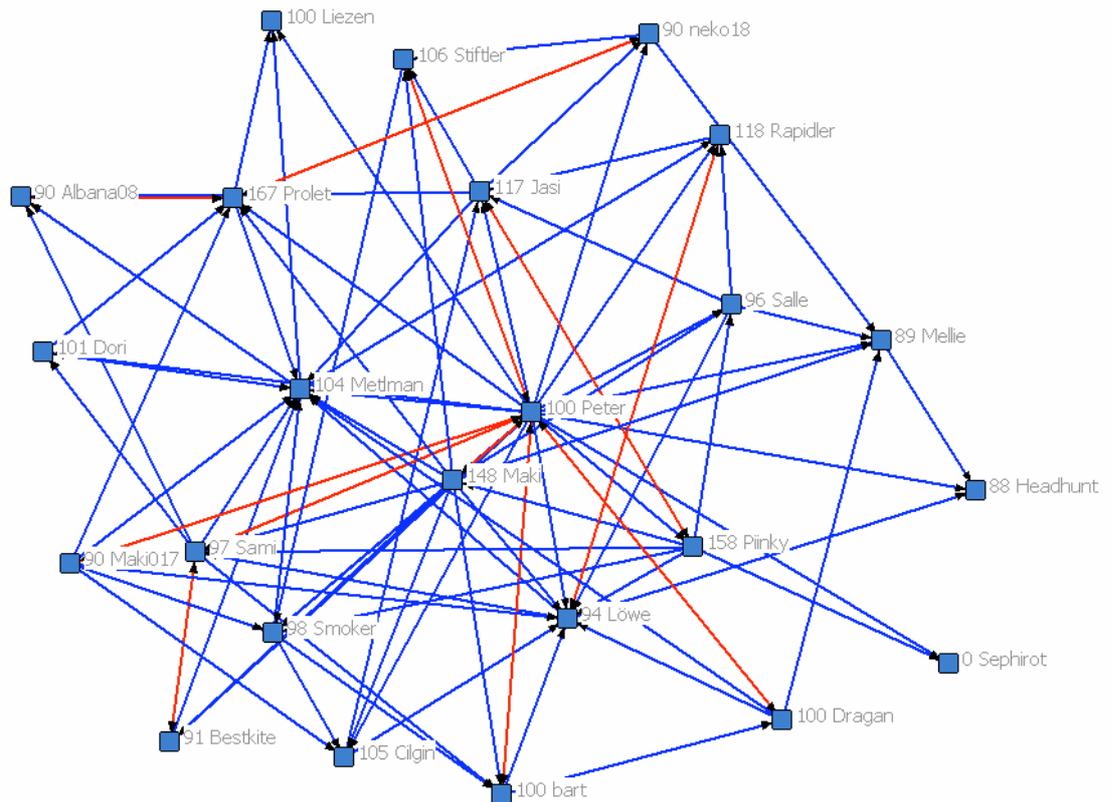


Figure 65: Reciprocity in Vienna participants regarding dislike-relation (red...reciprocal relation, blue...non-reciprocal relation)

For Metlman, Salle, Cilgin, Smoker, Mellie, Sephirot, Dori, Headhunt and Liezen the non-reciprocity value is at its maximum with 1. This means, that none of the dislike-relations is returned.

The highest reciprocity value can be found in Peter with a value of .27 which is still a quite low reciprocity-level.

Again the know- and the dislike-relation do not correlate.

The density of the dislike-relation is similarly low as the friends-relation network (.25). Thus, in average 25% of all possible ties have been realised.

17.3.3.3. Contact relations before the pilot

Meet contact-relation

The overall reciprocity level for meeting other people of the Vienna group is rather low with a value of .28 as one could expect that both people involved in a physical meeting would remember meeting the other person and also would want to disclose it. Thus, other factors might play a role resulting in such a low reciprocity level. The value varies between 0 and .75 among participants, while two thirds of them have a value of 0, i.e. none of their meet contact-relation is reciprocal.

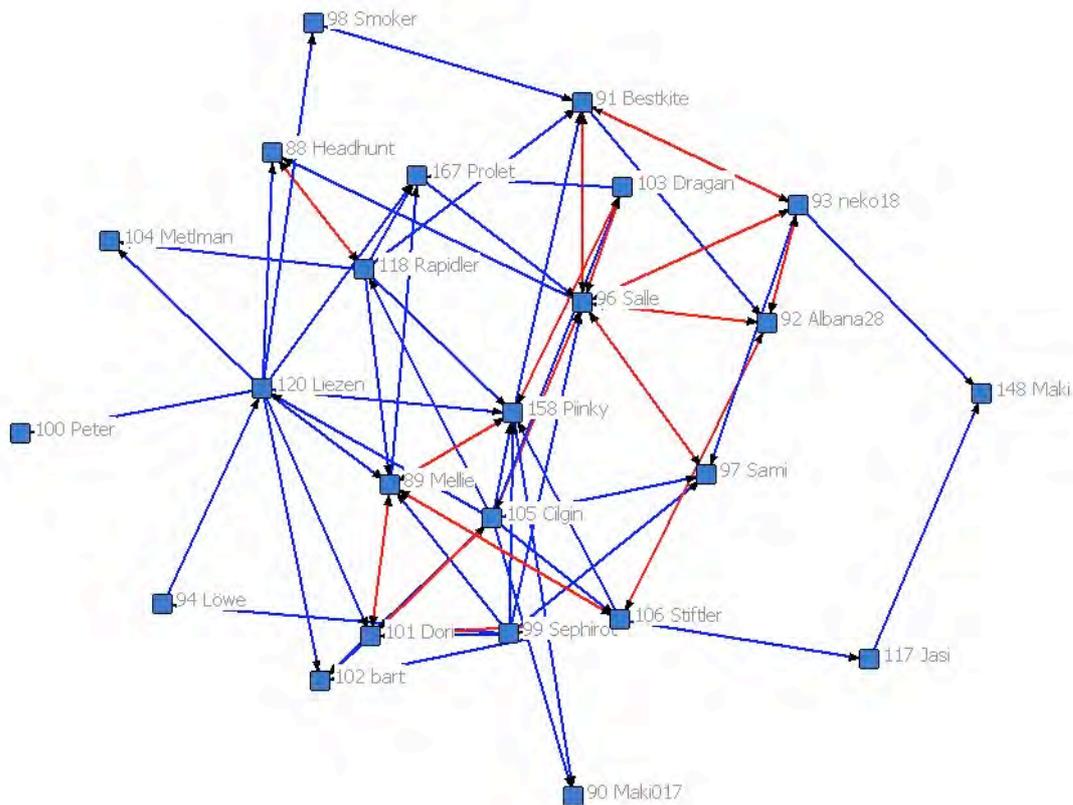


Figure 66: Reciprocity in Vienna participants regarding meet contact-relation (red...reciprocal relation, blue...non-reciprocal relation)

All contact-relation networks are characterised by a low density level which also the figures illustrate: Only 19% of all possible ties in the meet-contact-relation are realised.

Telephone contact-relation

In contrast to the physical meeting, the reciprocity on the telephone contact-relation is higher with .56 with a range between 0 (Löwe, Bart, Smoker, Sephirot, Rapdiler, Dori, Dragan, and Liezen) and 1 (Albana 28). Peter is isolated in terms of contact to the others via telephone and Stifler has a cut-point position which means that if he was not part of the network it would break into several groups. Thus, he has a bridging function in this network.

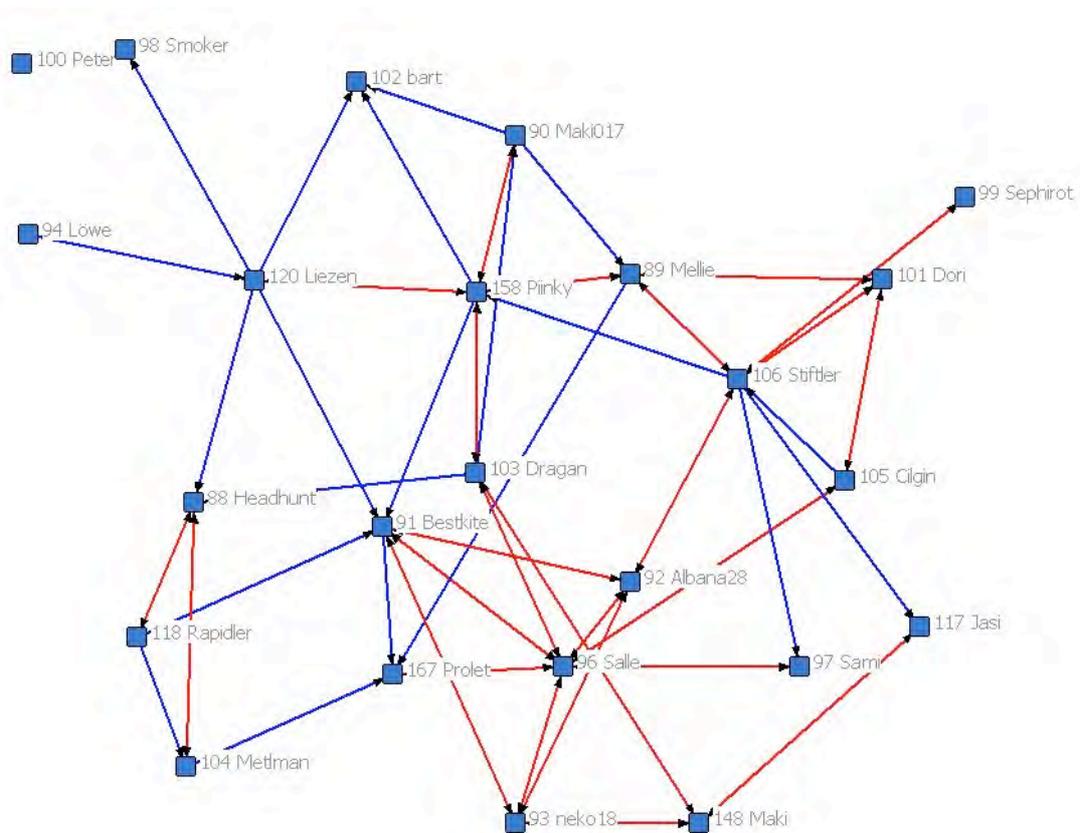


Figure 67: Reciprocity in Vienna participants regarding telephone contact-relation (red...reciprocal relation, blue...non-reciprocal relation)

As Figure 67 shows, the density of the network is rather loose with only 16% of all possible ties realised.

Internet contact-relation

The overall reciprocity in the Internet contact-relation is rather low with a value of .21 with a range between 0 (12 participants) and 1 (Sami). Eight participants are not linked to the others via the Internet: Metlman, Jasi,

Peter, Smoker, Sephirot, Stiffler, Maki, and Dragan as can be seen in the illustration.

Salle and Bestkite are cut-points in the network and thus have a bridging function.

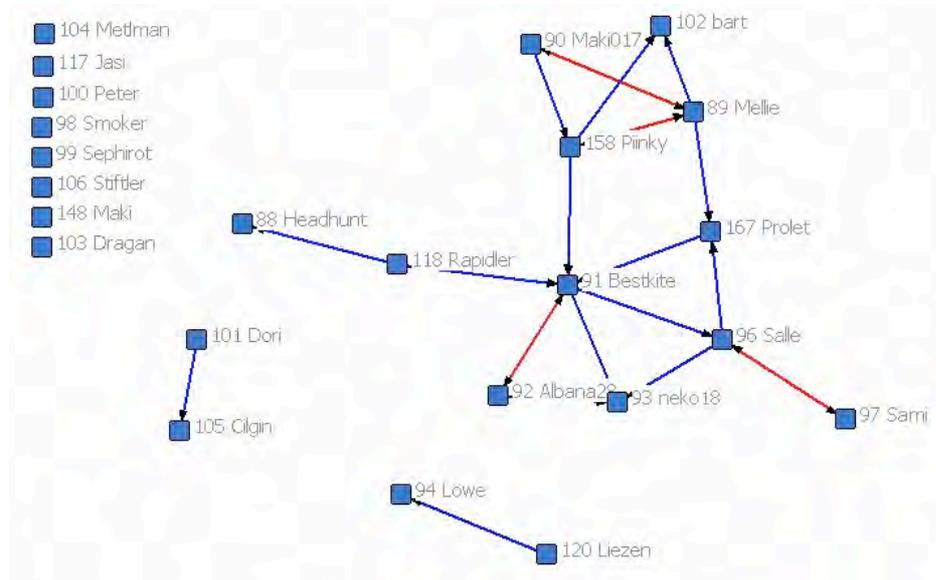


Figure 68: Reciprocity in Vienna participants regarding Internet contact-relation (red...reciprocal relation, blue...non-reciprocal relation)

The density of the Internet-contact-relation network is very loose with a value of .05. Thus, only 5% of all possible ties referring to keeping contact via the Internet have been realised.

17.3.3.4. Relations after the pilot

These relations have been gathered in the framework of the second SNA survey after the end of the pilot.

Know-relation

The overall average reciprocity of .55 is a slightly higher reciprocity value compared to the statements in the first survey.

Again the range of reciprocal ties varies to a great extent: Smoker, Maki, Bestkite, Albana28 and Rapidler are among those with the lowest reciprocal ties and Cilgin, Mellie and Salle achieve the highest values in reciprocity.

Compared to the survey previous to the pilot start the positions of some of the young people have changed. While Rapidler, Bestkite and Maki have a low degree of reciprocity both before and after the pilot, Albana had a higher degree of reciprocity before than after the pilot.

However, the statements in survey 1 and 2 do correlate (.467). Their statements do not differ significantly from stage 1 to stage 2. Thus, we can not claim that the reciprocity has augmented during the pilot.

While before the pilot the average number of acquaintances was 13, after the pilot the number of acquaintances was 15.4 within the Vienna community. However, the difference is not significant.

The average density of the know-relation network is moderate with a value of .67 and thus slightly higher as the average density before the pilot (.56). At the end of the pilot, 67% of all possible know-relations have been realised.

Friends-relation

The overall reciprocity level has decreased significantly but to a minor extent to .32 from the first survey to the second one.

Also after the end of the pilot some young people have no reciprocal ties, i.e. Peter, Smoker, Jasi and Maki.

The number of these participants has increased compared to stage 1 before the pilot. The participants Sephirot and Maki experience the highest reciprocity in the friends-relation as about half of their stated friendships are returned.

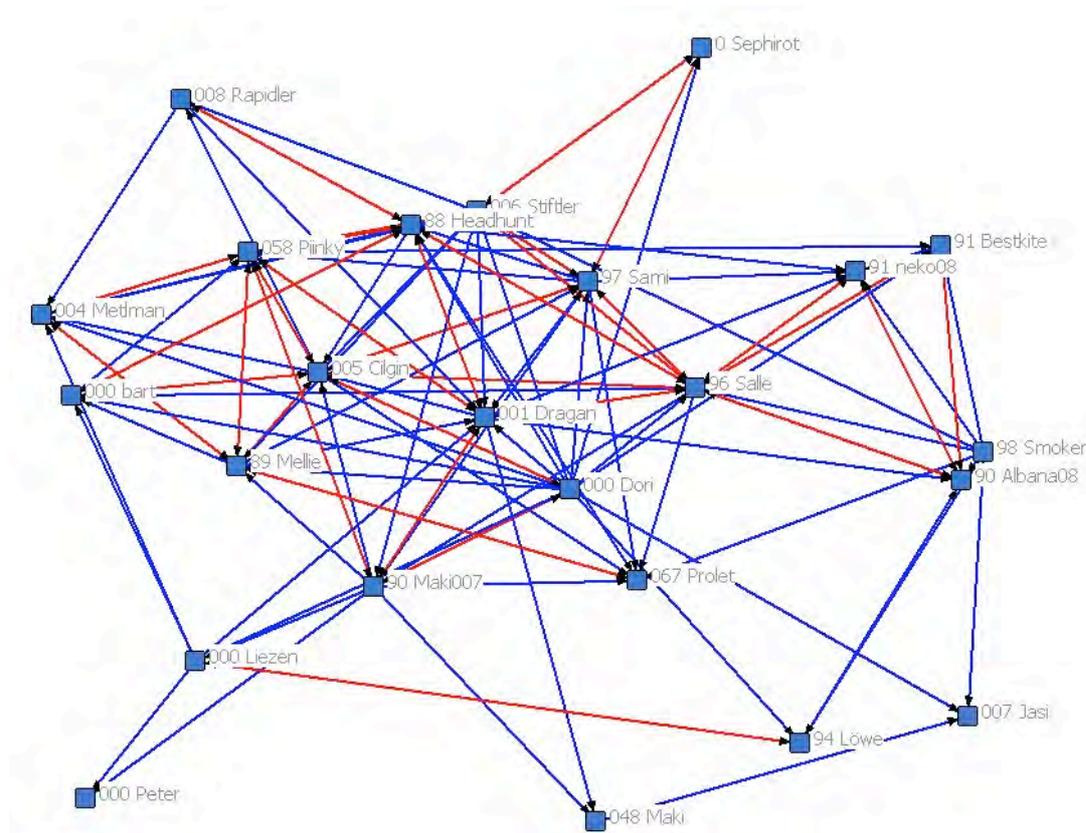


Figure 69: Reciprocity in Vienna participants regarding friends-relationship after pilot
(red...reciprocal relation, blue...non-reciprocal relation)

As can be seen in Figure 69 everybody is connected via a friends-relationship and Jasi who before the start of the pilot was not linked to others in terms of friendship has become a member of the circle of friends (although in many cases friendship is not a reciprocal relation).

During the pilot friendships have evolved within the community as previous to the pilot the average count was 4.67 and after its end it raised to 5.5 (again the difference is not significant).

This is also confirmed by the now slightly higher density value: 23% are befriended after the pilot while before it was 20%.

Dislike-relation

The overall reciprocity level for the dislike-relation has seemingly decreased to .0506 in survey 2, i.e. almost none of the stated dislike-relations are reciprocal.

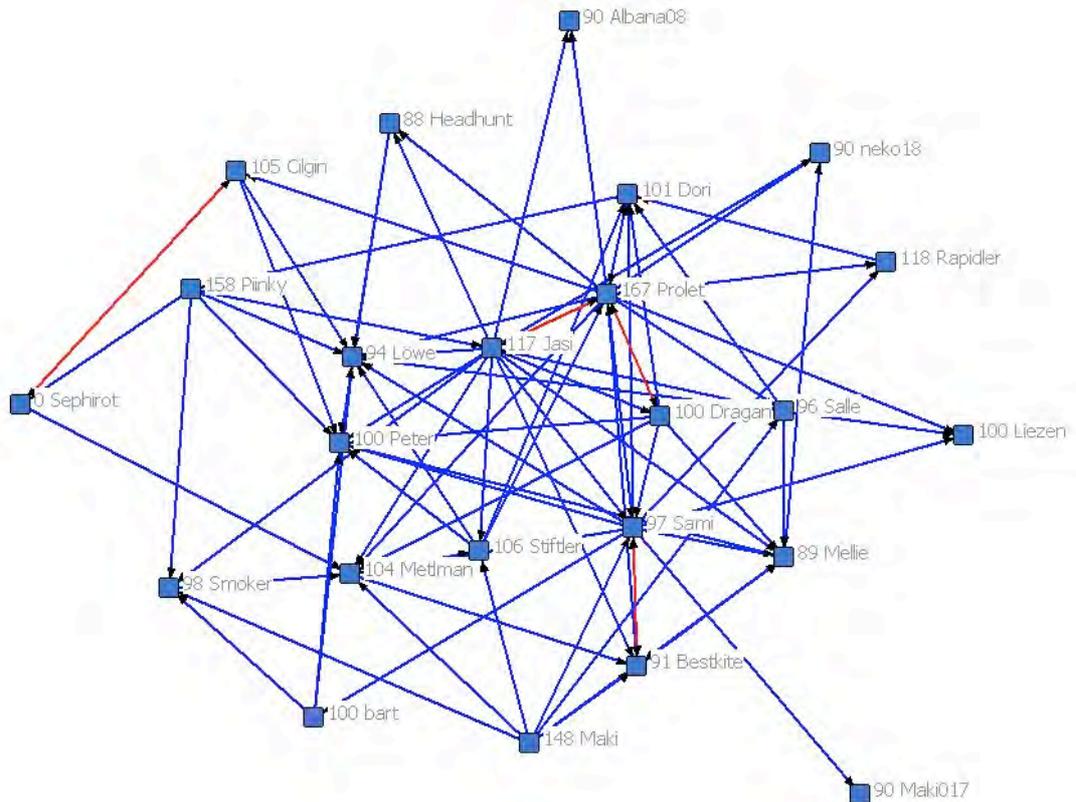


Figure 70: Reciprocity in Vienna participants regarding dislike-relation after the end of the pilot (red...reciprocal relation, blue...non-reciprocal relation)

In contrast to the previous described relations knowing each other and friendship which have both increased during the pilot the number of disliked people has decreased, from an average of 4.6 to 3.7 (the difference is not significant).

The density value has decreased for this network from .25 to .15. After the pilot, only 15% are connected by a relation that is based on antipathy.

17.3.3.5. Contact relations after the pilot

Meet contact-relation

The overall reciprocity value is quite low and even a little lower than before the pilot (.2). The values range between 0 (12 participants) and .5 (Sami). The actual frequency of physical meetings has however increased from 3.35 to 4.35 per participants. Thus, while before the pilot participants

stated in average to meet 3.35 others on a regular basis, after the pilot it was 4.35.

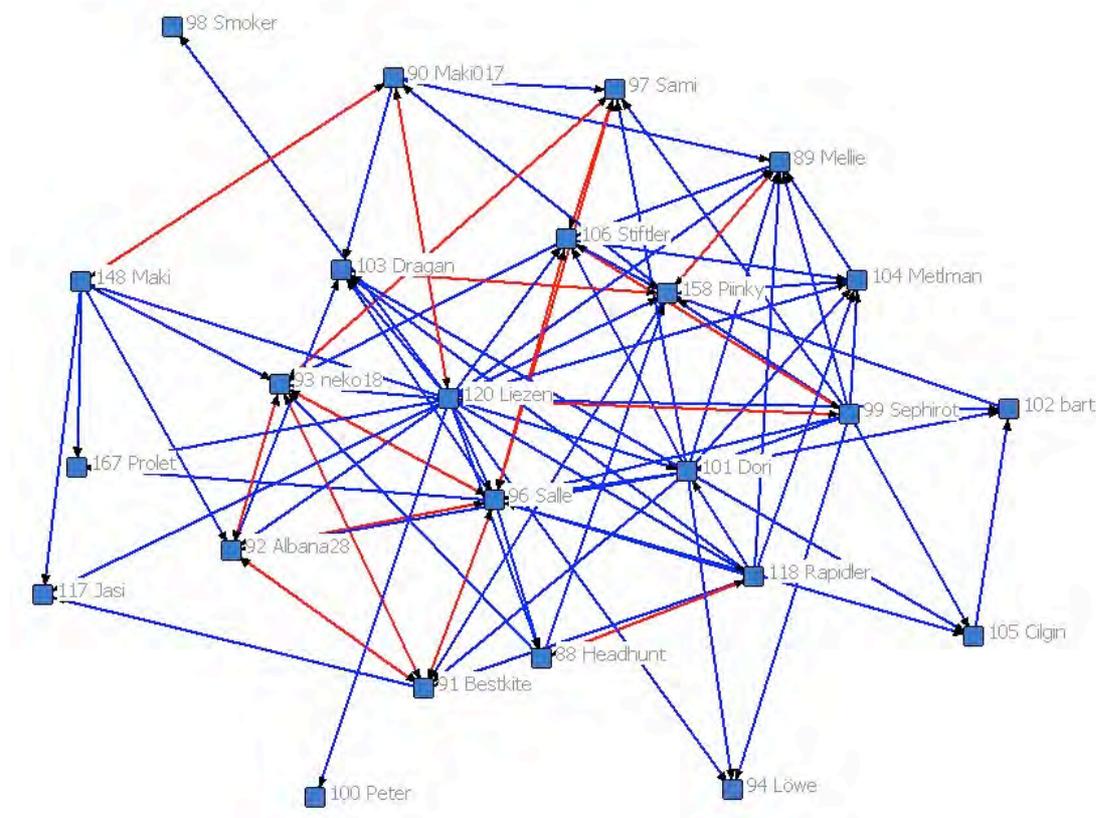


Figure 71: Reciprocity in Vienna participants regarding meet contact-relation after the end of the pilot (red...reciprocal relation, blue...non-reciprocal relation)

The density of the meeting-contact relation network has slightly increased from .19 to .23. Thus, after the pilot 23% of all Vienna participants are connected in terms of physical meeting.

Telephone contact-relation

The overall reciprocity level has slightly decreased to .42. It ranges from 0 (Löwe, Maki017, Dori) to 1 (Bart). Not as many participants have no reciprocal ties anymore compared to survey 1 before the pilot. In the network connected via the telephone Peter and Smoker are isolates. Previously it was only Peter to stand outside in terms of contact to others via telephone.

The participants Maki, Stiffler, Pinky, and Dragan are cut-points. If they were taken away from the network it would break into different groups.

The average frequency of keeping in touch via the telephone has slightly increased from 2.1 to 2.5.

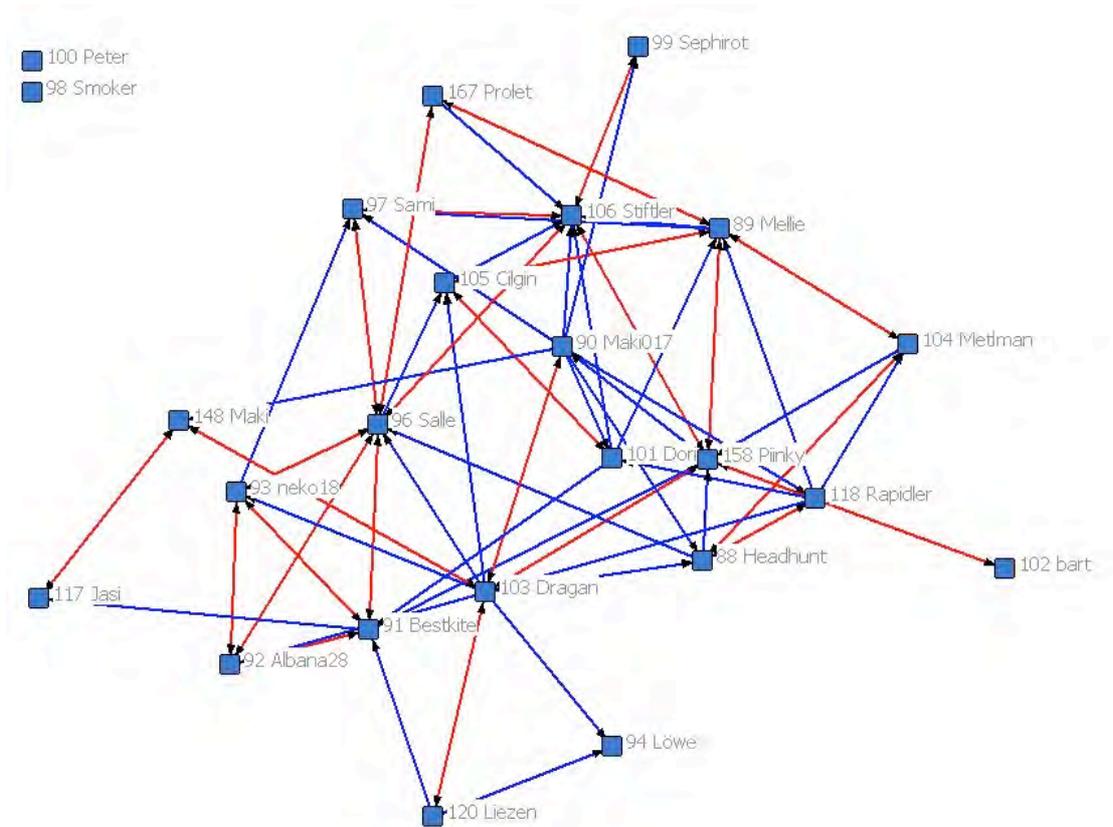


Figure 72: Reciprocity in Vienna participants regarding telephone contact-relation after the end of the pilot (red...reciprocal relation, blue...non-reciprocal relation)

The density for keeping in touch via the telephone has increased from .16 to .21. An enhanced communication pattern via the telephone could be partly explained by the availability of the mobile phone provided by the researchers which included also free calls and text messages.

Internet contact-relation

The average reciprocity value is medium with a level of .32 although higher than previous to the pilot. The value ranges between 0 (11 participants) and 1 (Cilgin and Sami).

Less people than before are now not connected to the others by means of the contact via the Internet: Löwe, Peter, Smoker and Sephirot.

Salle and Bestkite are still cut-points in the network.

Also after the pilot components can be found; now 2 instead of initially 3.

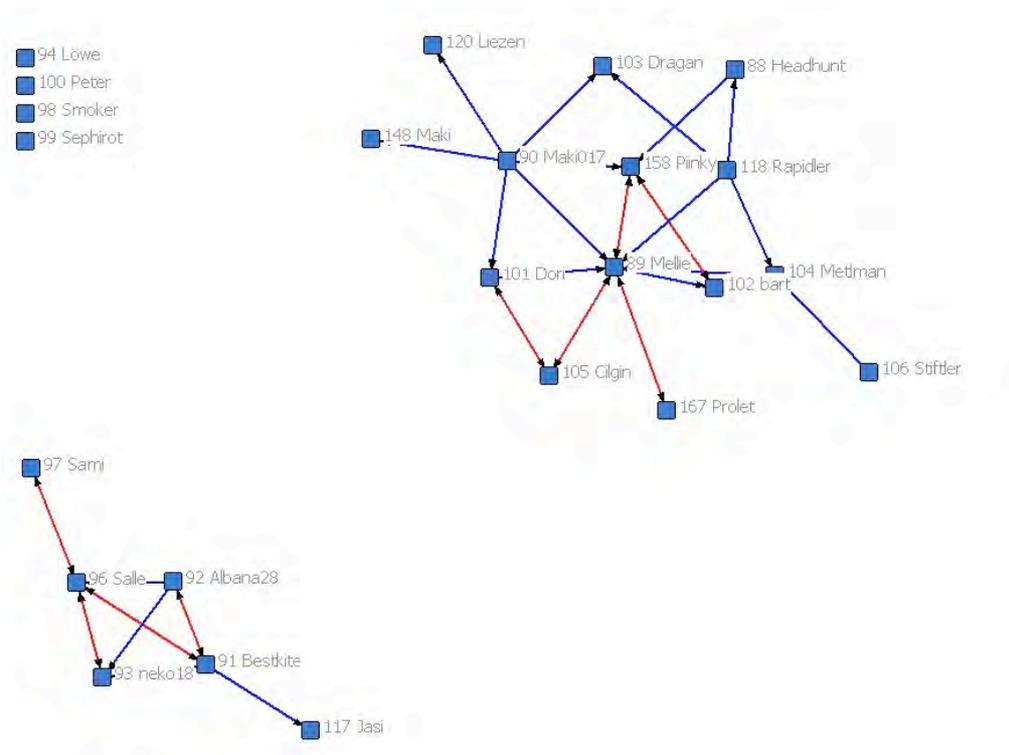


Figure 73: Reciprocity in Vienna participants regarding Internet contact-relation after the end of the pilot (red...reciprocal relation, blue...non-reciprocal relation)

The density of this network is rather loose with only .10 but is slightly higher after the pilot compared to keeping in touch via the Internet before the pilot (.05).

To cultivate their relations via the Internet seemingly is not the favourite option with only .96 before the pilot and a slightly higher value after the pilot of 1.54.

17.3.3.6. Activity relations on the platform

In the following the different activities and how people are connected by these activities on the platform will be analysed in detail.

The focus lies again on characteristics of the different networks but also on different roles acquired by the participants on the platform.

When all different activities on the platform are taken into account two special positions of the participants Mellie and Salle can be observed. They both have bridging functions in the network as they have cut-point

positions on a specific activity relation dimension: Mellie in terms of exchanged messages, and Salle in terms of rated videos.

Sent messages on the platform

The overall reciprocity level in terms of sent messages between the Vienna participants in the three months lasting pilot is surprisingly high when comparing to the rather low to medium levels in all different kinds of (contact) relations before and after the pilot with a value of .71. The individual reciprocity values vary considerably: between 0 and 1 (Pinky). Maki and Liezen do not participate in this activity. Interestingly also a participant who was functional illiterate (Dragan) received messages by others but did send none.

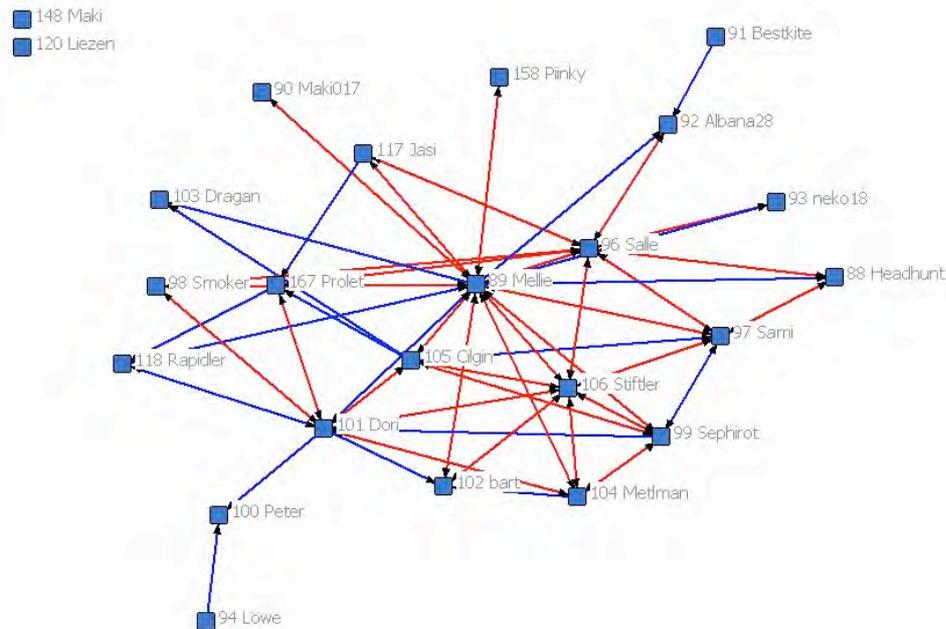


Figure 74: Overall reciprocity among Vienna participants regarding sending messages on the platform (red...reciprocal relation, blue...non-reciprocal relation)

The overall density of the network of sent messages is high with a value of 1.74. While not all participants are connected, the ones who are connected have multiple ties in terms of exchanged messages, i.e. several messages have been exchanged among the people who are connected. When observing the evolution of the network in terms of sent messages on the platform over the months of the pilot, the different shape of the

network as well as intensity of exchange becomes obvious. The density values decrease dramatically from 1.58 in month 1 to .15 in month 2 and finally to .001 in month 3.

The reciprocity levels seemingly decrease from to month. While the level is rather high in the first month with .69, in month 2 it decreases to .58 and finally in month 3, to the lowest level possible of 0.

In month 1, three people do not send messages to others on the platform (Maki, Liezen and Prolet). The rest is linked to one of the two networks while the smaller one consists only of two people (Peter and Löwe). Mellie has a cut-point position in this month. Thus, she connects other subgroups in the network and has a bridging function.

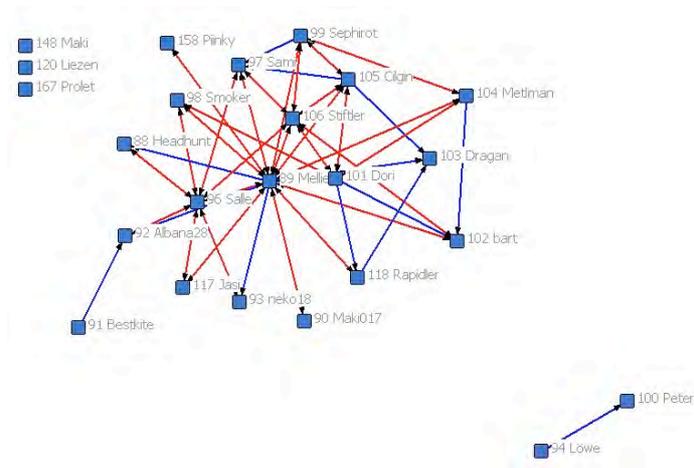


Figure 75: Month 1: Reciprocity among Vienna participants regarding sending messages on the platform
(red....reciprocal relation, blue....non-reciprocal relation)

In month 2, the number of not participating young people increases to 10. The remaining 14 people are connected to others in terms of exchanged messages. The participants Salle, Sami and Prolet serve as cut-points in the network. If they were taken away the network would have broken into different sub-networks.

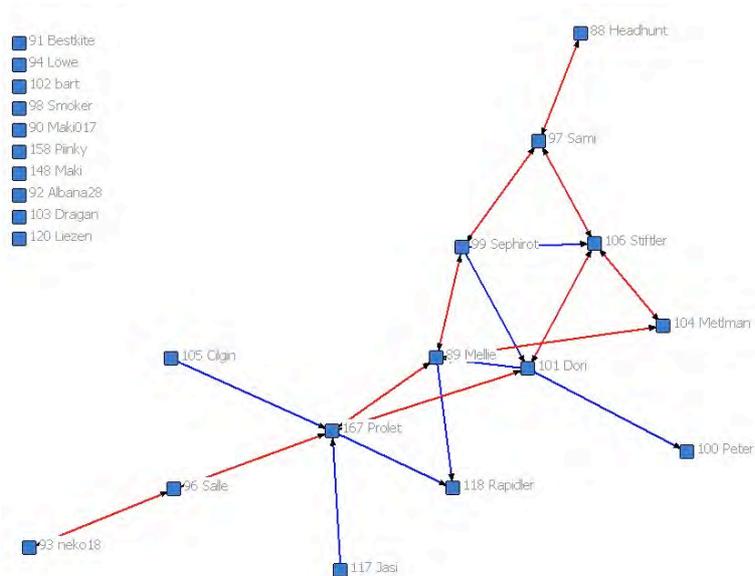


Figure 76: Month 2: reciprocity among Vienna participants regarding sending messages on the platform
(red...reciprocal relation, blue...non-reciprocal relation)

In month 3, finally, only two participants are active in sending messages and even this relation is not reciprocal.

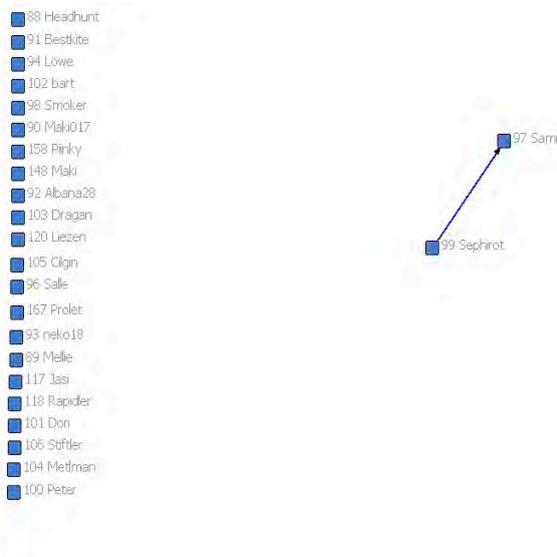


Figure 77: Month 3: reciprocity among Vienna participants regarding sending messages on the platform
(red...reciprocal relation, blue...non-reciprocal relation)

Rating videos on the platform

The overall reciprocity level in rating videos is lowest with .09. Almost all ties are not reciprocal. Thus, rating one's video does not automatically lead the other to rate one's own video in return. Sending messages in contrast seems to have a much higher stimulative nature to directly reply

to the sender. This is in line with the reciprocity norm which determines rules in mobile communication and requires others to call back (in time) or to reply to text messages.

During the three months of the pilot only three people do not rate videos of others and are thus not connected to the network in terms of rating videos: Bart, Maki18 and Neko18.

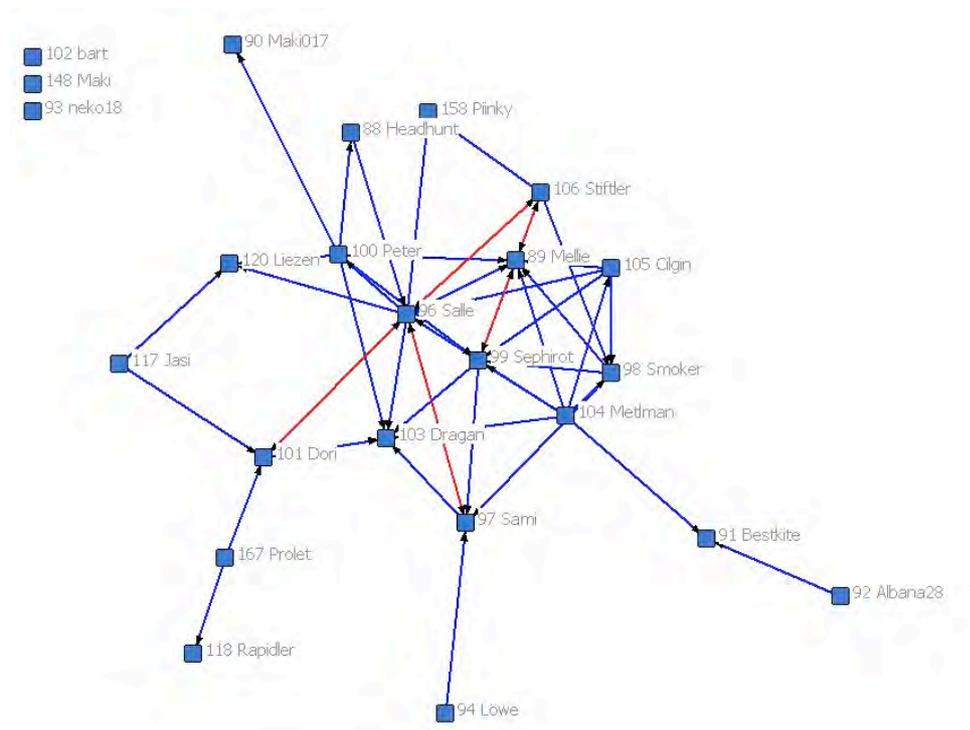


Figure 78: Overall reciprocity among Vienna participants regarding rating others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

In the three months of the pilot the network breaks slowly down into smaller networks comprising only a few people. In month 1, most are connected to others with the exception of six people who did not rate others' videos. There are still some reciprocal ties which cannot be found in the remaining two months. Salle has a bridging function as cut-point in this network.

The overall density is rather low with .16 which means that only 16% of all possible ties have been realised. A decrease of density over the three months of the pilot can be noted: from .12 in month 1 to .02 in month 2 and then remained constant at the same value in month 3.

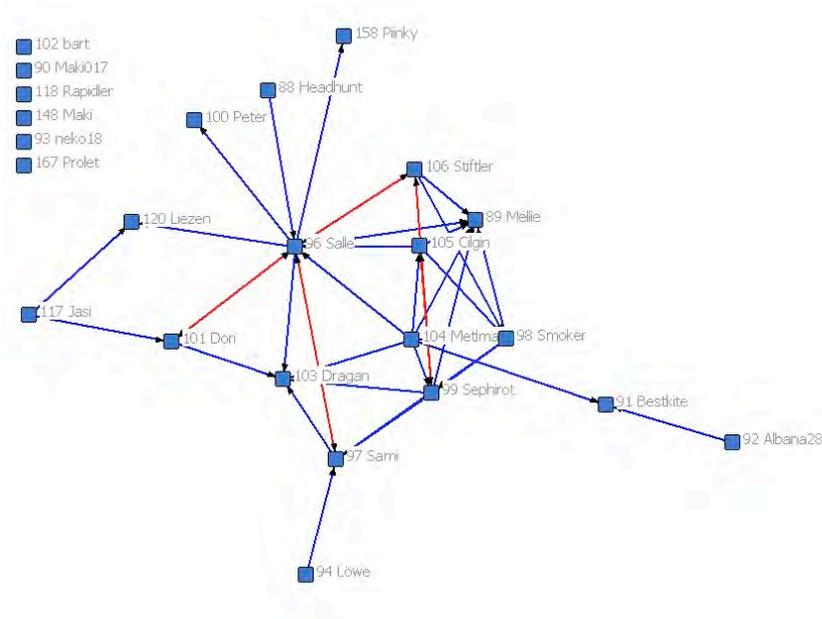


Figure 79: Month 1: reciprocity among Vienna participants regarding rating others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

In month 2, the network has broken up and three small networks consisting of three to six people each have evolved. Twelve participants are not linked to others in terms of rating others' videos.

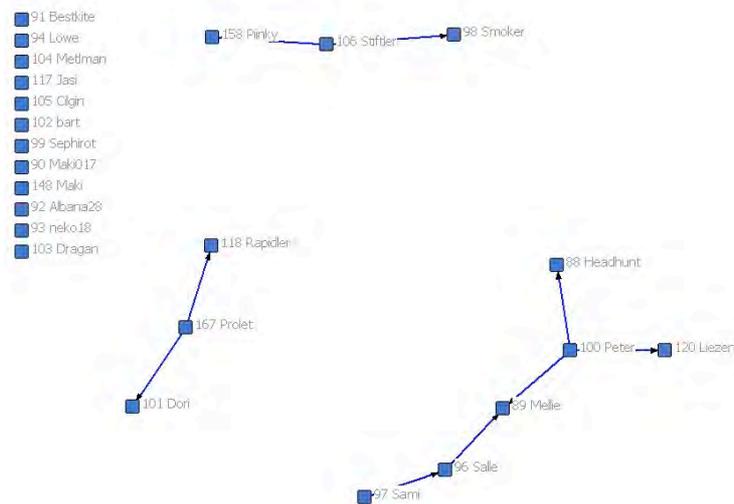


Figure 80: Month 2: reciprocity among Vienna participants regarding rating others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

In month 3, the activity level on this relation dimension has decreased even more. Only four participants are still active and are connected in one network with only non-reciprocal ties. Three of these participants have not

been active in the previous month. Thus, a different network, comprising new members, has evolved.

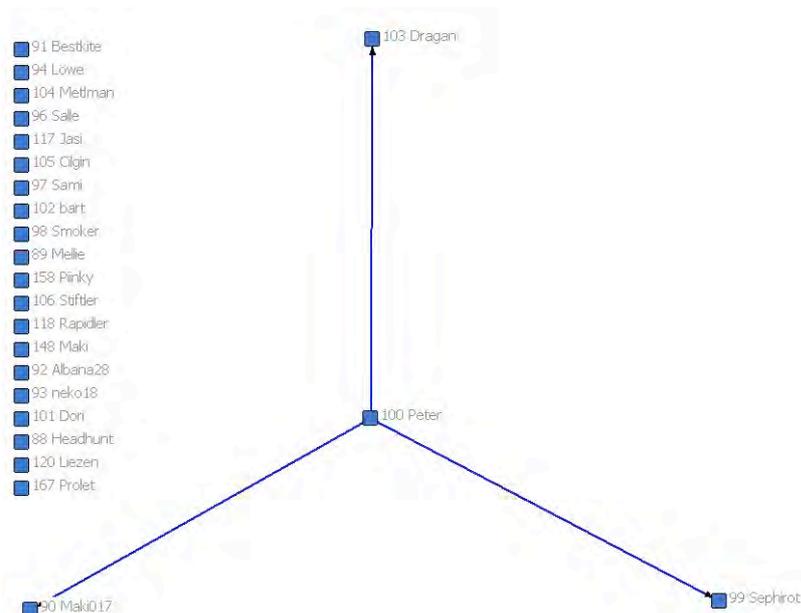


Figure 81: Month 3: reciprocity among Vienna participants regarding rating others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

Video reply on the platform

As young people have not interacted among them by uploading direct reply videos to others' videos social network analysis cannot be applied as there are no relations between the Vienna participants. As already mentioned in previous chapters, the participants may have uploaded videos that directly react to others' videos but omitted to upload them specifically as reply videos and therefore these cannot be identified in the framework of this analysis. However, later in this chapter the overall network consisting of participants also in the UK and moderators of the platform will be analysed also on this activity dimension.

Watching videos on the platform

The overall reciprocity level is medium with the value of .32. It ranges between 0 and .16. All participants are connected by the means of watching others' videos during the three months of the pilot. The reciprocity level decreases from month to month, from .26 in month 1, to .12 in month 2 and finally to .08 in month 3.

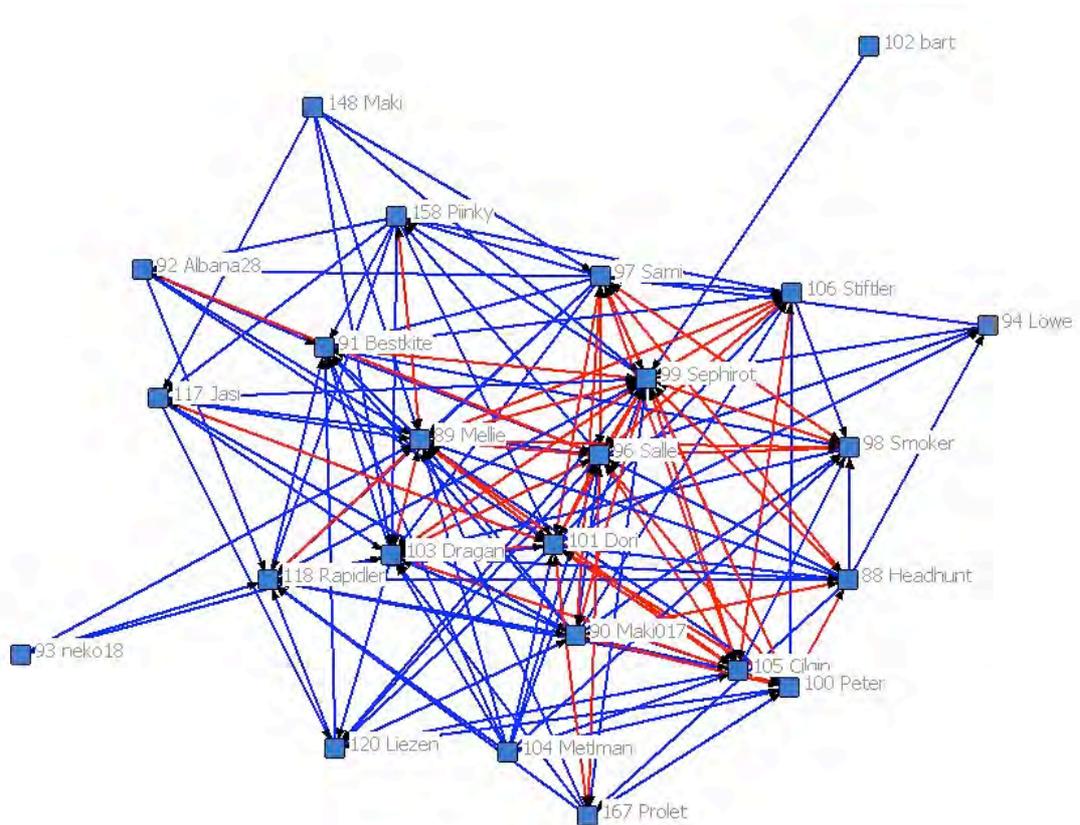


Figure 82: Overall reciprocity among Vienna participants regarding watching others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

The overall density of watched videos is comparably high to exchanged messages with a value of 1.20. All participants are connected and they are connected by multiple ties as more than one video uploaded by a participant has been accessed in average, namely 120%.

Over the three months of the pilot the density of the network however has decreased: from .95 in month 1 to .16 in month 2 and finally to .05 in month 3.

In month 1, one participants (Prolet) is not engaged in this activity on the platform.

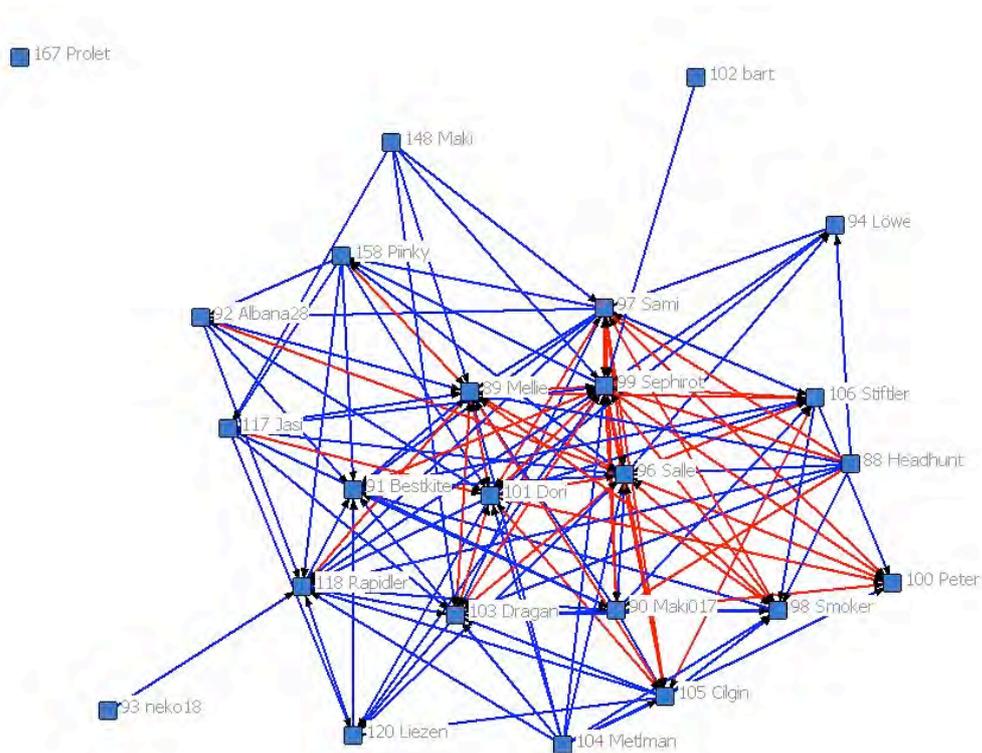


Figure 83: Month 1: reciprocity among Vienna participants regarding watching others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

In month 2, six people do not watch others' videos: Löwe, Metlman, Jasi, Maki, Bart, and Albana28. The remaining participants are connected but only a few reciprocal ties can be found.

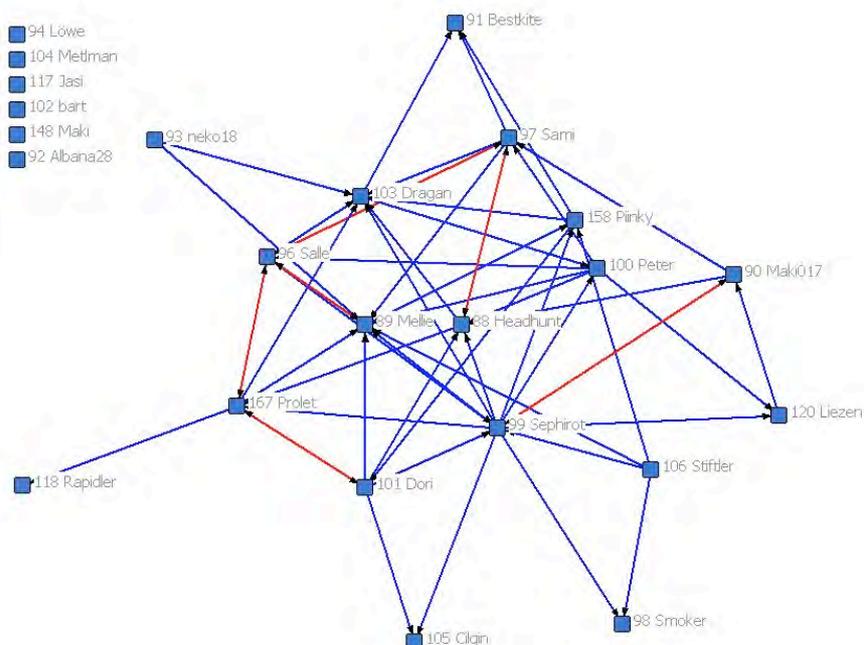


Figure 84: Month 2: reciprocity among Vienna participants regarding watching others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

Finally in month 3, around half of the participants people quit watching others' videos. The network has become very loose with only one reciprocal tie.

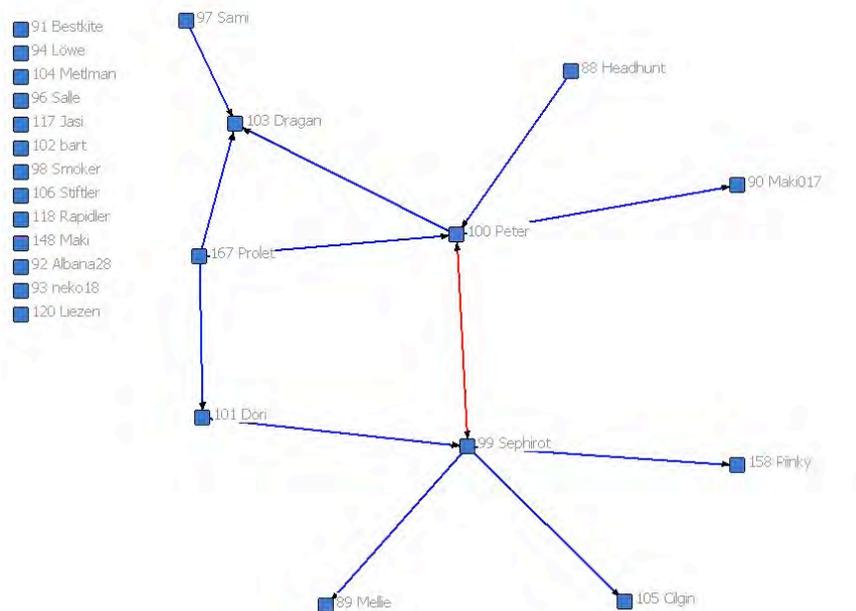


Figure 85: Month 3: reciprocity among Vienna participants regarding watching others' videos on the platform (red...reciprocal relation, blue...non-reciprocal relation)

Correlation of reciprocities on different dimensions:

Most (contact) relations before and after the pilot correlate moderately with one exception: The reciprocity of the dislike-relation does not correlate with any other relations, be it relations before and after the pilot as well as with activity relations on the platform.

Thus, the reciprocity values correlate between the know-relation and the meet-relation (.427), the friends-relations does also correlate with the meet contact-relation (.573) and the telephone contact-relation (.448) and the reciprocity of the meet contact-relation highly correlates with the reciprocity of the telephone contact-relation (.748). The reciprocity levels of these relations before the pilot correlate with the reciprocity levels after the pilot, e.g. friends-relation before correlates with friends-relation after the pilot (.613).

Interestingly, there is no correlation in terms of reciprocity levels with activity relations of the platform. Thus, on the platform a different set of social rules seems to have evolved that is not organised according the

norm of reciprocity which says that for contact cultivation both parties have to relate to each other.

Gender

Females tend to have higher reciprocity levels compared to males. However, most differences are not significant: only in contact via the Internet before the pilot and exchanged messages on the platform the females outperform their male counterparts in terms of reciprocity values. Their friendships tend to be more reciprocal as well as keeping in touch via the telephone. Males have slightly higher reciprocity values when it comes to knowing each other and meeting each other.

Age class

The older age class tends to achieve higher reciprocity values but also here due to the small sample size only one difference is significant: The elder ones have significantly more reciprocal ties in cultivating their relations via the telephone, and tend to have more reciprocal relations in knowing and disliking each other, and cultivating relations via physical meeting and via the Internet. On the platform sent messages are more likely to be answered among the older group.

These finding could be interpreted that elder ones might have internalised social norms to a greater extent than younger ones.

17.3.4. Degree centrality

The in-degree is a measure for links directed to a node (in our case a person), and the out-degree equals the number of ties that the node directs to others. Thus, this measure reveals more about the different roles of the participants and their position in the networks.

The in-degree will be interpreted as popularity henceforth as it represents the frequency of how often he or she has been named on any kind of relation dimensions by others within the community.

The out-degree can be interpreted as gregariousness as it represents the number of given relations by one specific person within the community.

The In-degrees of the different relations-types (know, friends) and rated activities (meet physically, virtually or via telephone) as well as activities on the platform (exchange messages on the platform, watch each others' videos, etc.) in general correlate to a higher degree compared to the Out-degrees.

Interestingly, the out-degrees of the different relation-types and stated activities, either at stage 1 and stage 2 do not correlate with some exceptions with directed activities on the platform. Thus, the number of acquaintances does not correlate with sent messages or watched videos and does only correlate with rated videos (.40).

However, the in-degrees, i.e. ingoing relations, do correlate to a higher extent. For instance, people who were indicated by others to be in regular touch via Internet or telephone at stage 2 also were more often indicated as friends (.43 - .55). As this fact cannot be observed at stage 1, it could be said that these people learnt to increasingly communicate via the Internet and the telephone in the course of the pilot.

17.3.5. Popularity (in-degree)

The following two illustrations (Figure 86 and Figure 87) give an overview of the popularity of participants at stage 1 and stage 2, respectively.

In both illustrations the variance in popularity between the different participants on all given relation dimensions becomes clear. Also already at first sight can be seen that the frequency of stated relations differs to a big extent.

The most likely relation at both stages was the know-relation, followed by the friends-relation, while the dislike-relation as well as the contact-relations have not been given that often.

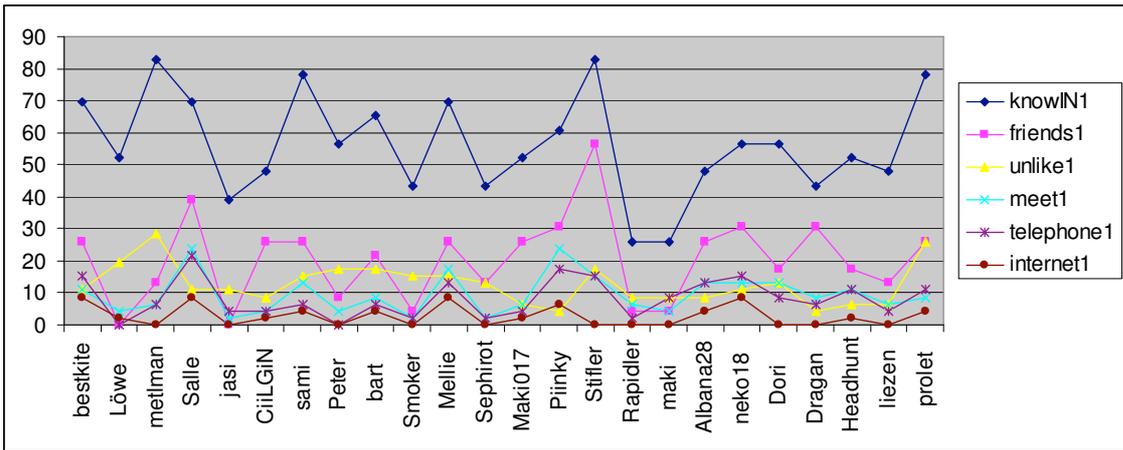


Figure 86: Popularity of participants at stage 1 (in-degree)

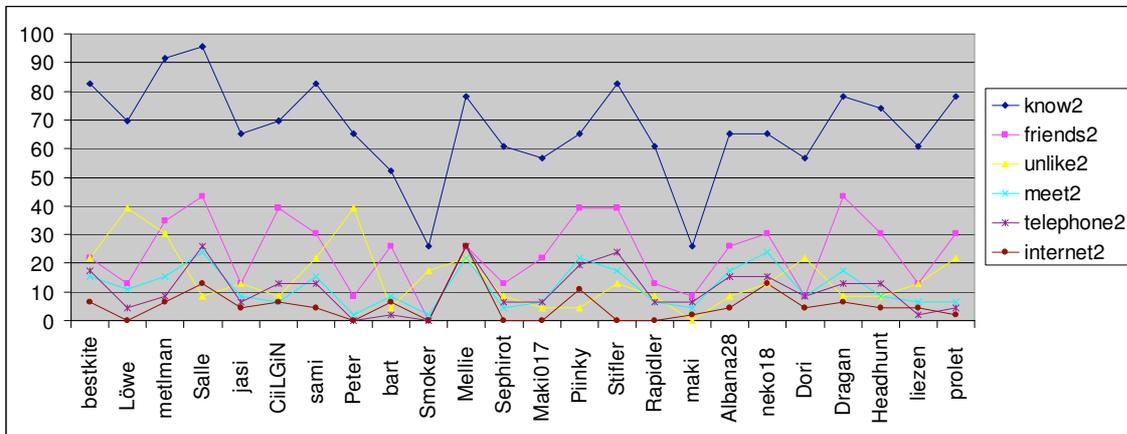


Figure 87: Popularity of participants at stage 2 (in-degree)

To understand differences between single participants and differences between stage 1 and stage 2 the relations will be more closely analysed in the following.

Know-relation

The popularity in terms of acquaintances differs between the participants. At stage 1 the in-degree varies between 26 (26% stated to know this specific person) and 83 (83% stated to know this person). Before the pilot, the participants Rapidler, Jasi and Maki received the lowest values, while Prolet, Metlman and Stifter were named most often as acquaintances. At the end of the pilot the order has somewhat changed. Maki has still received a low value; Smoker has lost popularity and can be found under

the least popular participants, while almost all others have gained popularity in terms of stated acquaintances.

When the number of stated acquaintances in stage 1 is contrasted against the number of acquaintances in stage 2 in Figure 88 it can be seen that the latter one in most cases is higher. In average, the in-degree at stage 1 was 12.92 and rose to 15.42 at stage 2.

Surprisingly, some participants such as Bart and Smoker have been named fewer times as acquaintances.

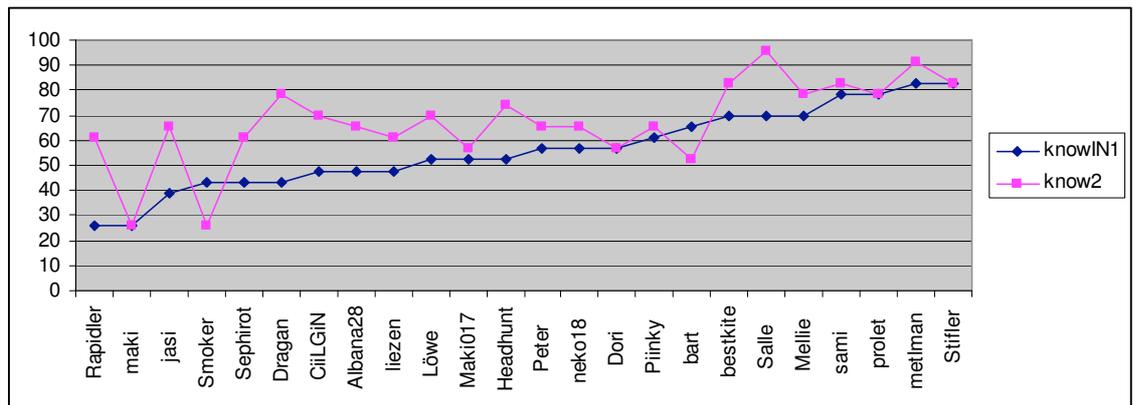


Figure 88: Popularity in terms of acquaintances at stage 1 and 2

Friends-relation

Also the popularity in terms of friendships varies to a significant extent with Löwe and Maki who have been indicated as friends by 57% and 39%, respectively, at stage 1, to Smoker and Dori who have not been rated as friend by anybody. Compared to stage 1, both Smoker and Dori gained popularity.

As can be seen in Figure 89 the popularity of most participants increases from stage 1 to stage 2 with a few exceptions, from an average of 4.7 to 5.5.

The participants Löwe, Pinky, Maki, Bestkite and Albana28 are named by fewer people as friends after the pilot.

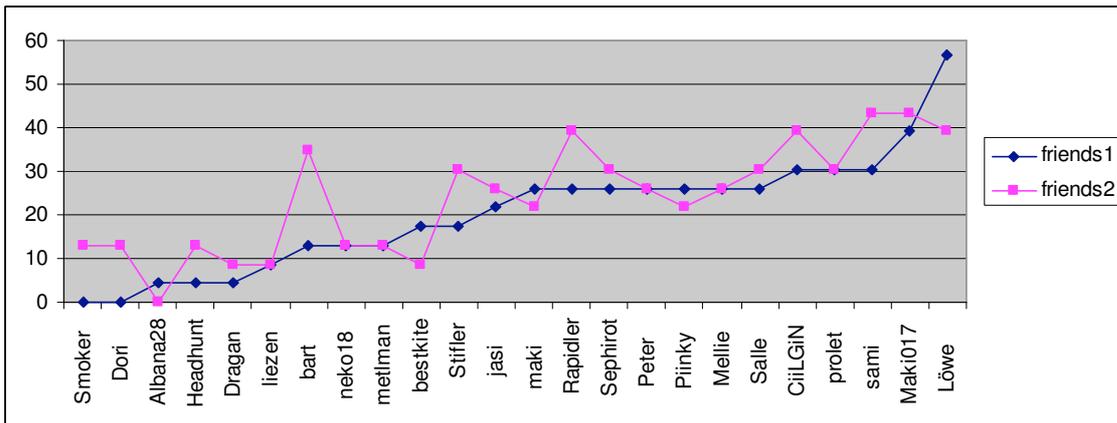


Figure 89: Popularity in terms of friendships at stage 1 and 2

Dislike-relation

Most participants received low in-degrees for the dislike-relation, thus they were named only a few times by other people as person who they did not like. Before the pilot, the in-degrees vary between 4.3 (Prolet) and 28.3 (Sephirot). The in-degrees for this relation dimension decrease during the pilot from initially 5.8 to 3.5 at the end of the pilot.

As Figure 90 reveals, it can be noted that the unpopularity rank order changes from stage 1 to stage 2. The unpopularity of the participant Metlman, for instance, rises significantly, from 17.4 to almost 40.

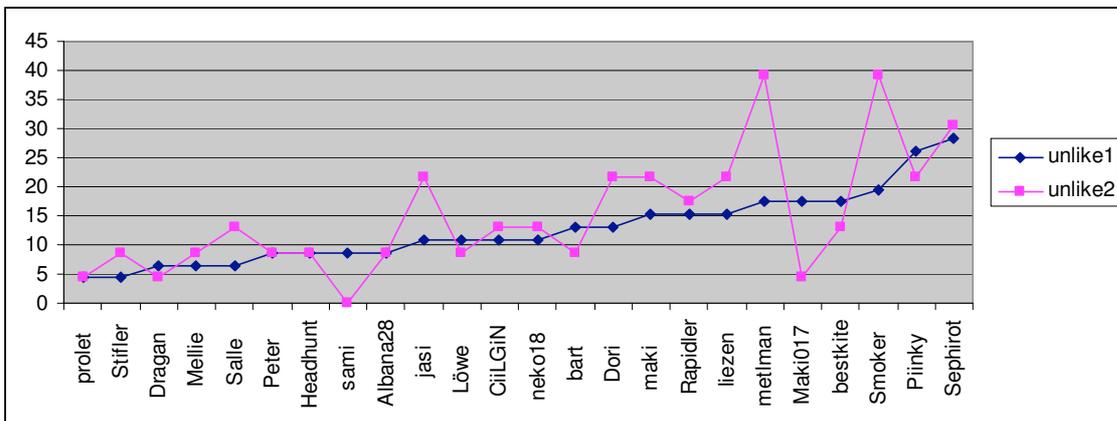


Figure 90: Unpopularity in terms of dislike-relations at stage 1 and 2

Meet physically

In general, meeting people physically seems to be not that popular among the Vienna participants. Thus, also the range between the in-degrees between the participants does not vary to a significant extent, namely from

an in-degree of 2.2 (Jasi, Smoker and Sephirot) to around 24 (Salle and Pinky).

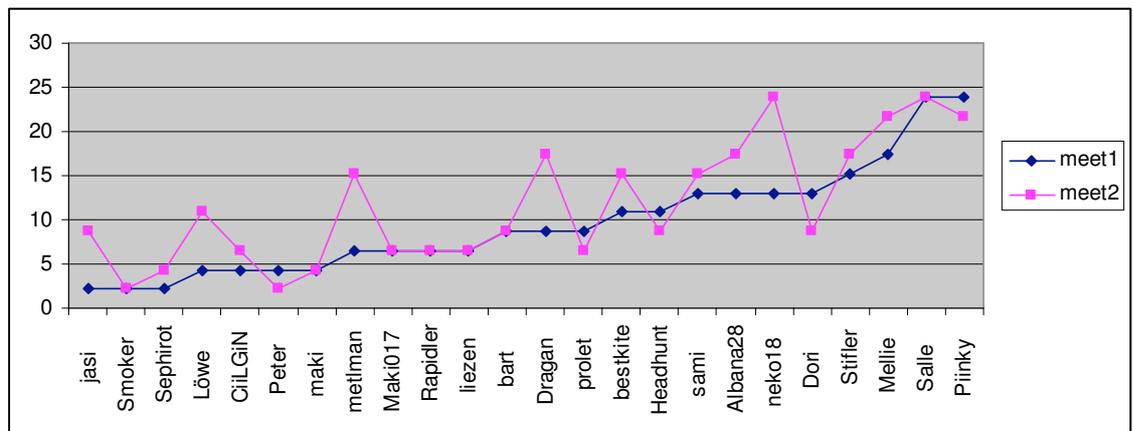


Figure 91: Popularity in terms of physical contact at stage 1 and 2

In most cases participants gain popularity in terms of meeting them physically, from stage 1 to stage 2: from an average of 4.4 to 5.4.

The figures suggest that involvement in the virtual community has not led to a decrease in physical contact among the participants. Probably the use of the platform has even contributed to the willingness to meet other people in person.

Telephone

The in-degrees for keeping in touch via telephone varies between 0 (Stiffler and Sami) and 21.7 (Mellie) at stage 1 and at stage 2 between 0 (Sami and Jasi) and 26.1 (Löwe and Mellie).

In most cases after the pilot the in-degree for telephone is higher, thus more people are indicated as being called via telephone by others as Figure 92 illustrates. The average in-degree rises from 3.8 to around 5 from stage 1 to stage 2.

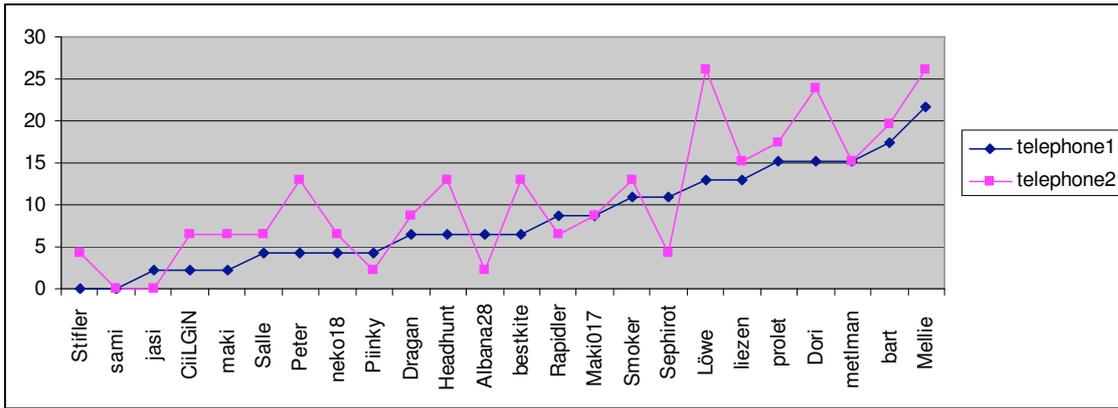


Figure 92: Popularity in terms of contact via telephone at stage 1 and 2

Meet virtually

Not many people have been indicated to be in touch with virtually. At stage 1 the in-degrees for virtual contact ranged between 0 (Pinky, Stiffler, Maki, Neko18, Dragan, Headhunt, Bestkite, Smoker, Prolet, Bart and Löwe) to 8.7 (Sami, Albana28, Rapidler and Metlman).

At stage 2, the in-degrees varied to a higher extent: from 0 (Maki, Neko18, Dragan, Headhunt, Bestkite, Jasi and Maki017) to 26.1 (Rapidler).

Overall, the likeliness to cultivate friendships virtually increased from stage 1 to stage 2 from an average of 1.3 to 2.4.

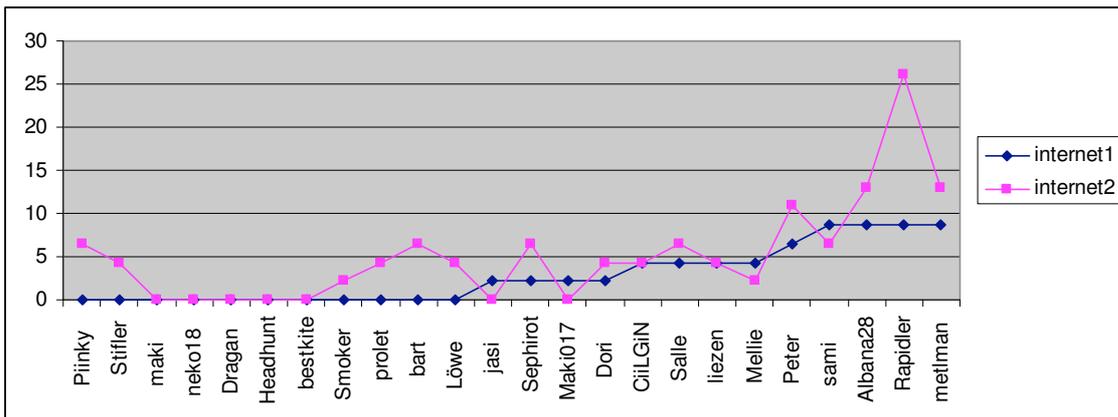


Figure 93: Popularity in terms of virtual contact at stage 1 and 2

17.3.5.1. Component structure

To understand group building processes the component structures of the various relations have been explored. A component is a smaller network within a network that comprises only part of the community members. The following Table 23 shall give an overview over the evolvement of group building among the Vienna group as well as online as offline, before and after the pilot.

Table 23: Overview of component structure per participant

	Nr Comp	Before pilot					Month 1				Month 2				Month 3				After pilot				
		Know	Friend	Meet	Tele	Inter	Messag	RateV	ReplyV	WatchV	Messag	RateV	ReplyV	WatchV	Messag	RateV	ReplyV	WatchV	Know	Friend	Meet	Tele	Inter
Jasi	14	1	0	1	1	0	1	1	0	1	1	0	0	0	1	0	0	1	1	1	1	1	1
Peter	15	1	1	1	0	0	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	0	0
Metlman	14	1	1	1	1	0	1	1	0	1	1	0	0	1	0	0	0	1	1	1	1	1	1
Smoker	13	1	1	1	1	0	1	1	0	1	0	1	0	1	1	0	0	0	1	1	1	0	0
Sephriot	16	1	1	1	1	0	1	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	0
Stiftler	16	1	1	1	1	0	1	1	0	1	1	1	0	1	1	0	0	0	1	1	1	1	1
Maki	12	1	1	1	1	0	0	0	0	1	0	0	0	0	1	1	0	0	1	1	1	1	1
Dragan	16	1	1	1	1	0	1	1	0	1	0	0	0	1	1	1	0	1	1	1	1	1	1
Löwe	13	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	0	1	1	1	1	0
Liezen	15	1	1	1	1	1	0	1	0	1	0	1	0	1	1	0	0	0	1	1	1	1	1
Bart	13	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0	1	1	1	1	1
Mellie	18	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1
Maki017	15	1	1	1	1	1	1	1	0	0	1	0	0	0	1	1	0	0	1	1	1	1	1
Pinky	17	1	1	1	1	1	1	1	0	1	0	1	0	1	1	0	0	1	1	1	1	1	1
Prolet	15	1	1	1	1	1	0	0	0	0	1	1	0	1	1	0	0	1	1	1	1	1	1
Bestkite	15	1	1	1	1	1	1	1	0	1	0	0	0	1	1	0	0	0	1	1	1	1	1
Salle	17	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	0	1	1	1	1	1
Sami	18	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1
Neko18	15	1	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	0	1	1	1	1	1
Albana28	14	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	0	1	1	1	1	1
Rapidler	16	1	1	1	1	1	1	0	0	1	1	1	0	1	1	0	0	0	1	1	1	1	1
Headhunt	18	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1
Dori	18	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1
Cilgin	17	1	1	1	1	1	1	1	0	1	1	0	0	1	1	0	0	1	1	1	1	1	1
Sum		24	23	24	23	16	21	18	0	23	14	12	0	18	24	4	0	12	24	24	24	22	20

In the table above the value “0” stands for “not linked to component”. The value “1” represents a link to a component. For a better overview 0-values have been high lightened in red. When more than one component (group) was detected than these were also highlighted in different colours.

“Nr Comp” (second column) stands for number of components membership. The higher the value, the more memberships does a specific participant have. These range between 12 and 18 which means all participants are members of at least 12 different groups. This means that no participant is excluded from group building activities and that one communication channels or activity on the platform complements the other. For instance, a person who is not in touch with others by sending messages on the platform might very well watch others’ videos or meet their friends physically.

The sum in the last row indicates whether the different kind of relations and activities on the platform have led to group building. This value ranges between 0 and 24. The higher the value, the higher was the group building. When in a column there are “1”s without colour, then one group was found (e.g. know). When several colours have been applied, more groups have evolved (e.g. Internet). Thus, communicating via Internet before and after the pilot seems to take place in different groups. However, the composition of the groups differs from stage 1 to stage 2, i.e. not the same people belong to the same group after the pilot compared to before the pilot. The two small groups disappear after the pilot and others evolve and become larger.

According to the table the group building activities on the platform decrease over time. Rating videos, which in month 1 leads to the evolvment of groups, in month 3 is no longer relevant in this respect. Sending messages to others on the platform seemingly has the highest impact on group building in all three months of the pilot.

Overall it must be said that group building has partly taken place but the groups overlap and not very closed groups that communicate just within the group could be found.

17.3.6. Homophily

Homophily is a measure for the homogeneity of evolving groups, thus people sharing the same attribute such as gender would rather form a group than people with opposite gender. The homophily-index can range between -1 and +1, the first one speaking for homophily and the second one for heterophily.

17.3.6.1. Homophily - gender

Table 24 below gives an overview of this trend on various relation dimensions in respect to gender.

Table 24: Homophily in respect to gender on different relation dimensions

	Relation dimension	Homophily-Index	Interpretation/Note
Before pilot	know	-.2065	Slight homophily: males tend to know more males, females also tend to know more males.
	friends	-.3036	Slight homophily: males tend to be friends with more with males, and females too.
	Dislike	-.1571	Slight homophily: males tend to not like males more often and females too.
	Meet	-.2830	Slight homophily: males tend to meet males physically more often, among females the proportion is balanced.
	Telephone	-.3043	Slight homophily: males tend to call males more often; among females the proportion is balanced.
	Internet	-.4194	Medium homophily: males tend to call males more often; among females the proportion is balanced.
Month 1	SendMessage	.5325	Medium heterophily: Males tend to send more messages to females, and females more to males.
	RateVideo	-.0145	No trend in either direction
	WatchVideo	.076	No trend in either direction
Month 2	SendMessage	.6049	Medium heterophily: Males tend to send more messages to females, and females more to males.
	RateVideo	-.0909	No trend in either direction
	WatchVideo	.0000	No trend in either direction
Month 3	SendMessage	1.0000	Cannot be interpreted due to a lack of data.
	RateVideo	-.8182	High homophily: males more videos of other males. The value for females cannot be interpreted due to lack of data.
	WatchVideo	-.2143	Cannot be interpreted due to a lack of data.
After pilot	know	-.1514	Slight homophily: males tend to know more males; females also tend to know more males.
	friends	-.1667	Slight homophily: males tend to be friends with more with males, and females too.
	Dislike	.0120	No trend in either direction
	Meet	-.1938	Slight homophily: males tend to meet males physically more often, females too.
	Telephone	-.1597	Slight homophily: males tend to call males more often, females too.
	Internet	-.0690	No trend in either direction

The homophily analysis in respect to gender as factor in group building brings forth interesting findings: On most dimensions before and after the pilot homophily can be noted among male participants but not among female participants: Males know more males, are more befriended with males, and cultivate their male relation making use of different forms of contact such as meeting physically, via telephone or the Internet. Females too tend to know more males, be friends with males and meet them more often on a regular basis.

These patterns do not change from stage 1 to stage 2, from before to after the pilot.

On the platform, however, males tend to send more messages to females and females tend to send more messages to males, showing higher heterophily scores.

A possible interpretation could be that males do not have the courage to get to know, be friends with females but once an online platform is offered to them, they make much use of the contact options to the opposite gender. For females the option to communicate on the platform does not change their communication pattern very much as already before the pilot they tended to be in touch more with males than females.

17.3.6.2. Homophily - age class

The following Table 25 gives an overview over homophily indices in respect to age class. As the table shows, the trends towards homophily and heterophily, respectively, are not that significant with a few exceptions. Thus, the measures need to be interpreted as solely trends.

Table 25: Homophily in respect to age class on different relation dimensions

	Relation dimension	Homophily-Index	Interpretation/Note
Before pilot	Know	-.1742	Slight homophily: The older tend to know the older, the younger tend to know the older too.
	Friends	-.0536	No trend in either direction
	Dislike	-.2857	Slight homophily: Both age groups tend to dislike the older ones.
	Meet	-.1132	Slight homophily: Both age groups seem to be more oriented towards the older age group in terms of physical meeting.
	Telephone	-.1304	Slight homophily: Both age groups tend to call the older ones.
	Internet	-.2903	Slight homophily: Both age groups tend to be in touch with the older ones via the Internet.
Month 1	SendMessage	-.1517	Slight homophily: The younger tend to send messages within their same age cohort, the older ones tend to send more messages to the younger ones.
	RateVideo	.1884	Slight heterophily: Both age groups seem to be oriented towards the other age group in terms of rating others' videos.
	WatchVideo	.1141	Slight heterophily: Both age groups are oriented towards the younger age group.
Month 2	SendMessage	.3827	Slight heterophily: The younger send more messages to the older, and the older more to the younger.
	RateVideo	.4545	Cannot be interpreted due to a lack of data.
	WatchVideo	.3778	Slight heterophily: The older watch the videos of the younger and the younger the ones by the older.
Month 3	SendMessage	1.0000	Cannot be interpreted due to a lack of data.
	RateVideo	.8182	Cannot be interpreted due to a lack of data.
	WatchVideo	.5000	The older watch the videos by the younger; among the younger the distribution is balanced.
After pilot	Know	-.0919	No trend in either direction
	Friends	-.1061	Slight homophily: The older tend to be friends with the older age group, the younger too.
	Dislike	-.0361	No trend in either direction
	Meet	-.1628	Slight homophily: Both age groups seem to be more oriented towards the older age group in terms of physical meeting.
	Telephone	-.0756	No trend in either direction
	Internet	-.1724	Slight homophily: The older ones tend to cultivate more friendships in their own cohort via the Internet, in the younger age group this communication channel is balanced between both age groups.

That the younger are oriented towards the older and that the older remain within their age cohort in terms of knowing each other and cultivating their contacts is not surprising. This is a finding that is also known from schools, for instance, where younger pupils know the names of pupils of upper classes but those pupils do not know the younger ones in return.

On the platform however not the same pattern is repeated. Messages, from younger and older participants, are more frequently directed to the younger, at least in the beginning (month 1). In month 2 there is an increased exchange of messages between the two age groups.

Interestingly the videos of the younger are more frequently watched by both age groups but the ones by the older are more frequently rated. This pattern however is not repeated in month 2 and month 3, as the table shows.

17.4. The community as a whole

The following analyses are based on the whole community including participants from Styria and different regions from the United Kingdom as well as the moderators from both countries.

Firstly, again the overall network as such will be in focus of the analysis and secondly, research question 5 which aims at asking for the relation and interaction between the different groups (Vienna, Styria and the UK) shall be answered.

17.4.1. The overall relation network

Before going into more detail the overall relation network shall be analysed consisting of all different relations possible on the platform, i.e. exchanging messages, watching others' videos, rating others' videos and replying to these. As basis for this analysis a matrix has been compiled that is laid on the sums of all these different relations. The higher the sum, the higher is the number of relations and the thicker is the line between two participants in Figure 94.

The following figure (Figure 94) shows the multiplex platform relations of the whole virtual community. Austrian participants are represented by red symbols and participants from the UK by blue symbols. The two genders are also represented by different symbol shapes: the triangle for males, and the circles for females.

As the relations are manifold the result is a dense network which does only allow with some limitation to identify single relations.

Overall, it seems that all participants are by some means connected to others with one exception: The participant 59, a female participant, from

Styria, has not participated in any activity on the platform and thus no interaction pattern could be found in her case.

Some participants are more connected than others (in the centre).

In general, it seems that interaction has taken place in the own language community in the first place while surprisingly in spite of language barriers, interaction between some participants from the UK and participants from Austria could be noted.

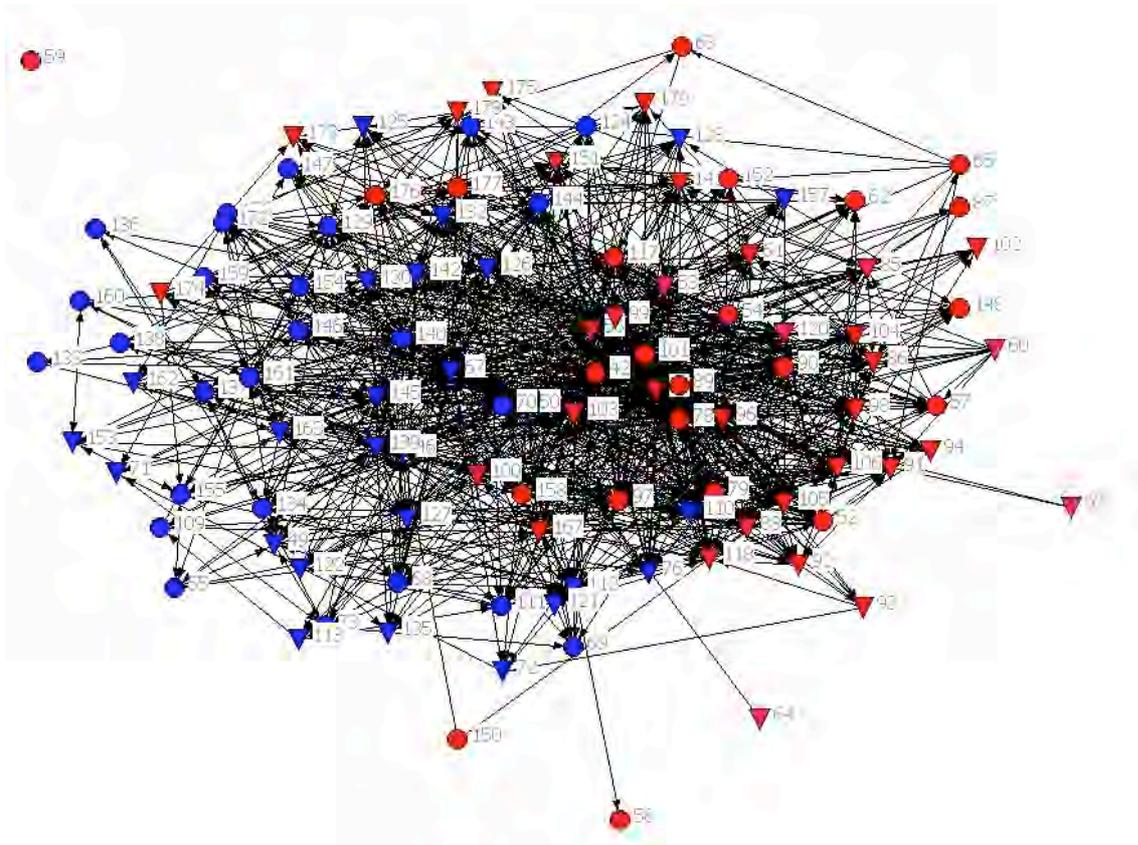


Figure 94: Overall network of the whole community

As the figure lets already suggest, the overall density is rather high with .71, i.e. 71% of all possible relations were used by the participants. The Austrian group shows a higher density in itself than the UK group with a value of 1.653 versus .716. In the first case, participants in average are all connected and with more than one relation, in the latter case around 71% of the UK participants are connected to each other.

The overall reciprocity is average with a value of .339, i.e. almost 40% of all the relations on the platform are reciprocal.

The centrality degrees of 3.59% (in-degree) and 3.99% (out-degree) indicate that the overall network is very egalitarian with no central positions of single participants.

The in-degrees is significantly higher among the Austrian group ($t=2.391$, $df=108$, $p=.019$) as well as the out-degree ($t=2.051$, $df=108$, $p=.043$).

No significant differences were found between the two genders and the two age groups. Thus, popularity did not correlate with gender or age group.

17.4.2. Single relations in detail

In the following the single activity relations on the platform connecting different participants will be analysed while the focus lies on the exchange between the two language groups.

Sent messages on the platform

From the statistical analysis we know that many messages have been exchanged between the participants. As the illustration below indicates, overall during the three months of the pilot, every participant in the UK has sent at least one message on the platform, while in Austria eight participants did not sent any messages: seven from Styria and one from Austria.

While the majority seems to stick to their own language group some young people have also communicated to people with a different language by sending messages: Around 10 participants from the UK and 10 from Austria were in touch with one another. Vienna participants have been particularly active as from the 10 participants in Austria 6 were young people from Vienna, 2 were from Styria and the remaining two were moderators. In the UK only young people were in exchange with participants from Austria.

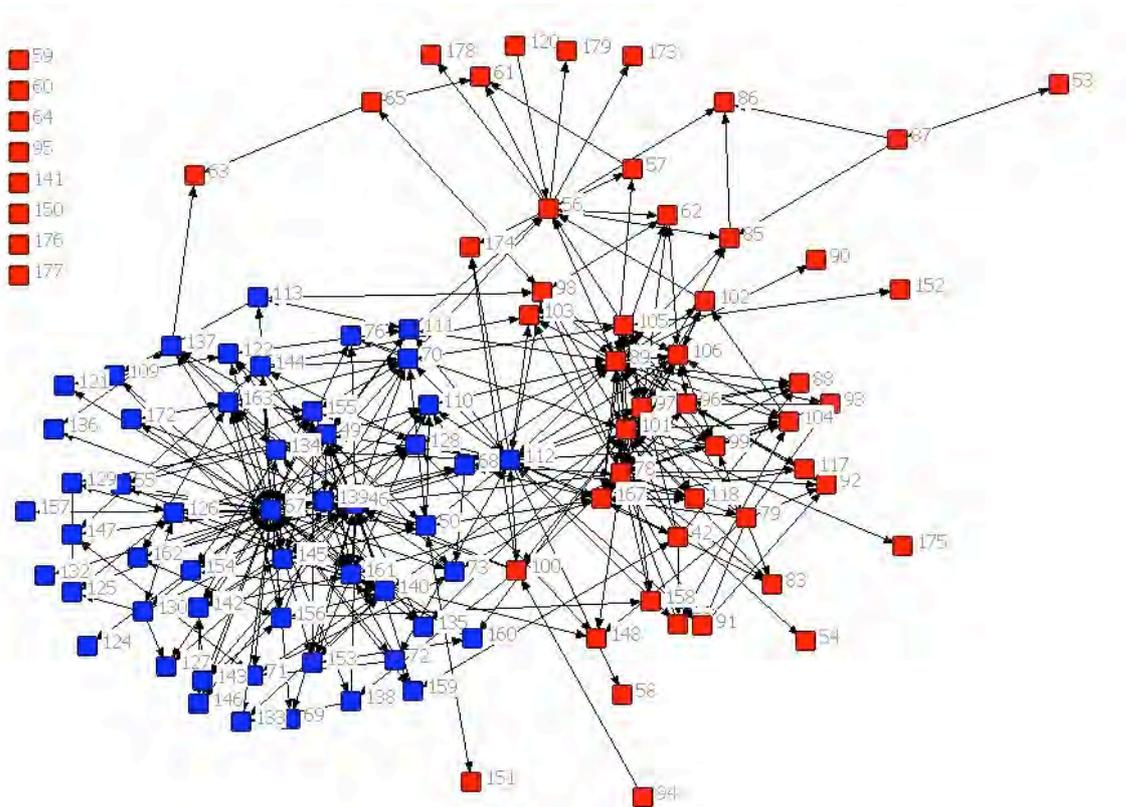


Figure 95: Overall sent messages differentiated by country (red... Austria, blue...UK)

Over the three months of the pilot more participants become inactive in terms of sent messages: While in month 1 eight participants are inactive (six of these from Austria), in month 2 the number of inactive participants is already 24 (all from Austria) and in month 3 finally 26 (21 from Austria). At the beginning the network is rather dense but the density decreases from month to month.

In month 1, messages are sent to participants with the same language in the first place but also a few links can be noted between Austrian participants and participants from the UK (c.f. Figure 95).

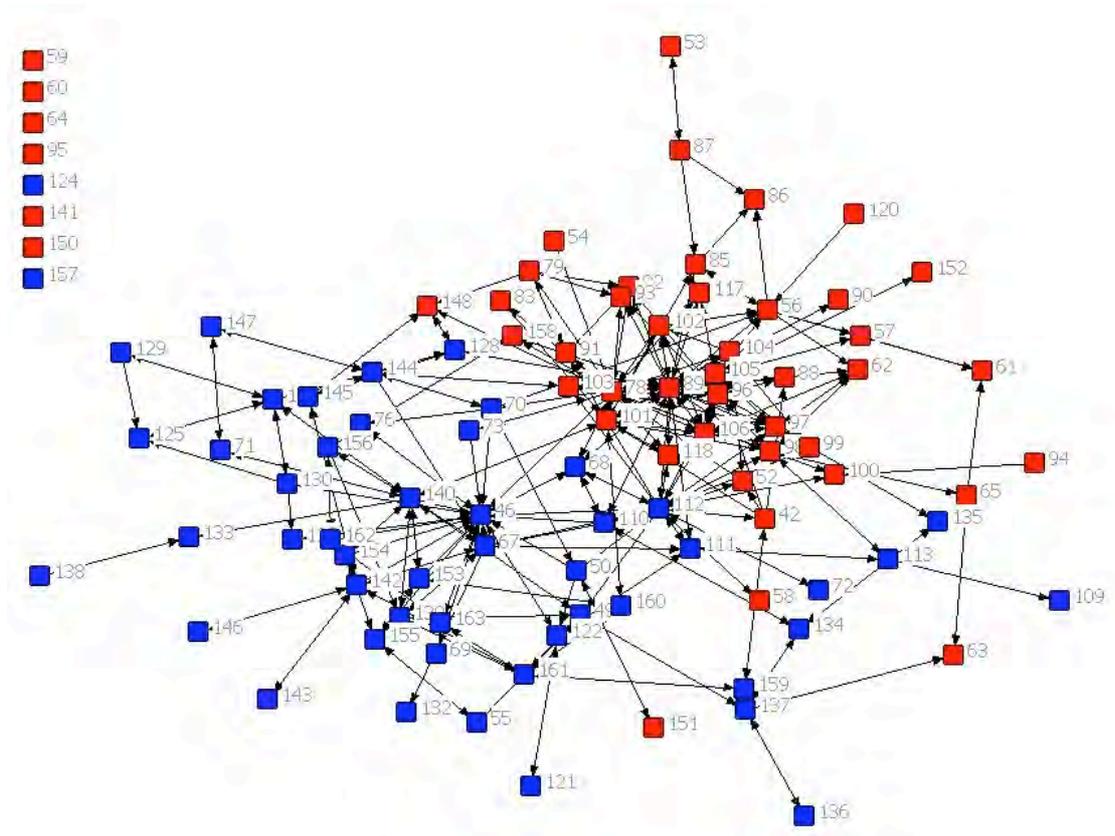


Figure 96: Month 1 - Sent messages differentiated by country (red... Austria, blue...UK)

In month 2 most of the participants are still connected by means of exchanged messages. Only three participants in Austria have formed a subgroup which has separated itself from the rest of the community in terms of exchanged messages. The participants in UK are very well connected among each other and some links to the Austrian participants can also be noted.

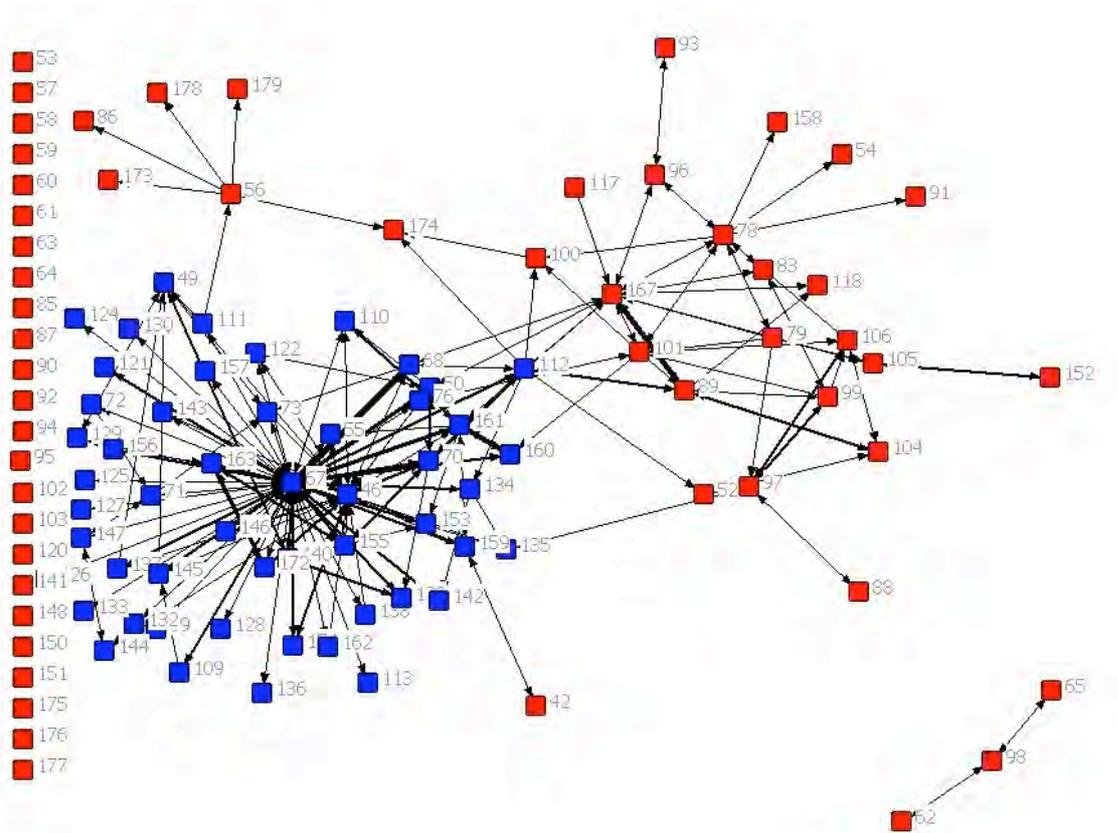


Figure 97: Month 2 - Sent messages differentiated by country (red... Austria, blue...UK)

In month 3, finally, many Austrian participants and a few participants from the UK have quit sending messages. The remaining participants in the UK form a strong network with links also to two Austrian participants. In Austria two subgroups consisting only of two participants each have formed which are isolated from the rest of the community. Two young people from Vienna have been in constant touch with participants from the UK over the whole length of the pilot: Mellie and Peter.

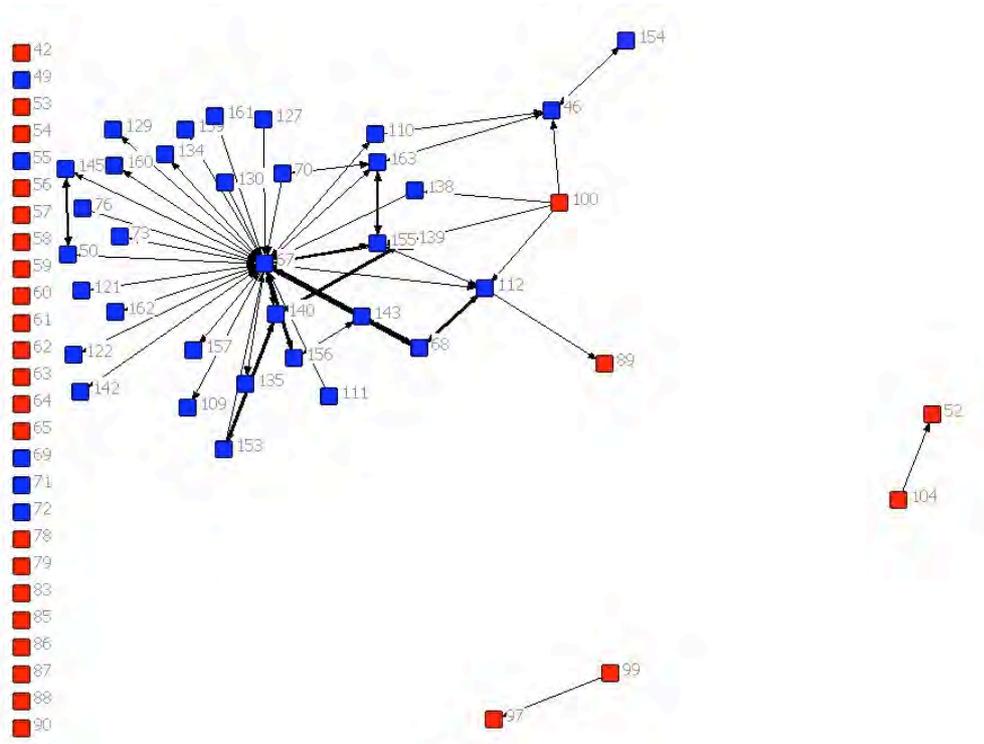


Figure 98: Month 3 - Sent messages differentiated by country (red... Austria, blue...UK)

Rating videos on the platform

Compared to sending messages fewer people have been active on the platform. In the three months lasting pilot 27 participants have not rated any video. Four out of 13 inactive Austrian participants were from Vienna. As Figure 99 illustrates in the established network the interaction in terms of rated videos is higher compared to exchanged messages. Of course language barriers do not play such a big role when rating others' videos.

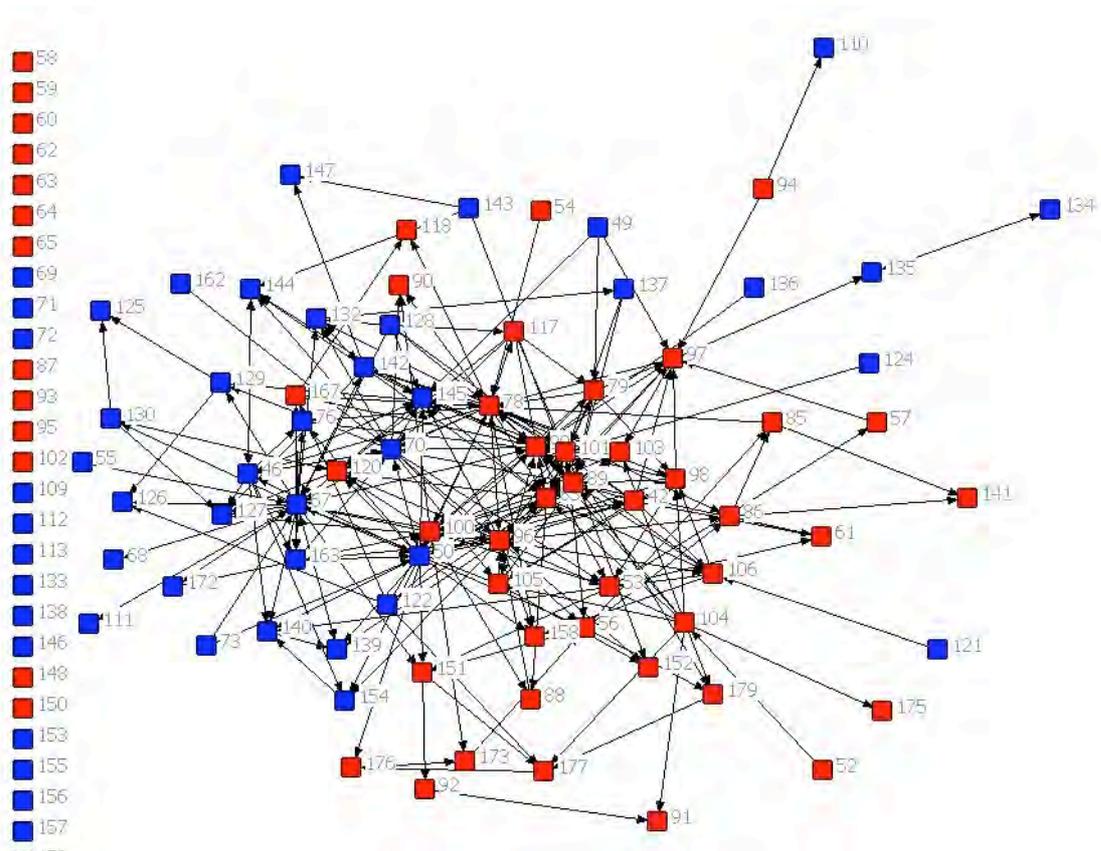


Figure 99: Overall rated videos differentiated by country (red... Austria, blue...UK)

During the three months of the pilot the activity rate decreases. In month 1 the inactivity rate among participants from Austria and the UK is quite equal with 15 and 16 inactive participants. In month 2 the British participants are more active than the Austrian participants: 9 participants are inactive in the UK, and 17 in Austria.

In month 3, the ratio is similar: 18 Austrian participants are not active and 8 British participants.

In month 1, besides the inactive participants all are connected.

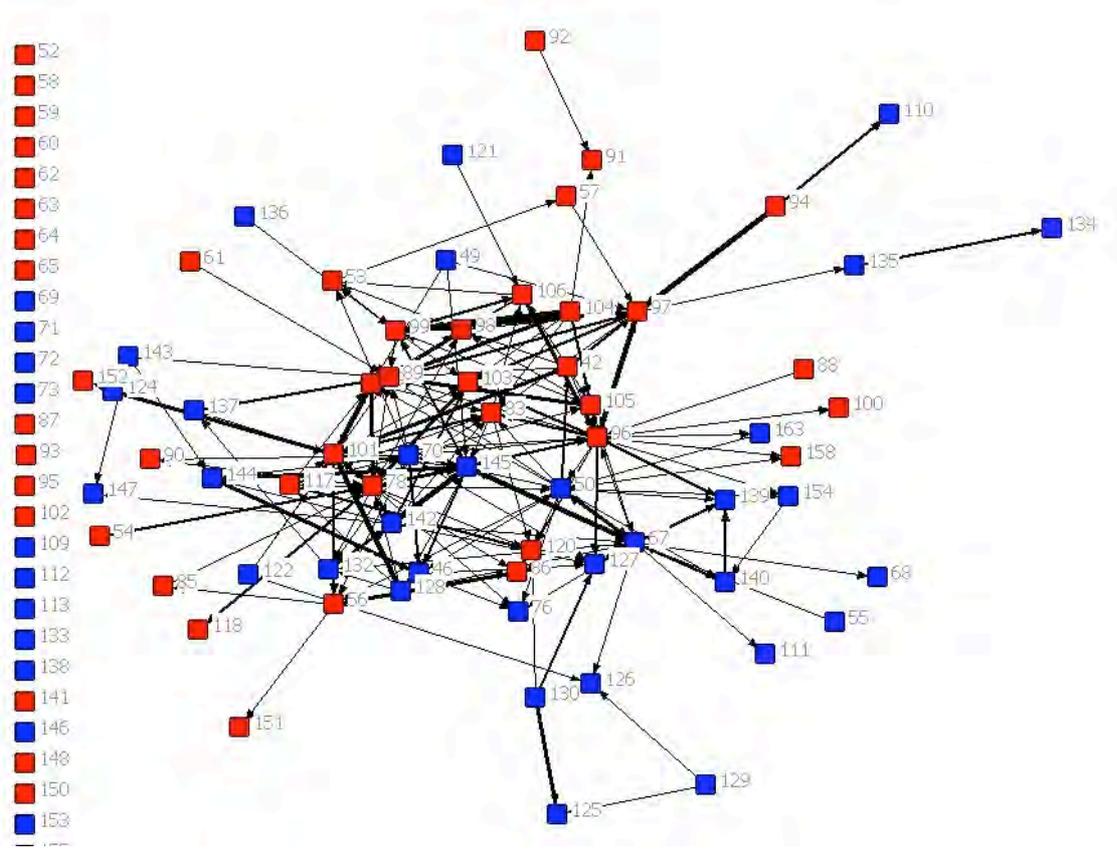


Figure 100: Month 1 – Rated videos differentiated by country (red... Austria, blue...UK)

In month 2 two subgroups in Austria have evolved with 2 and 3 participants, respectively. The remaining participants are connected while they seem to stick more now to their own language group.

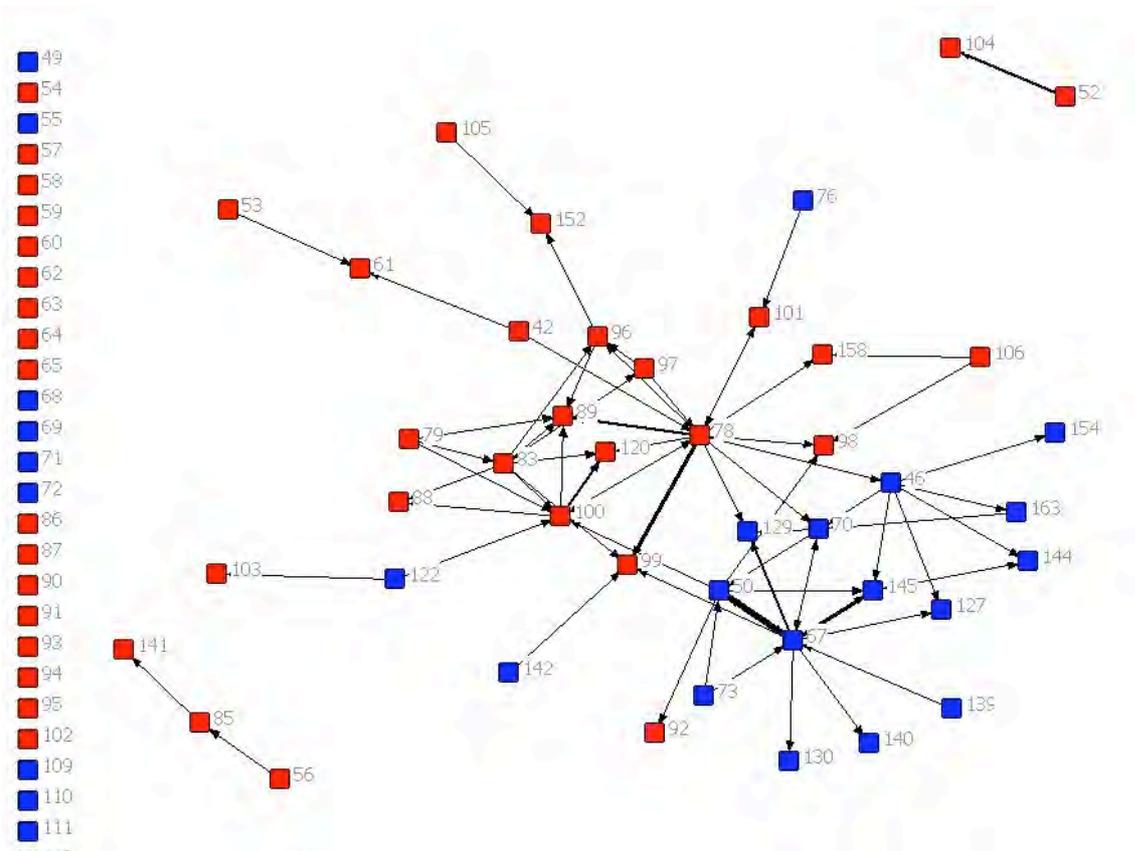


Figure 101: Month 2 – Rated videos differentiated by country (red... Austria, blue...UK)

In month 3, one Austrian subgroup, consisting of four people, has split from the rest of the community. The remaining community is loosely connected with only some interaction between the two language groups.

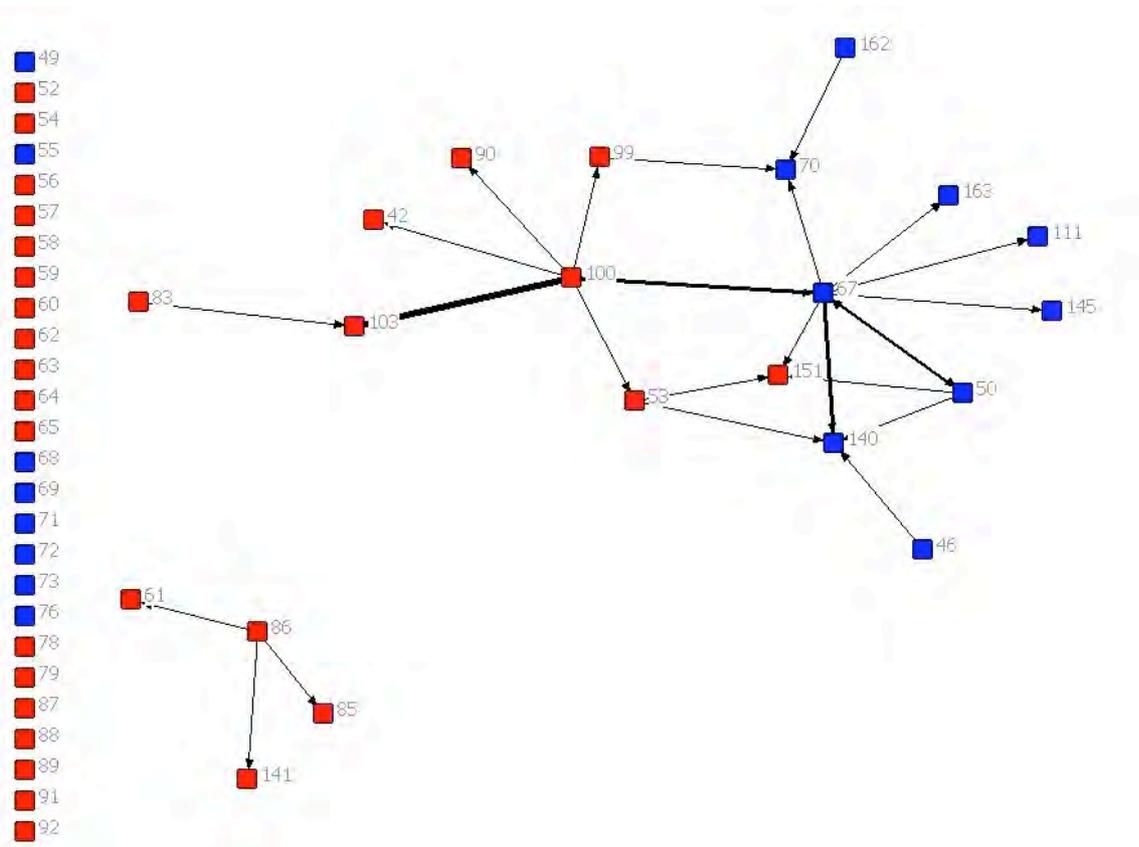


Figure 102: Month 3 – Rated videos differentiated by country (red...Austria, blue...UK)

Watching videos on the platform

The network of watched videos of others is very dense as can be seen in Figure 103. Two Austrian participants (from Styria) have not watched any video. The rest of the community is very active in terms of watching others' videos and language barriers do not seem to keep them from watching videos in another language.

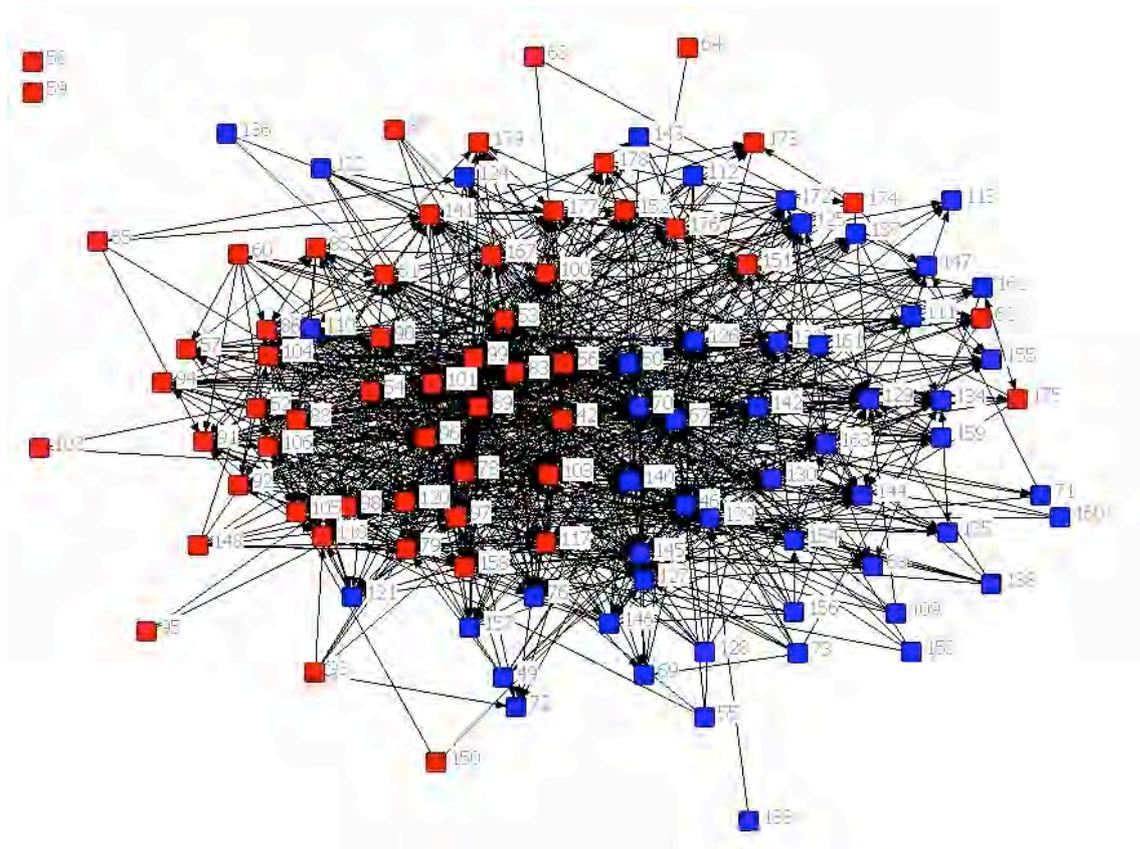


Figure 103: Overall watched videos differentiated by country (red... Austria, blue...UK)

During the three months of the pilot the inactivity rate raises, from originally three inactive participants (from Austria) in month 1 , to 13 inactive in month 2 (seven from Austria and five from the UK), and finally to 26 (12 from Austria and 14 from the UK).

In month 1, all participants besides the inactive ones are connected in one dense network with many links between the Austrian and the British participants.

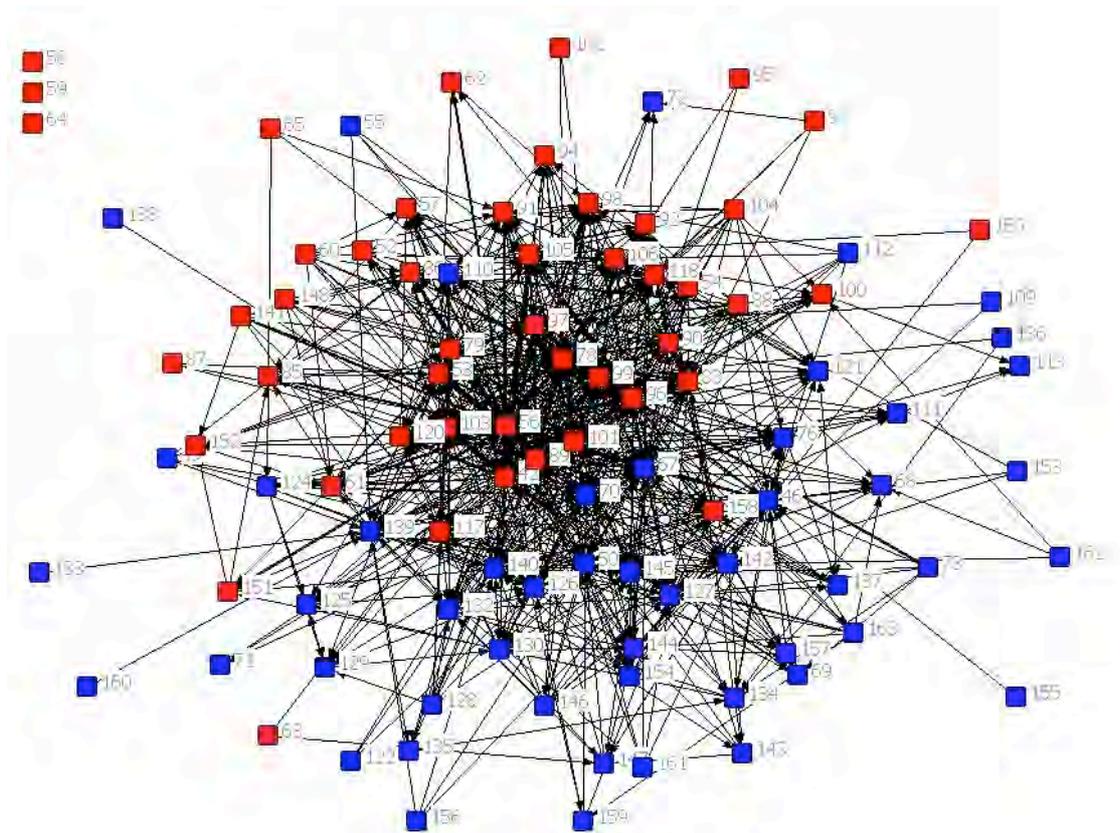


Figure 104: Month 1 – Watched videos differentiated by country (red... Austria, blue...UK)

In month 2, the network has become somewhat less dense with still links between the two language groups.

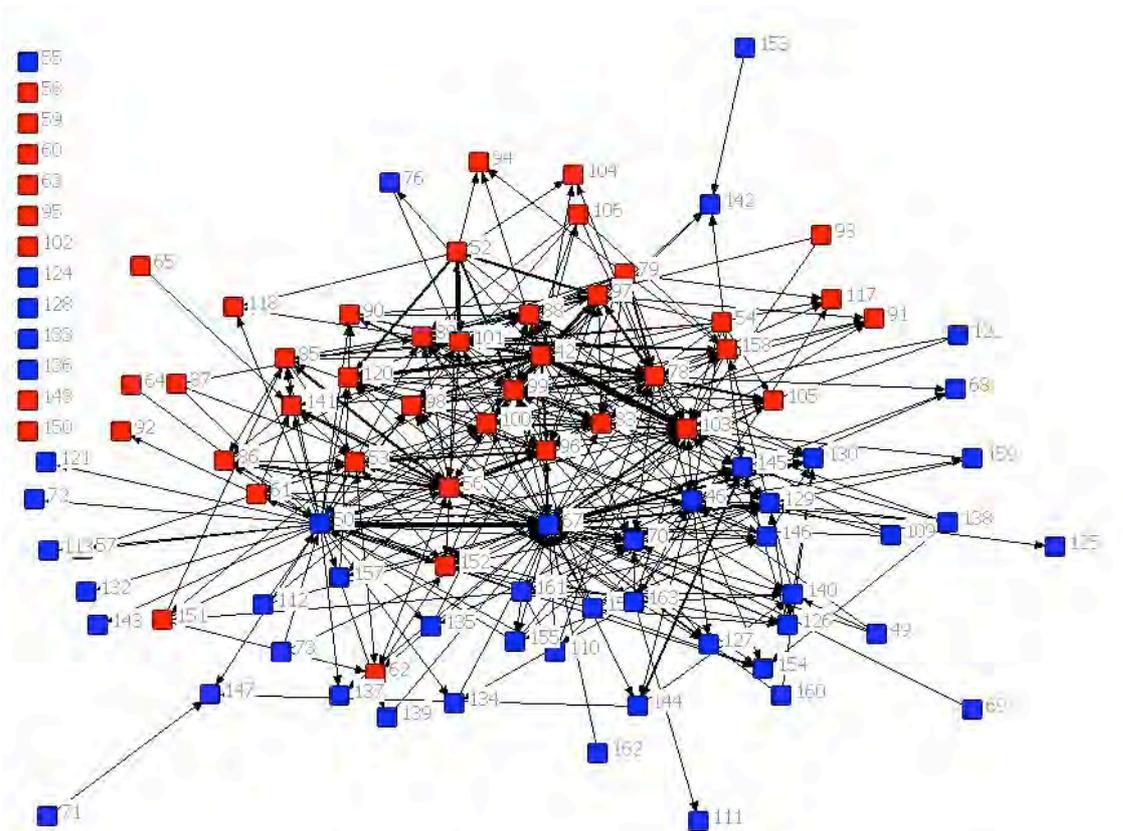


Figure 105: Month 2 – Watched videos differentiated by country (red... Austria, blue...UK)

In month 3, the network has become even looser and one small subgroup, consisting of two British participants, is isolated from the rest of the community. Some links between the two language groups can still be found.

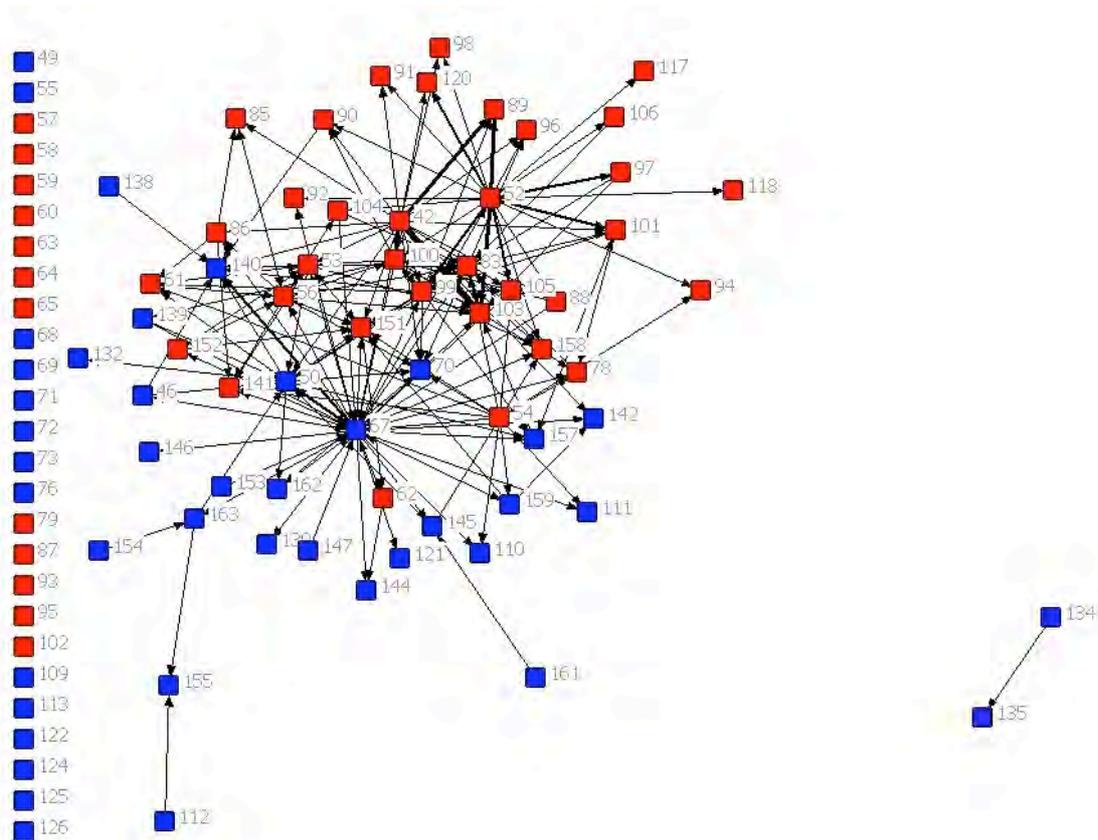


Figure 106: Month 3 – Watched videos differentiated by country (red... Austria, blue...UK)

Video reply on the platform

The network resulting from replying to others' videos is the loosest of all. Not many participants have made use of the opportunity to reply directly to videos and upload their videos as reply videos. However, as was previously mentioned this has to be seen in the light of some technical challenges. Some videos that were meant to be reply videos have not been uploaded as such because this option was more difficult to find. Therefore the actual interaction could be much higher. Nevertheless, the status quo of the resulting network shall be described herein.

Overall only two British and 13 Austrian participants have used this function of the platform. In the UK the pedagogical concept was somewhat different as it was not based on challenge videos but simply on the ping-pong-system without any prompting videos. This might explain the low number of UK participants making use of the reply video function.

Overall, the participants are connected in five small networks with four of them with only two participants.

Four of these are moderators from Vienna (ID 83 and ID 78) and from Styria (ID 53 and ID 56). Thus, reply videos to their videos are reactions to challenge videos. Most members of the bigger network are participants from Styria.

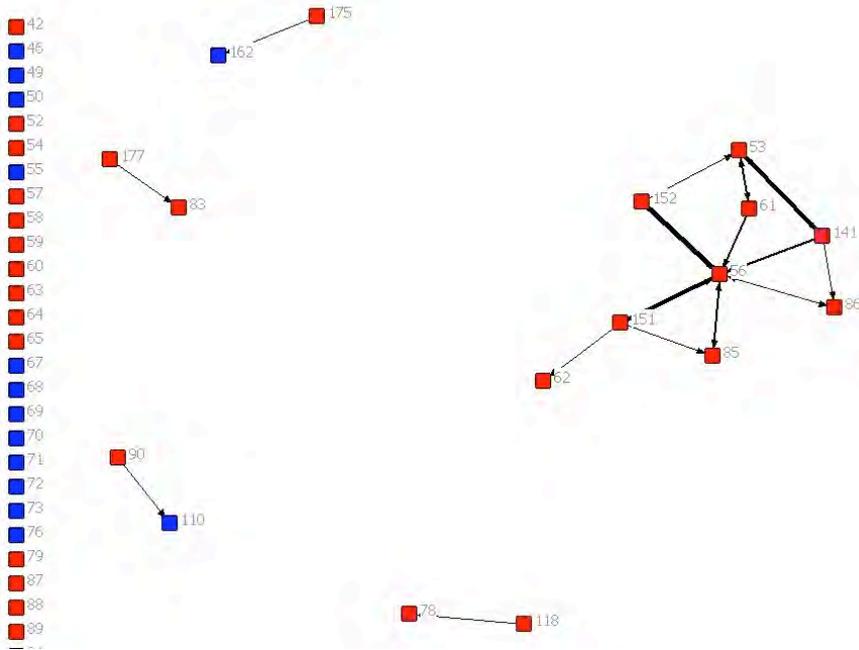


Figure 107: Video reply differentiated by country (red... Austria, blue...UK)

Over the three months of the pilot the activity has decreased. Young people from the UK have participated in this activity only in the first month. In month 1, three small networks evolved with two networks comprising only two members and the third one comprising five. Two are moderators (ID 56 and ID 78).

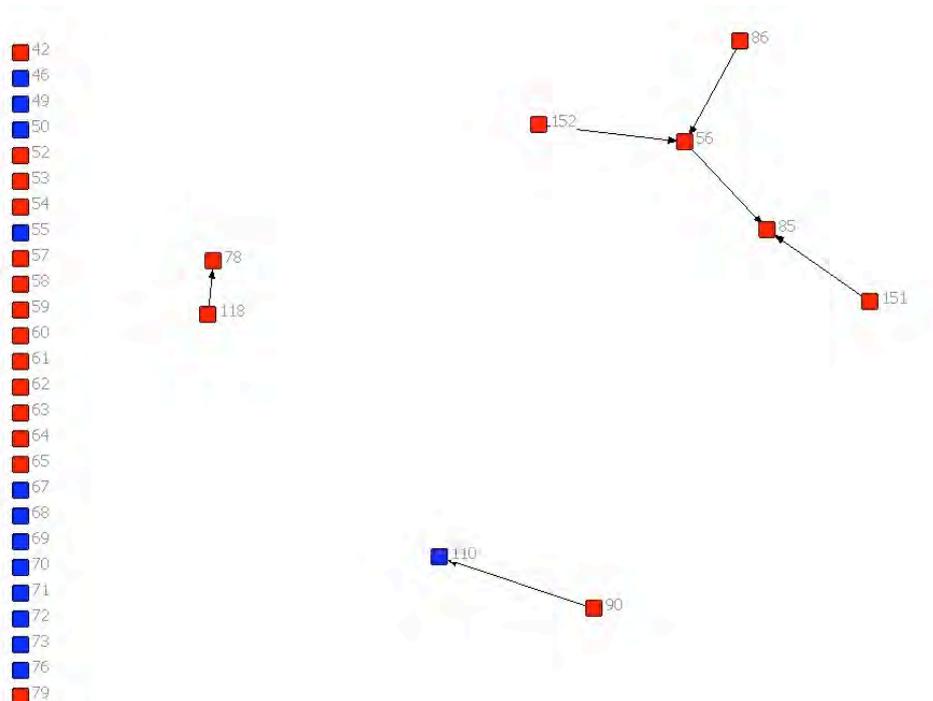


Figure 108: Month 1 – Video reply differentiated by country (red... Austria, blue...UK)

In month 2 there is only one small network with mostly Styrian participants (including two Styrian moderators: ID 53 and ID 56).

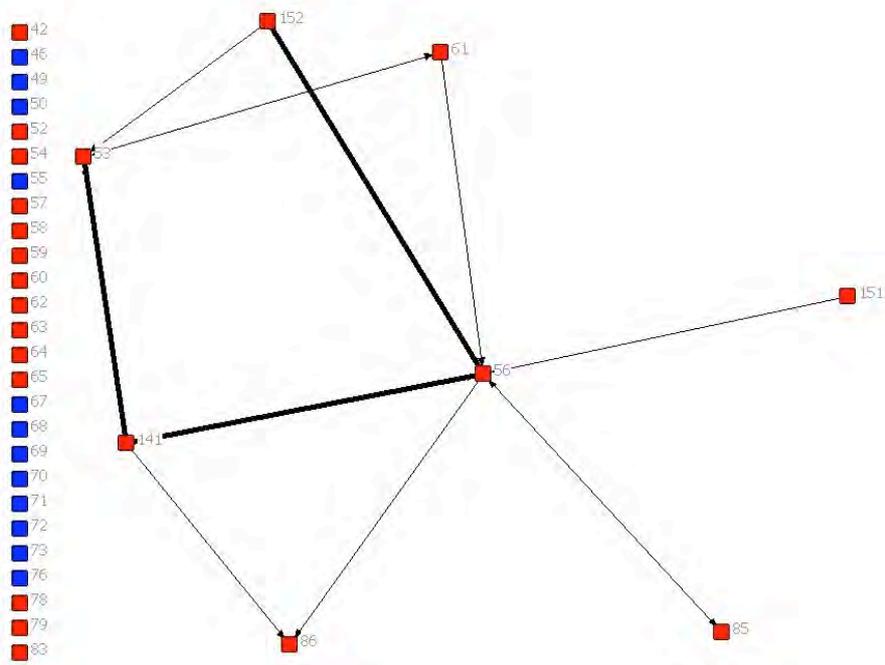


Figure 109: Month 2 – Video reply differentiated by country (red... Austria, blue...UK)

In the last month there is also just one network with again mostly Styrian participants with two Styrian moderators. Interesting is the chain of reply videos. As Figure 107 indicates, participant 61 replies to moderator 56 and

moderator 53 and 53 and participant 141 both upload reply videos as reaction to each others' videos.

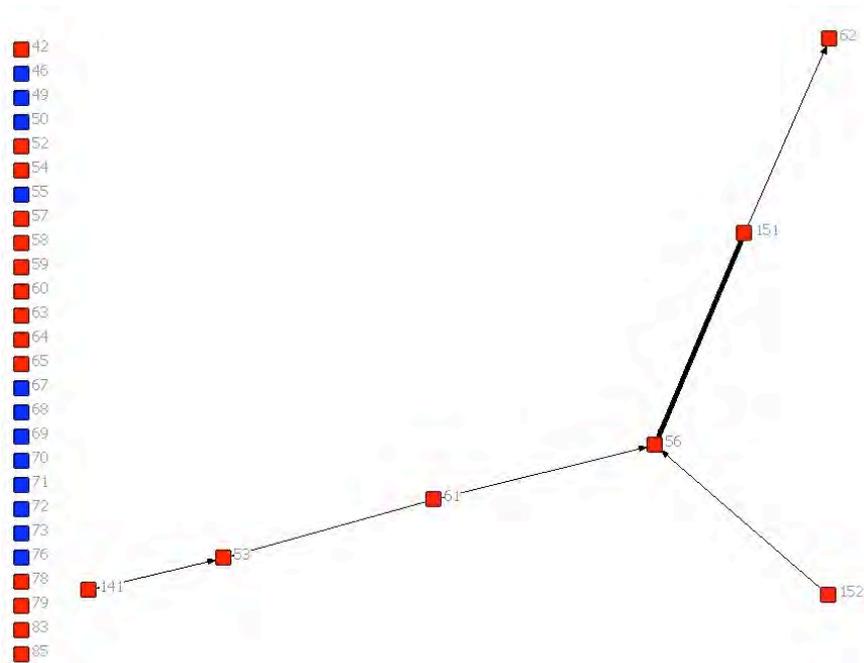


Figure 110: Month 3 – Video reply differentiated by country (red... Austria, blue...UK)

To get a measure for the interaction between the two language groups, homophily indexes have been calculated. This can range between -1 and +1, the first one speaking for homophily and the second one for heterophily.

The overall homophily is medium with a value of -.6984.

The following table reveals how many interactions in total have been exchanged between the Austrian participants with other Austrians (5,090), the Austrian participants with participants from the UK (659), British with Austrian participants (582) and UK participants among themselves (1,898). This shows, that the majority of interactions has taken place within the own language community but also a significant proportion of interaction has been ongoing between the language groups.

Table 26: Interactions on the platform among participants differentiated by country

interactions	Austria	UK
Austria	5,090	659
UK	582	1,898

Table 27 shall illustrate the evolution of interaction over the months of the pilot as well as a differentiation according to the different possible activities on the platform.

Table 27: Homophily in respect to country on different relation dimensions

	Relation dimension	Homophily-Index	Interpretation/Note
Overall according time	Month 1	-.6642	Medium homophily: Participants tend to stick to their own language group in interaction on the platform.
	Month 2	-.7521	Medium homophily: Participants tend to stick to their own language group in interaction on the platform.
	Month 3	-.7456	Medium homophily: Participants tend to stick to their own language group in interaction on the platform.
Overall according relation	SendMessage	-.8689	High homophily: Participants stick to their own language group when they send messages.
	RateVideo	-.6122	Medium homophily: Participants tend to rate videos uploaded by members of their own language group.
	WatchVideo	-.6344	Medium homophily: Participants tend to watch videos uploaded by members of their own language group.
	Video reply	-.8710	High homophily: Cannot be interpreted as only Austrians do participate. These however have replied mostly to videos uploaded by other Austrian participants.
Month 1	SendMessage	-.8578	High homophily: Participants stick to their own language group when they send messages.
	RateVideo	-.5603	Medium homophily: Participants tend to rate videos uploaded by members of their own language group.
	WatchVideo	-.5834	Medium homophily: Participants tend to watch videos uploaded by members of their own language group.
	Video reply	-.6667	Cannot be interpreted due to a lack of data.
Month 2	SendMessage	-.8814	High homophily: Participants stick to their own language group when they send messages.
	RateVideo	-.7094	Medium homophily: Participants tend to rate videos uploaded by members of their own language group.
	WatchVideo	-.6933	Medium homophily: Participants tend to watch videos uploaded by members of their own language group.
	Video reply	-.8824	High homophily: Cannot be interpreted as only Austrians do participate. These however have replied mostly to videos uploaded by other Austrian participants.
Month 3	SendMessage	-.9286	High homophily: Participants in the UK sent messages within their own language group. Austrian participants sent only a few messages but these were distributed sent to both language groups.
	RateVideo	-.6667	Medium homophily: Participants tend to rate videos uploaded by members of their own language group.
	WatchVideo	-.7213	Medium homophily: Participants tend to watch videos uploaded by members of their own language group.
	Video reply	-1.0000	Highest homophily: Cannot be interpreted as only Austrians do participate. These however have replied mostly to videos uploaded by other Austrian participants.

As the table reveals, all interactions on the platform are characterised by homophily among the two language groups to a lesser or higher degree. Thus, in all activities on the platform participants from the UK tend to interact with participants from the UK, while Austrian participants tend to interact with participants from Austria. When differentiating according to the three months of the pilot, we can note that the homophily index at the beginning was somewhat lower than in the consecutive months. Probably

the participants were more interested in the beginning to interact with the other language group.

Among the different activities on the platform sending messages and replying to videos has high homophily indexes. Obviously in sending messages language barriers play a more significant role than in watching videos and rating videos. The rather high homophily index in replying to others' videos has to be interpreted with caution as only the Austrian participants used the opportunity to upload reply videos. As the Austrian moderators uploaded challenge videos this might have stimulated the Austrian participants to upload reply videos (not only to the challenge videos).

In the course of the pilot, the homophily index increases from month to month in sending messages while for other activities such as rating videos and watching videos the degree remains rather constant.

17.5. Relations between Styria and Vienna

To understand the interaction taken place between participants of the two Austrian regions, these have been separately analysed based on homophily indices.

The resulting overall homophily index is moderate with a value of -.7305, i.e. Styrian participants tend to interact among themselves as well as the Viennese. Interestingly the homophily index is somewhat higher compared to the index calculated among the Austrian versus the British group. Thus, the young people in Austria if they interacted with people from abroad they rather interacted with people from the UK than from the other Austrian region.

Table 28: Interactions on the platform among participants differentiated by Austrian regions

interactions	Vienna	Styria
Vienna	3,712	228
Styria	458	692

The table above reveals the distribution of interaction. During the three months of the pilot Viennese participants have 3,712 times interacted among their regional group and 228 times got in touch with the Styrian group. Styrian participants have 458 times interacted with the Vienna group and 692 times with people from Styria.

The following table gives an overview of the homophily indices in relation to the time of the pilot, in relation to the different activities of the platform and gives information about the single activities per month.

Table 29: Homophily in respect to Austrian region on different relation dimensions

	Relation dimension	Homophily-Index	Interpretation/Note
Overall according time	Month 1	-0.6951	Medium homophily: The Viennese participants tend to stick to their own regional group, while among the Styrian group the interaction is distributed among both regional groups.
	Month 2	-0.7941	Medium homophily: Participants tend to stick to their regional group in terms of interaction on the platform in month 2.
	Month 3	-0.7978	Medium homophily: Participants tend to stick to their regional group in terms of interaction on the platform in month 3.
Overall according relation	SendMessage	-0.8471	High homophily: The Viennese participants tend to stick to their own regional group when they send messages, while Styrian participants interact with both groups.
	RateVideo	-0.7854	Medium homophily: Participants tend to rate videos uploaded by members of their own region group.
	WatchVideo	-0.6878	Medium homophily: Participants tend to watch videos uploaded by members of their own regional group.
	Video reply	-0.9310	High homophily but has to be interpreted with caution as only a few video replies have been uploaded.
Month 1	SendMessage	-0.8560	High homophily: The Viennese participants tend to stick to their own regional group when they send messages, while Styrian participants interact with both groups.
	RateVideo	-0.8462	High homophily: Participants tend to rate videos uploaded by members of their own region group.
	WatchVideo	-0.6046	Medium homophily: The Viennese participants tend to stick to their own regional group when they watch others' videos, while Styrian participants watch videos from both groups.
	Video reply	-1.0000	Cannot be interpreted due to a lack of data.
Month 2	SendMessage	-0.8015	High homophily: The Viennese participants stick to their own regional group when they send messages, while Styrian participants interact with both groups.
	RateVideo	-0.8644	High homophily: Participants tend to rate videos uploaded by members of their own region group.
	WatchVideo	-0.7866	Medium homophily: Participants tend to watch videos uploaded by members of their own regional group.
	Video reply	-0.8750	High homophily: but has to be interpreted with caution as only the Styrian group uploaded video replies.
Month 3	SendMessage	0.0000	Cannot be interpreted due to a lack of data.
	RateVideo	-0.3548	Low homophily: Participants tend to rate videos uploaded by members of their own region group.
	WatchVideo	-0.8200	High homophily: Participants watch mostly videos uploaded by members of their own regional group.
	Video reply	-1.0000	Highest homophily: but has to be interpreted with caution as only the Styrian group uploaded video replies.

As the homophily indices show interaction between the two Austrian groups takes place but mostly interaction occurs within the same regional group. At the beginning of the pilot the homophily was somewhat lower, i.e. Styrians and Viennese participants tended to interact a little more than in the consecutive months. Sending messages and rating videos and replying to videos obtain the highest homophily scores, i.e. on these relation dimensions also both Austrian groups stick to their own regional group. Over the period of the pilot the homophily index for sending messages remains rather constant, while video ratings in month 1 and 2 are mostly given to member of the same regional group and in month 3 participants give more ratings also to members of the other regional group. The homophily indices are not always symmetric among the two groups as on some relations Viennese participants stick to their own regional group and the Styrians do not.

Compared to the interaction between the two country groups the evolution of the interaction is very similar between the two regional groups within Austria.

17.6. Moderators' role

The moderators, according to the developed pedagogical approach, have a central role on the platform as they were responsible for uploaded challenge videos on a weekly basis, upload feedback videos and intervene using different channels and provide support to the participants if necessary.

As could be seen already in Figure 107, the reply video function was rarely used by the community. Thus, moderators were only linked to some participants by this channel. The following illustrations reveal the positions of moderators in the community on other dimensions.

Although not many participants have reacted to the challenge videos by uploading reply videos, many have watched the challenge videos uploaded by the moderators as the following figure illustrates. The

moderators are in very central positions in this figure with many incoming relations.

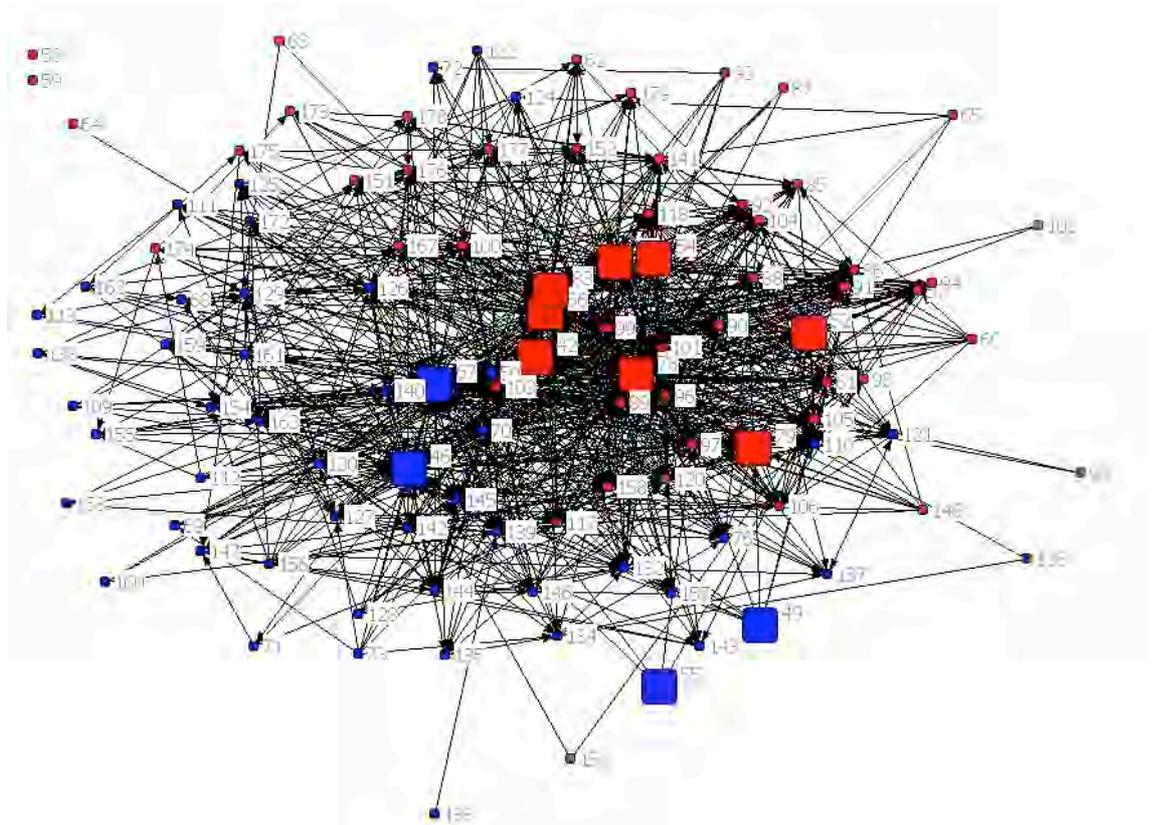


Figure 111: Watching videos (red...Austria, blue...UK, big symbol...moderator, small symbol...participant)

Also had the moderators central positions in sent messages. They used this function to intervene and to get in touch with participants and vice versa could the participants easily contact the moderators by sending them a personal message on the platform. As the illustration further shows also the moderators stick more to their country group as they are personally acquainted and as it was the responsibility to look after their own group in the first place.

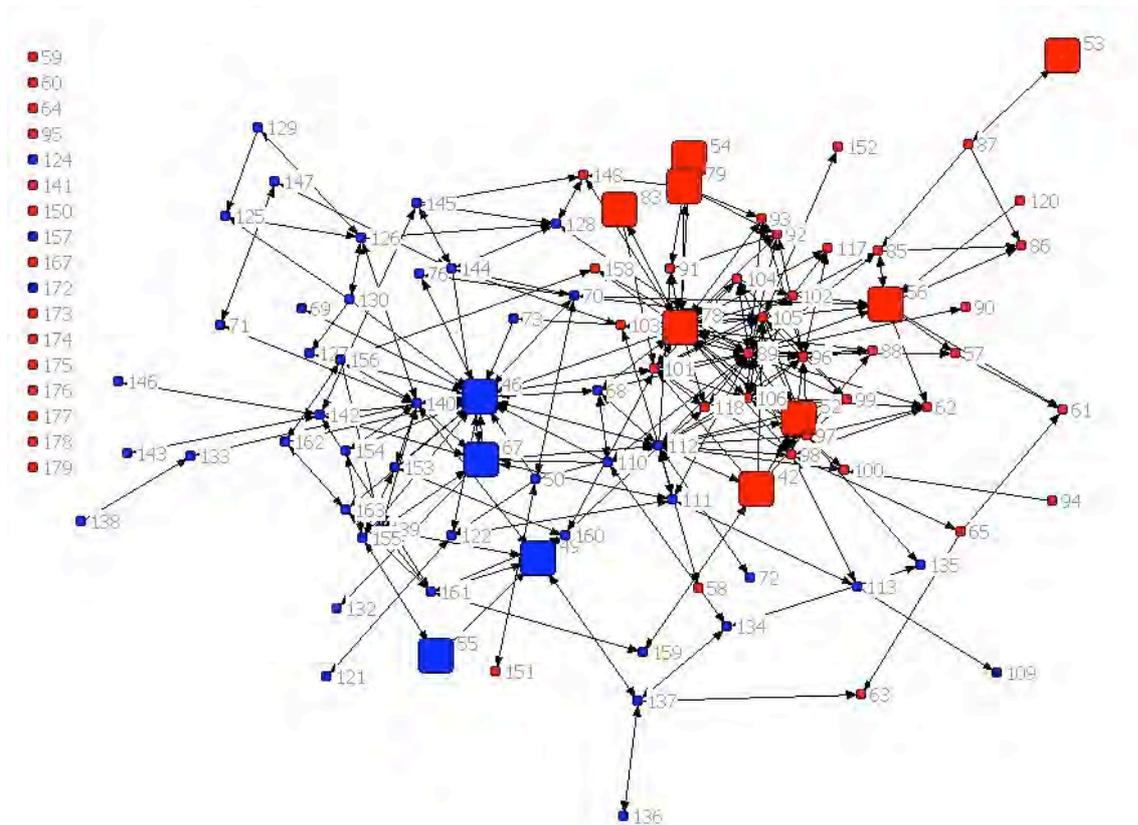


Figure 112: Overall sent messages (red...Austria, blue...UK, big symbol...moderator, small symbol...participant)

Also in rating videos they have acquired a central position. Their (challenge) videos are rated quite often by the participants and moderators have rated participants' videos to reinforce engagement.

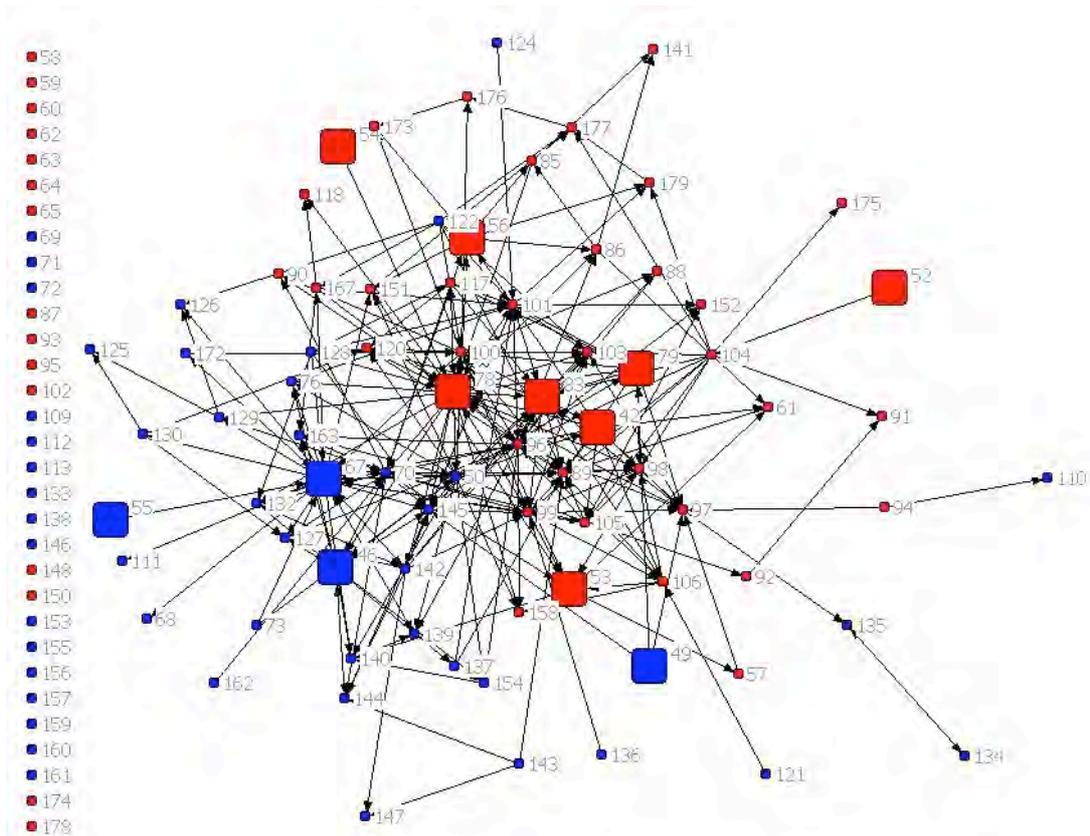


Figure 113: Rating videos (red...Austria, blue...UK, big symbol...moderator, small symbol...participant)

17.7. Summary and answers to SNA research questions

In summary, it can be observed that on all different relation dimensions the popularity between different participants varies to a significant extent. Some gain popularity in the course of the pilot, others lose some popularity points. However, in average on all relation dimensions except the dislike dimension the popularity increases. Over the course of the pilot the young participants get to know each other better, make more friends, cultivate their friendships more making use of different communication channels such as meeting physically, virtually or via telephone. After the pilot the number of people they do not like decreases significantly. Also interestingly, one communication channel does not seem to substitute the other one but rather complements it. The use of the platform does not lead to less physical contact for instance but probably reinforces it.

The impact of the use of the platform on the social life within the community however is difficult to tell but the number and figures presented might suggest a positive effect. But many more factors have to be taken into account apart from the use of the platform when friendships as well as other kind of relations evolve.

Ad 1) To answer the first research question whether real life relations shape the relations on the platform, the following calculation steps have been necessary:

All activity relations on the platform have been summed up per month, as well as all relations previous to the pilot. These newly obtained matrixes of the pilot months have been correlated one by one with the summed relation matrix previous to the pilot by applying the Quadratic Assignment Procedure (QAP).

The assumed hypothesis suggests that people who know each other or are friends who meet also offline are more likely to interact also in a virtual world. The alternative hypothesis could suggest that virtual relations could have a complimentary function to the offline world and thus people who know each other would not have a higher probability to interact on the platform.

The following table gives an overview of the QAP correlations between the relation matrix before the pilot (SNA1-sum) and the platform activity matrixes of the different months of the pilots.

Table 30: QAP correlations between relations before the pilot and activities on the platform during the pilot

	Pilot month 1	Pilot month 2	Pilot month 3
SNA 1-sum	.125*	.157*	No correlation

The QAP correlations indicate that in the first two months personal contact does, to however minor extent, correlate with activities on the platform. The correlations in the first two months are significant but marginal. In the last month no correlation can be found, thus there does not seem to be an impact from the offline life before the start of the pilot within the Vienna

group. As the correlations are rather low other factors will have a higher impact on interaction patterns on the platform.

To understand whether it is one specific kind of offline-relation that has an influence on the online-relation behaviour offline-relations will be analysed one by one in the first step and in the second step the activities on the platform will be separately analysed as well.

Table 31: QAP correlations between different relations before the pilot and activities on the platform during the pilot

	Pilot month 1	Pilot month 2	Pilot month 3
Know-relation	No corr	No corr	No corr
Friends-relation	No corr	.154*	No corr
Dislike-relation	-.084*	No corr	No corr
Meet-relation	.171*	.138*	No corr
Telephone-relation	No corr	.161*	No corr
Internet-relation	No corr	.107*	No corr

The obtained QAP correlations between the offline-relations before the pilot and the online relations on the platform are all rather low and in most cases the correlations are not significant.

Knowing someone in person seemingly has no impact on interacting with other participants on the platform. Being friends with has only an insignificant influence on interaction patterns on the platform. Only in month 2 of the pilot a small correlation between the friends-relation and the activities on the platform were found.

Disliking other people in the offline world and interacting with those in the virtual world correlate negatively (but rather insignificant): people who do not like each other are also less likely to approach each other on the platform. Physical meeting has an impact on the interaction pattern in month 2 and 3 on the platform but still only to a minor extent.

In the following the correlations of the single offline relations with the single activity relations on the platform separated by month will be closely analysed to understand whether besides these above described rather insignificant correlations single relations have a higher influence.

Month 1

In month 1, some offline-relations before the pilot correlate with some of the online activity-relations, but to a limited extent.

According to the QAP correlations, there exists a tendency to watch friends' videos more often than others, fewer messages are sent to people who they do not like, being in regular face-to-face contact has an impact on all platform activities: more messages are sent, more ratings are given to and more videos are watched of those who they regularly meet. Being in touch with others via the Internet has also a small impact on watching and rating more frequently their videos.

Table 32: QAP correlations between different relations before the pilot and different activity relations on the platform during the pilot in month 1

	Send message	Rate video	Watch video
Know-relation	No corr	No corr	No corr
Friends-relation	No corr	No corr	.101*
Dislike-relation	-.079*	No corr	No corr
Meet-relation	.143*	.141*	.155*
Telephone-relation	No corr	.114*	.122*
Internet-relation	No corr	.134*	.117*

Month 2

In month 2 the impact of the offline life seemingly decreases as only a few correlations can be found in the table below.

Still, more messages are sent to those who they are friends with, who they meet regularly and who they are in contact with via telephone.

An interesting finding is the positive correlation between the dislike-relation and rating videos on the platform, i.e. people have rated more videos of those who they did not like. A possible explanation for this is that they probably have made use of the rating in a negative manner. Instead of giving high scores they might have given the lowest possible scores when rating their videos. As the database does not save the data of the concrete rating values this hypothesis cannot be tested.

Table 33: QAP correlations between different relations before the pilot and different activity relations on the platform during the pilot in month 2

	Send message	Rate video	Watch video
Know-relation	No corr	No corr	No corr
Friends-relation	.152*	No corr	No corr
Dislike-relation	No corr	.137*	No corr
Meet-relation	.120*	No corr	No corr
Telephone-relation	.148*	No corr	No corr
Internet-relation	No corr	No corr	No corr

Month 3

The correlations of the offline-relations with the online activities in month 3 again decrease; only two relations do correlate at all.

Again, meeting people offline has an impact on sending them also more messages. A positive correlation can again be found between disliking people and rating their videos.

Table 34: QAP correlations between different relations before the pilot and different activity relations on the platform during the pilot in month 3

	Send message	Rate video	Watch video
Know-relation	No corr	No corr	No corr
Friends-relation	No corr	No corr	No corr
Dislike-relation	No corr	.111*	No corr
Meet-relation	.152*	No corr	No corr
Telephone-relation	No corr	No corr	No corr
Internet-relation	No corr	No corr	No corr

In summary having in mind all these results, the question whether the virtual life on the platform resembles the offline life of the young participants in the way that they seek especially for friends in the platform and keep in touch via the platform with those who they were in touch already before the pilot in the first place can only partly affirmed. There are some correlations between the offline-relations with the interaction pattern on the platform at the beginning of the pilot but most of these correlations decrease until the end of the pilot. Knowing somebody does not seem to play a role at all, while being friends and cultivating this relation using different communication channels has an impact to some extent. However,

the correlations are rather insignificant in all cases. Thus, other more important factors will play a role.

Ad 2) To answer the second research question, whether the activities in the online mobile community foster real life relations, all online activity relations and all offline-relations stated in the second survey after the pilot have been aggregated in one single matrix each and correlated applying the QAP procedure. The result is that online activities during the pilot correlate with offline-relations at the end of pilot to a minor extent ($r=.213$, $p=.002$). Thus, the online life seems to correlate with the offline life within the Vienna group after the pilot, however again to a limited extent. Thus, while the online interaction certainly has an impact also other factors will play a more crucial role in getting acquainted to others and be friends with. QAP correlations have additionally been computed to understand whether specific activities on the platform have more influence on the formation of relations in the offline-world as others.

The following table gives an overview of these correlations which are all significant but rather low. Sending messages within the community seems to have the highest impact on the evolvement of relations in the Vienna group and rating videos (besides replying to videos) the least.

Table 35: QAP correlations between relations after the pilot (SNA2-sum) and activities on the platform during the pilot

	Send message	Rate video	Watch video
SNA 2-sum	.188*	.117*	.146*

Probably specific activities have a higher impact only on some relation dimension. Thus, we could expect for instance, that sending messages could lead also to a higher frequency of telephone calls and messages. To understand this impact, correlations have been calculated between the different activities on the platform and the different types of offline-relation after the pilot.

As the following table shows, for getting acquainted to others only sending messages played a role. Sending messages had also a certain impact on

the different contact-relations after the pilot such as meeting in person, and keeping in touch via the telephone and the Internet. For the contact-relations also the other activities on the platform had some importance but not for the know- and friends-relations.

Table 36: QAP correlations between different relations after the pilot and different activity relations on the platform during the pilot

	Send message	Rate video	Watch video
Know-relation	.120	No corr	No corr
Friends-relation	No corr	.090	No corr
Dislike-relation	No corr	No corr	No corr
Meet-relation	.142	.096	.129
Telephone-relation	.187*	.120	.133
Internet-relation	.158	.113	.111

That the online activities played a certain role in the development of relations in the Vienna group is also cautiously supported by the findings reported in chapter 17.3.2: The multiplexity of relations within the Vienna group has increased after the pilot compared to stage 1, before the pilot. The number of know-relations has increased during the pilot; so has the number of friends. The number of people who were disliked by others decreased. The frequency of all contact-relations has increased: meeting others physically as well as keeping in touch via the telephone as well as via the Internet has increased. The density, in terms of the social network analysis, of all these networks has increased except for the unlike-relation. Thus after the pilot, stronger ties can be found between single participants. While these stronger ties might be a direct result from the use of the platform, obviously more factors might play a role: they frequented from time to time the same youth organisation or some of them worked as interns in the same organisation. The most likely explanation for an enhancement of their relation is a combination all of these factors, while the use of the platform is just one of them. Certainly, no negative effect of the online activities on their offline-social life can be attested. The offline-relations have not been substituted by the online-world.

So far only the relations within the Vienna community have been taken into account. When further contacts that were mentioned in the second survey by the Vienna participants are taken into account the following can be observed: Table 37 shows in the left column the average relations before the pilot within the Vienna group; in the middle column the relations after the pilot still within the Vienna group and in the right column the average relations of the Vienna group within the whole community.

In the framework of the second survey after the pilot the Vienna participants were asked to reveal also nicknames of people they got to know during the pilot and rate their relation according to the same relation dimensions. As these are based on active reproductions (no hints are given to the participants) and not recall (names are given to the participant) the actual number of acquaintances might be higher due to memory effects.

However, it can be said that in average the number of acquaintances has increased within the Vienna group but relations have also been extended to other contacts in the different regions (Styria and the UK) as well as to different moderators of the platform. From an average of around 13 contacts the number of acquaintances increased to 16.5 in the three months of the pilot. This is surprising given the fact that language barriers existed in the communication with English native speakers.

Also the friends-relations increased from averagely 4.67 to 5.71. Thus, within this limited amount of time of the three months lasting pilot some participants made new friends and even beyond their regional environment.

Dislike-relations decreased from 4.08 to 3.58. Thus, getting to know other people virtually might have contributed overcoming some antipathies. All contact relations have increased, surprisingly also for those people who they got to know on the platform and who were from other regions and who were approached by the Vienna participants by meeting them in person (probably people from Styria and moderators), and keeping in touch via the telephone and the Internet.

Table 37: Average relations and contact relations before the pilot and after the pilot within the Vienna group and additional contacts in the community

	Before pilot	After pilot within Vienna group	After pilot plus additional contacts within the community
know	12.92	15.42	16.50
friends	4.67	5.50	5.71
dislike	4.08	3.46	3.58
meet	3.25	4.25	5.42
telephone	2.92	3.50	5.04
Internet	0.96	1.54	3.08

Thus overall, it can be said that the activities in the online mobile learning community have contributed to the social life of the young participants and have thus enhanced their social capital. No negative effects of the platform on their social life can be attested as the offline-life has not simply been substituted by online social interactions but the analysis suggests that the online activities have enhanced social relations also in the offline world. Obviously, the effects of the platform are limited as many other factors play a role when social relations evolve. But within its limits the platform has had a positive effect.

Ad 3) Different roles can be found in the Vienna group. In the overall network, Mellie, for instance, seems to have a very central position as she is connected by more multiple relations to other participants than any other participant in the Vienna group.

Other people are not active on some dimensions and thus are not linked to other in these activity relations.

Jasi, for instance, has not been a friend of anyone before the pilot but this changed during the pilot. Peter is isolated in terms of contacts to others via telephone and Stifler has a cut-point position which means that if he was not part of the network it would break into several subgroups. Thus, he has a bridging function in this network.

In being in contact via the Internet Salle and Bestkite have a cut-point position before the pilot and after the pilot. After the pilot, four people of

the Vienna group are isolated in terms of contact to others via the Internet: Löwe, Peter, Smoker and Sephirot.

Regarding being in touch with others via the telephone, Peter and Smoker are isolates and Maki, Stiftler, Pinky, and Dragan have a cut-point position. On the platform, Maki and Liezen are not connected to the others in terms of exchanged messages. In the first month of the pilot Mellie has a cut-point position while in the second month no such position was identified and in the last month Salle, Sami and Prolet acquire cut-point positions.

As Bart, Maki18 and Neko18 do not participate in rating others' videos in this network they are isolates. In the first month of the pilot Salle in his cut-point position has a bridging function between others.

Overall on the platform Mellie has a cut-point position in terms of sent messages, Salle in terms of rated videos.

As can be seen the specific roles such as the cut-point positions are specific to the relation-dimension and the activity-dimension on the platform, respectively and thus these positions are not constant. Different people acquire cut-point positions on different dimensions.

Similarly, also the reciprocity levels vary with the dimension.

For instance, in the know-relation Rapidler has the lowest reciprocity level, i.e. most of his stated relations are not reciprocal. On the friends-dimension, Löwe, Peter and Smoker reveal mono-directed relations and on the dislike-dimension the number of mono-directed relations increases to 9, etc. These different reciprocity patterns might suggest that the reasons might not lie so much in the character of the person concerned as reciprocity levels do only correlate to a minor extent. Thus a person that reveals mono-directed relations on one dimension will not necessarily state a mono-directed relation on another dimension.

Not only do cut-point positions and reciprocity values vary with the dimension, also popularity does.

Therefore, most roles seem to be specific to the different activity on the platform; constant roles cannot be identified, neither in the offline nor in the virtual community. The roles change and seem only be specific to

some activity or relation. Overall, no one is isolated nor had anyone a very central position.

None of them were isolated nor did the Vienna group break into cliques which would have limited their interaction to the clique.

Ad 4) Regarding the question whether subgroups have evolved within the Vienna community the following can be said: Group building has partly taken place but the groups overlap and cannot be considered as very closed groups that communicate just within the group. No participant is excluded from group building activities and everybody is member of some group. For instance, a person who is not in touch with others by sending messages on the platform might very well watch others' videos or meet their friends physically. During the pilot the group building activities on the platform decrease. The network becomes even more egalitarian with no specific roles and no separated and closed subgroups.

The homophily analyses reveal that group building according to gender takes place to some extent. In the offline life males are more in contact with other males, while females do not stick to their own gender group. In the virtual life on the platform however, males tend to send more messages to females and females tend to send more messages to males, showing higher heterophily scores. A possible explanation could be that males do not have the courage to get to know, be friends with females but once an online platform is offered to them, they make much use of the contact options to the opposite gender. For females the option to communicate on the platform does not change their communication pattern very much as already before the pilot they tended to be in touch more with males than females.

The homophily indices in respect to the two age groups does not show significant group building among these two groups but trends can nevertheless be noted. The younger seem to be more oriented towards the elder and the elder remain within their age cohort in terms of knowing each other and cultivating their contacts which is not surprising. This is a finding that is also known from schools, for instance, where younger pupils

know the names of pupils of upper classes but those pupils do not know the younger ones in return.

Ad 5) To answer question 5 in chapter 17.4.2 different computations were necessary. As the illustrations let suggest, which is further confirmed by the homophily indices, the two language groups do mix on the platform to a certain extent. While most interaction takes place within the same language group a significant proportion of interaction takes also place between participants from different countries. For this interaction some activities play a more crucial role than others. For instance, sending messages has not been an attractive opportunity to get in touch with the other language group as language barriers in written text obviously play a major role. In watching and rating others' videos language barriers might not have had the same impact; thus more interaction had been going on these relation dimensions.

There is also some interaction between the two regional groups within Austria, between the participants from Vienna and from Styria. However, both rather tend to interact mostly within their regional community. The evolution of interaction among the two regional groups is very similar to the evolution of interaction among the two country groups.

Although the interaction beyond the own regional community is somewhat limited it is rather interesting that interaction between these different groups has taken place at all, that people get in touch with other people they have never met or who even speak another language. Of course this is not an unknown phenomenon in times of web2.0 technologies but given that the participants were marginalised young people it was fairly surprising. The young participants were known as being afraid of performance situations but in the virtual mobile community they found a nice way to practice their English and to get in touch with others without a traditional school setting.

Ad 6) The question what role moderators play in the terms of relations on the platform can be answered as follows:

The moderators acquired a central position in the network: Their videos have been watched and rated more often than other videos. They exchanged more messages with participants. According to statements given by moderators in interviews they used the function to send messages to participants to encourage their participation, to set interventions but also as communication channel for other purposes. Vice versa the participants could easily get in touch with the moderators.

Within the network the moderators stuck more to their own group of young people.

18. Benefits from participation

The third research question that shall be answered in the framework of this dissertation asks about the effect the participation in the pilot had in terms of interaction with others and in terms of benefits, gained understandings and insights.

To answer this question different sources of information will be used: statistical data, relational data and qualitative data from interviews and focus groups with moderators and participants. The latter ones have not been described in detail in order not to overload the scope of this work but the essence of these will be reflected herein to answer the last research question.

Besides the incentives, the free mobile phone and the certificate for their successful participation, which constitute external factors for motivation and might be considered as benefits by the participants, the young people might have benefitted also on the following dimensions:

- Interaction dimension

Young people used the different communication channels which the platform has offered to them. Also illiterate people could get in touch with others without the need to write by uploading videos or reacting to others'

videos. Other young people chose to send more textual messages instead. Thus, people could use the channel they preferred and which suited their needs.

Getting to know people from abroad and making new friends were the two most frequent motives to take part in the pilot study that were mentioned by the young people in the interviews. They felt safe on the platform and appreciated to speak in their own language (including text speak). The platform has been used for interaction purposes by young people with different challenges in their lives: young people with illiteracy, young people with Asperger syndrome or antisocial personality disorder, etc.

Through the interaction they could practice their social skills as well as language skills in terms of getting to know a few new expressions in the other language and writing (messages). They had the possibility to learn from their peers as well as from the moderators of the platform.

They learnt to respect rules that are important in social relations. The netiquette rules were introduced to them during the “Welcome-workshops” and they were violated only two times during the whole duration of the pilot. Given that the whole community has uploaded more than 550 videos and only two of these were in conflict with the netiquette rules shows that most participants had internalised these rules. One of the videos had to be removed because it was sexually connoted and the other video because it could be understood as racist (although it was not explicitly racist as the young person had made fun of an ethnic group he himself belonged to which the others did not know). In both cases the moderators of the platform intervened and invited the young people for a face-to-face conversation.

Through their created space in the framework of groups where they discussed topics of interest, they had the possibility to exchange ideas. That these topics did not solely deal with fun topics but also with serious issues show the names of these groups (such as “kids having kids”). Discussing these issues might have prompted a reflection process among the participants.

Not only did the young people appreciate the opportunity to get in touch with their peers, they also liked to contact the moderators of the platform who could be reached at any time through the use of the platform.

As the moderators revealed in the interviews they likewise appreciated this additional channel of communication as they had another instrument to reach young people who otherwise were difficult to get in touch with. There were situations where young people quit visiting the youth organisation and the social workers, who were worried, could still get in contact with them through the platform. Accessing their videos allowed the social workers and youth workers to get to know the people from another perspective, to see their environment, their family, etc. It helped them to understand more deeply what was in the mind of the young people and how they were able to support them better. In face-to-face meetings social workers would often use these snippets of information as ice-breakers to start a conversation which then again showed the young person that the social worker was interested in him or her.

- Creative expression dimension

The participants have appropriated the platform in the sense that they used it not only for the intended purposes but also through spontaneous and creative ideas they integrated the platform in their lives for self determined purposes. For instance, some young people used the platform like a diary; they would upload a video every now and then sharing their thoughts and experiences of the day such as first impressions at a new internship placement.

The video format turned out to be an appropriate format also for illiterate persons. Although he could not give a name to his videos or exchange messages with other participants the illiterate participant was the one who uploaded the most videos. His videos showed his environment, his room, his family and friends, his favourite objects and his hobbies such as him playing an instrument. Also did he film short clips of events that took place during the pilot such as a wedding in a Roma community (he himself was a Roma too).

The participants also enjoyed experimenting with the format: some spoke directly into the camera, others filmed and spoke from the off; another creative idea came from one young male who did not want to disclose himself, he lent a computer game hero his voice and shared his thought on different topics this way.

In the beginning many videos were obviously test videos which were more characterised by trial and error but later videos became more targeted and some obviously were based on a (simple) dramaturgy. For instance, they played roles or they let interview themselves or made interviews of others, filmed others' activities, etc. One particular creative video was uploaded by a male participant who commented the preparation of a dish in the kitchen of the youth organisation as if it was a football game in a stadium.

- Other aspects

The moderators of the platform who saw the participants on a regular basis also face-to-face noted improvements of skills on different levels. But obviously it is difficult to tell what the effects of their participation in the study was versus other factors also impacting at the same time.

Probable learning gains were, according to the moderators' interviews, speaking in front of other people and speaking in front of a camera. They noted that their self-expression skills improved significantly in terms of spoken words but also in terms of visual compositions in the videos (especially towards the end of the pilot where the uploaded videos became fewer but were more elaborated).

Through the use of the platform and the possibility to log onto the Internet the participants have practiced their ICT skills which are required in today's digitalised world.

In the interviews the moderators revealed their surprise about the frustration tolerance of the participants if it came to technical problems during the pilot. Either they worked out solutions by themselves, contacted the moderator or searched for help among other people. Thus, they showed a solution oriented approach which was often not the case in other difficult situations. However, these statements are somewhat in contrast with the statistical analysis of the log-data which clearly shows a significant decrease of participation after the first few couple of weeks after

the pilot start and therefore the statements might apply to single participants but the average was probably frustrated or the decline was due to other reasons.

According to the moderators, also communications skills and self-esteem among some young people improved during the pilot. Statements by young participants such as “I am so proud that I have been chosen to take part. I am so important that researchers want to have me as co-researcher in their study” underline this impression. Some young people who at the organisation were known as difficult to engage were active on the platform and some of this engagement could also be transferred to the offline life as the moderators noted them becoming more active also in group activities at the youth organisation.

During the focus groups which took place during the debriefing workshops at the end of the pilot the stimulation of self-reflection processes could be noted as participants talked about what to disclose in the Internet, what could be interesting to others and how to protect their privacy.

When they were asked whether they could imagine learning via videos, 20 out of 24 stated they could. Although some showed a rather critical attitude towards learning on a mobile phone instead of learning in a traditional learning setting, they were also quite open towards this unusual way of learning at the same time.

Another aspect which is worth mentioning in the discussion of benefits and insights gained through the pilot was monitoring their own expenditures. The research team provided the participants with a free mobile phone and free credit to spend on calls, text messages and data traffic. However, the credits had a (quite high) limitation and once the credit was spent the participants were still able to call and send messages etc. as an automatic limitation was not possible from the providers' side. Therefore the participants were asked during the welcome workshops to monitor their expenditures as the research team would have to cover the extra costs. Although there were a few participants who overstrained the credit most of them were quite attentive and monitored their expenditures by themselves.

Most of these gained benefits and insights mentioned in this chapter are not based on hard facts but are interpretations and observations of people who were involved in the study. Nevertheless they show the potential of the platform and the mobile based intervention besides pure statistical data and data from social network analysis.

CONCLUSIONS – POSSIBILITIES AND LIMITATIONS

The mobile learning based intervention for marginalised young people has surely brought some benefits for the participants but there are obviously also limitations that shall be discussed in this last part of the work. The various parts of the dissertation shall be integrated herein to come to final conclusions.

For a final evaluation of the mobile based learning approach the FRAME model presented in chapter 4.1 shall be contrasted against the realisation of the platform as well as the development of the pedagogical concept and the outcomes of the study respectively.

This model allows for considering all elements of mobile learning at the same time. The main elements are the device (D), the learner (L) and social aspects (S). The overlaps between the three main aspects result into more aspects: the device usability (DL) as intersection between the learner and the device; social technology aspect (DS) as overlap of device and social aspects; interaction design (LS) as result of a combination of learner and social aspects and finally mobile learning (DLS) as combination of all three main aspects. When going through this different elements the following can be said:

In respect to the devices (D) the different sets of mobile phones used during the pilot could be easily handled by the participants but some of the technical problems reported above were due to a combination of software installed and data traffic delivery problems at the provider's side. This issues are difficult to solve as it would need or a high commitment by the provider or a longer pre-testing phase where these kinds of problems can be solved well before the actual start of the pilot.

The needs of the learners (L) have been studied and have been taken into account into the development. Most user requirements have been reflected while a few did not find their way into the technological development of the platform and in the conceptualisation of the pedagogical approach which could be taken up in similar studies. For

instance, the reliability of the system was somewhat limited, uploading videos took often too long, and the platform was sometimes not accessible at all. The platform would have needed a more logical structure to easily find the different uploaded sources of information and should have allowed for more personalisation.

The social aspect (S) has been relevant in the Comeln study as cooperation and interaction, respecting norms and rules have been important and furthermore participants had the possibility to practise their social skills in the virtual life and in the offline life as videos were taken offline and only then uploaded online.

When we refer to the device usability aspect (DS) more in terms of the usability aspect of the platform some issues have to be mentioned: While the usability was mostly satisfactory some refinements of the platform would be necessary to enhance usability such as a better structure of the ping-pong approach and an intuitive option to find challenge videos and to upload answer videos.

In respect to the social technology aspect (DS) the devices and the platform have allowed for interaction and communication among its various users through different channels of communications: text messages, calls and logging onto the Internet as option provided by the mobile phone; and sending messages, exchanges via video clips and rating videos and communication in groups provided by the platform.

To satisfy the aspect of interaction design (LS), according to Koole, the needs of the learners as individuals who are situated in their unique culture and environments have to be taken into account. Three types of interaction are proposed which are all supported by the Comeln platform: learner-content, learner-instructor (moderator), and learner-learner.

Finally the last aspect, the mobile learning process (DLS), cannot be any better than its components as it is defined and continuously reshaped by the interaction between the device, the learner, and social aspects. Thus, the above mentioned challenges play a role in optimising the mobile learning experience. The platform currently is still constructed in a way which makes it difficult to search for specific information. In times of cognitive overload because of information overflow this is a crucial aspect

which should be taken into account in further developments (e.g. through the use of semantic web applications).

Thus, overall the mobile learning based approach seems promising but there is still room for improvements.

Another positive aspect that has to be emphasised is the provided possibility for a positive learning experience which is different from school. Participants have learnt and got insights without being aware to have actually learnt. Positive learning experiences are crucial as most marginalised young people have dropped out of school at an early stage without reaching sufficient qualifications for the employment market. Similarly their participation rates in lifelong learning activities are lower compared to their peers. Some of the reasons for low participation in education in general given by Brüning and Kuwan (2002) were among others socialisation of learning, interest in learning, age and gender, exploitation interest, value system and attitude to further education, forms of communication of learning contents, forms of organisation of learning, offers for orientation, consultancy of social pedagogies, and quality of pedagogical personal. Some of these have been met by the mobile learning based intervention which provided for positive learning experiences and a form of learning which can easily be transferred, pedagogues who are available most of the time and give individual support.

According to Lenz (2010) nobody is uneducated and with this view he distances himself from a deficit oriented model and acknowledges development which can take place outside of educational institutions. In this approach there is no room for failures which many young participants had a long history of and this view has been taken into account in the development of the pedagogical approach by recognising the skills of the participants.

According to Vavoula (2007) a productive pedagogical vision should recognise the cultural emergence of innovative educational practice following Bakardjieva's concept of appropriation or "technology-in-use-in-social situations", or in "learner-generated context". As discussed in the theoretical part of this work appropriation describes the process of finding

new dimensions of a technology and adapting these to the own purposes. The analysis of the different data (qualitative and quantitative) shows that on the one hand young people have used the platform in manifold ways and thus they have adapted the functionalities of the platform to their own purposes such as sharing their daily experiences and getting in touch with specific people and the moderators on the other hand have seamlessly appropriated the platform to communicate with their wards. After an initial phase of trial and error and exploration of the different functionalities of the platform participants as well as moderators have analysed possibilities and constraints and have integrated the use of the platform in their daily routines. Appropriation took also place in terms of choosing the favourite communication channel. While some used the platform solely to upload videos, others would use it exclusively to exchange messages or to discuss relevant issues in groups. Thus, these users have appropriated the platform according their own preferences to meet their skills, for instance, the illiterate person chose to rely on the video formats only. Discussing in groups allowed young people to bring in topics that were relevant to them and interestingly only about half of them dealt with fun, while the others had more serious content.

According to the statistical analysis of the data females and males have not differed in their use of the platform which is an encouraging finding given that inequalities between the two genders are particularly high among marginalised populations. Thus, the mobile learning based intervention has not reinforced some of the inequalities and the platform can be called gender fair as it encourages participation of both genders to the same extent. In studies such as the one conducted by D'Haenens (2003), girls made more use of social applications such as email or chat, and boys used it more for technical applications such as games or downloading files. Gender research would suggest females to exchange more messages and male participants to upload more videos. Although some group building activities based on gender have taken place in the sense that males had more relations to males (females did not stick to their own gender group), in the Comeln study none of these traditional patterns is repeated.

In terms of additional potential benefits participants might have gained through the mobile learning based intervention the following can be found: Studies suggest that the use of ICTs has a positive impact on a personal and psychological dimension. It may improve their self-esteem, their motivation, and support collaboration and networking between different people and increase also the involvement with their families (Tsikalas et al., 2002; Wartella et al., 2000). Whether the use of the platform was the main reason for an increase of their self-esteem among some young people or whether other factors were decisive is difficult to tell. The moderators have noted some positive changes in their behaviour in terms of motivation and engagement and self-esteem. They learnt to speak in front of others and in front of the camera. Their self-expression skills improved significantly in terms of spoken words but also in terms of visual compositions in the videos. Thus, even marginalised young people become contributors in the web2.0 landscape once they have found their medium of expression. Experiences of marginalisation per se lead to a rather low level of self-esteem while intrapersonal resources and dispositions such as motivation, self-efficacy or personal management skills would help to overcome marginalisation (Biggart et al., 2004). Thus, experiences that help to gain self-confidence are crucial to interrupt the vicious cycle of marginalisation.

In the framework of the mobile learning based intervention, learning might not have taken place in the traditional sense as it did not require the participants to sit down and study in a book for instance, but participants were constantly on the move and could choose to learn wherever they were. Also the way of learning has to be described as informal learning without a fixed curriculum to absolve as learning took place outside of dedicated study times and learning environments.

A typical characteristic of mobile learning that applies also to the Comeln study is that it allows for self-paced learning and learning according to their own preferences and a structure of learning which enhances “unique scaffolding” (c.f. Dawabi et al., 2004; Peters, 2009).

Learning furthermore took place online and offline: participants recorded videos offline and shared information online. Shooting videos required

creativity to some degree. A previous study by Puikkonen et al. (2008) with teenagers who collaboratively created mobile videos indicates that the mobile video creation could serve as great tool for creativity. This is also revealed when the video clips of the young people are analysed where some show a creative dramaturgy. In contrast to the study by Puikkonen et al. the ComelN study was quite demanding as in their study videos were taken in division of labour, while in ComelN single participants organised the shooting of videos including the involvement of other participants by themselves. Thus, this kind of offline learning can be called collaborative learning as in many cases they asked other people to assist them in the recording of videos. But also autonomous and constructive learning have been made possible as many steps were not predefined and participants relied on themselves but always had the option to ask for support.

According to Cochrane (2009) learning outcomes for students from mobile learning are (among others): development of critical thinking skills and group communication skills, and the development of potentially world-wide peers support. These outcomes might also be true for the pilot study. Self-reflection and critical thinking have been stimulated (e.g. after the pilot participants discussed about privacy and netiquette issues). Group communication was an essential part of the activities on the platform (in form of group discussion, sending messages and reacting to others' videos). There was also some interaction between the participants (also participants from different regions) with the aim of support and advice.

Sharples (2007) noted that one major opportunity was to support a person through a lifetime of learning by providing young children with tools to capture and organise their everyday experiences. Also in the framework of the study participants had the possibility to capture their daily experiences and share their impressions of the surrounding and some made use of this option.

Kukulaska mentions the advantages mobile learning based applications bear in respect to increased inclusion, widened participation, etc. Probably these advantages are true also for the mobile learning based intervention as it is targeted at young people who otherwise are excluded from society

and who otherwise are difficult to reach by conventional lifelong learning offers and as an increase of engagement among some participants could be noted.

The importance of social relations and institutional support as most helpful agencies for disadvantaged young people emphasises a study by Hartley, McNeill and Melrose (2003). Both is offered by the platform and the pedagogical framework as the platform enhances conversations between participants and participants and moderators and through their contact to moderators the young participants are somewhat embedded in an institutional context.

Enhancing one's social capital, when speaking in the terminology of Bourdieu's (1983), is key for marginalised young people in order to have more opportunities and access to (economic) resources but also to become engaged in lifelong learning (c.f. Field, 2005). As it is known unemployed people have unemployed friends (c.f. Spanning and Reinprecht, 2002) and young people living in poor communities are more likely to have friends who dropped out from school. Thus the relations marginalised young people have are one-sided with access to just one segment of society which matches their own. Having meaningful and supportive relations opens up additional opportunities which otherwise would not be available. The relation to at least one reference person decreases the likeliness to become marginalised.

In our study we, on the one hand supported the latter function by having moderators on the platform who might adopt the role of reference persons for some young people, on the other hand the community was restricted to the registered members and had thus only participants with similar experiences and challenges in their lives. Participants felt safe in this environment where they were not afraid of disclosing their experiences, from the social capital point of view the possibility of augmenting social capital was limited in terms of reaching out to other segments of society (besides the moderators). However, as the platform and the pedagogical approach were shaped according to the needs of marginalised young people opening up the community for external members would not have been an option.

In the interviews after the end of the pilot most young participants revealed that they had the feeling of being a member of the group, i.e. the platform community. Being member of a group is something marginalised young people often lack, many feel that they have not been given any chance or motivation to belong to a group and lack the feeling of membership in and consequently loyalty to their community (c.f. Davis, 2007). Even the person who was illiterate did not feel cut off from the rest of the group since he could express himself seamlessly. Illiterate people often experience to be excluded from important areas of life and from employment opportunities.

The statistical analysis of the SNA surveys and the log data shows that all relation dimensions within the community increase in the course of the pilot. Young participants get to know each other better, make more friends, and cultivate their friendships more frequently by making use of different communication channels such as meeting physically, virtually or via telephone. After the pilot the number of people they do not like decreases significantly. Thus, getting to know other people virtually might have contributed overcoming some antipathies. The use of the platform does not lead to less physical contact for instance but probably reinforces it. No negative impact of the online activities on their offline-social life can be attested. Nor have the offline-relations been substituted by the online-world.

Relations have also been extended towards participants from other regions, even though language barriers existed in respect to participants in the UK. The young participants were known as being afraid of performance situations but in the virtual mobile community they found a nice way to practice their English and to get in touch with others.

After the pilot, stronger ties can be found between single participants. While these stronger ties might be a direct result from the use of the platform, obviously more factors might play a role.

In the virtual community nobody is isolated nor had somebody a very central position. When specific roles were found then they referred to one relation dimension but not to all. Group building has taken place to some

extent on the platform but the evolved groups overlap and therefore these groups cannot be considered as closed groups.

After all, getting to know others was one of the most frequent motives to take part in the pilot.

The platform provided the opportunity to practice social skills in conversation with their peers and with the moderators. They learnt to respect social norms and the netiquette rules. As Davis (2007) indicates young people at risk of social exclusion might be a priori unsuccessful in establishing and maintaining relationships with others either because they lack the skills and resources or because they do not get the appropriate family support or due to other reasons.

One of the advantages of mobile learning which also applies to this study is that communication can occur multi-directional or mono-directional, i.e. directed at several persons or at one person (Kress & Pachler, 2007). People could send a message to a specific person or discuss a topic with several community members in a group or share videos with all. The platform could be used to overcome cultural and communication barriers by offering different channels and ways of communication (c.f. Kukulska-Hulme, 2007). During the pilot communication on the platform has taken place complementary to communication via mobile phones. Thus, the platform allows for communication which otherwise would not take place and encourages participants to communicate who otherwise would not. Also have the participant learnt during the pilot to monitor their own expenditure on the mobile phone. Only in a few cases the given free credit was overdrawn.

According to literature, in technology supported learning also ICT skills are trained at the same time which are crucial skills today in a highly competitive employment market where a big proportion of work places requires at least basic digital literacy. They have learnt to navigate across the platform and have accessed the Internet through their provided mobile phone. Most marginalised young people personally own a mobile phone and are thus used to handle it. Compared to other ICT tools in the use of mobile phones as means for intervention and learning no advanced ICT skills are required (c.f. Nyíri, 2003). Nor does the lack of confidence to use

this new kind of technology play a role compared to static devices (Jones et al., 2007). Closing the digital divide means closing also the economic divide and the literacy divide in the sense of Laouris model as all divides are interlinked. Initiatives need to aim to bridge one of the affected dimensions to achieve positive results also on the others.

Besides all these positive aspects of the mobile learning based intervention there are obviously limitations and restrictions in the approach.

Similar to other mobile learning based projects the participation declined after an initial phase of exploration once the fascination by the new technology decreased. Although several factors play a role in this decline which have been discussed above the fact remains that the decrease in participation is rather dramatically after the first few weeks and the question remains unanswered whether this change in behaviour can be totally explained by the mentioned factors or if there is something inherent to mobile learning which attracts attention only in the beginning and fades away later.

Another recurrent argument speaking against the introduction of mobile learning based interventions is the fact that in many institutions the mobile phone is perceived more as a device for distraction than as a working tool. This was also the case among the participants who had started an internship and were not allowed to use the mobile phone during working hours. Thus, educational staff as well as employers do not seem to be aware of the advantages mobile learning might bear but show a sceptical attitude. However, for sustainability of mobile learning based activities beyond a pure pilot phase support and institutional recognition of the value of mobile learning would be crucial.

Some misbehaviour of young people (and other people) has only been made possible because of the use of mobile devices such as the “happy slapping” phenomenon where young people record and film aggressive behaviour against a victim and share it afterwards on their mobile phones. Therefore when introducing new forms of technology enhanced learning also ethical issues need to be considered and an immediate reaction to undesired behaviour and violation of rules is key.

The most likely explanation for the infrequent use of uploading answer videos to challenge videos by the participants during the pilot has been discussed above such as difficulties to find the challenge videos and usability issues in uploading videos. Another not as encouraging explanation is that the young people simply did not want to be challenged as it is known that marginalised young people compared to their peers show different preferences in their media use as they are more entertainment and leisure oriented. This reason would be much more disconcerting as it is not a technical problem to be solved. In the development of the pedagogical approach the different media preference has been taken into account by applying a playful approach that leads from easy to more complex challenges. To find out the true reason another pilot study would be needed once all the technical problems have been solved. Similarly the platform would have to be stable and reliable all the time to exclude potential negative effects of the technology on the motivation of the participants. Our experience shows that a longer pre-test in real environments would be needed before involving end users. Different design cycles, probably based on user centred design approach where the users are involved in design processes from the very beginning in early prototyping until the final development of the technology, would help to reach a satisfactory level of usability and reliability. The ping-pong approach would have to be intuitively clear and the structure of the platform as well as search engines would have to be enhanced and installed respectively.

Also the role of the moderator would have to be consolidated in a project that builds on similar ideas. Although the moderators in general did a good job not all of them were as engaged as desired which resulted in some challenge videos not being uploaded and in lacking feedback videos. The role of the moderators however is very important as they are the ones to monitor the activities on the platform and to intervene in case it is necessary. Analyses have shown that the activity patterns of the moderators correlate with the activity patterns of the participants. Thus, the more active moderators are, the more active are also the participants. For some moderators it was difficult to fulfil their role as they did not

experience sufficient support by their institution. They did not find enough time to monitor the platform during their ordinary working hours but had to spend their free time to carry out these activities. This shows again the necessity of institutional embedding of initiatives such as mobile learning based interventions if sustainability shall be achieved.

Another issue to be considered in respect to sustainability is funding. If the participants are asked to pay for the expenditure on the mobile devices, the participation rate is likely to be very low. Thus, funding has to be provided. Compared to other technology enhanced learning initiatives the required financial resources needed are lower as the devices themselves are more convenient and data traffic costs have dropped significantly over the last years and months.

In summary, the advantages might outweigh the disadvantages but all of these negative issues would have to be taken into account when developing a similar intervention.

To conclude with the voices of the young themselves shall be heard. They themselves considered learning via video format and on mobile phones as a good opportunity and alternative to conventional learning formats, which is the probably the strongest argument for the introduction of mobile learning based interventions for marginalised young people.

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Ausgewählte Publikationen

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Sindelar, B. & Unterfrauner, E. (2007). *Testtheoretische Analyse des Verfahrens zur Erfassung von Teilleistungsschwächen*. Wien: Austria Press.

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