

MASTER

Connectedness and mobile communication "all that glitters is not gold"

Schipper, R.A.

Award date:
2007

[Link to publication](#)

Disclaimer

This document contains a student thesis (bachelor's or master's), as authored by a student at Eindhoven University of Technology. Student theses are made available in the TU/e repository upon obtaining the required degree. The grade received is not published on the document as presented in the repository. The required complexity or quality of research of student theses may vary by program, and the required minimum study period may vary in duration.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain

Connectedness and Mobile Communication
“All that glitters is not gold”

R.A. Schipper
0545232

Connectedness and Mobile Communication
“All that glitters is not gold”

R.A. Schipper
0545232

Master's thesis
April 2007

Graduation committee:

W.A. IJsselsteijn Department of Technology Management (TU/e)
D.G. Bouwhuis Department of Technology Management (TU/e)
H. Nelissen Department of Vodafone Group R&D

Eindhoven University of Technology – Department of Technology Management
Educational Program Technology and Society – Master's Program Human
Technology Interaction

Preface

This report describes the work done during my final graduation project for the faculty TM-management at the Eindhoven University of Technology and the Vodafone R&D group at Maastricht. In a period of approximately one year, I learned a lot about how to conduct qualitative research. I choose to conduct my final graduation project at the university and Vodafone R&D Group, because I expected it would provide complementary knowledge about conducting a research. My expectations were confirmed, which provided me with the best of both “worlds”. I would like to thank the following people.

Firstly, I would like to thank my supervisors:

Wijnand IJsselsteijn, for sharing his extensive knowledge about connectedness.

Don Bouwhuis, for providing general scientific knowledge.

Hans Nelissen, for helping me with structuring my research objective and report.

Secondly, I would like to thank my parents and grandmother for their support, and providing me the opportunity to study.

Thirdly, I would like to thank Marc Lambooi, Brian Gajadhar, Koen Crommentuijn, Roel Vergouwen and Jelle Berentsen for reviewing my report.

Finally, I would like to thank the participants and everybody I forget to mention, who helped me in this project.

Summary

People have a fundamental need to maintain and establish a positive relationship with interpersonal relationship (e.g., friends, loved ones or family), which is in the HCI research related to the concept connectedness. Connectedness is a positive emotional appraisal of the feeling of being in touch within interpersonal relationships. The goal of this research is to investigate how users can *maintain* and *enhance* a feeling of connectedness anywhere and anytime, and communication media are an important tool to satisfy this need. To accomplish this objective this research investigated which factors a crucial for maintaining a feeling of connectedness and how to enhance communication media for maintaining this feeling.

People generally maintained their interpersonal relationships with face-to-face communication, which is perceived by most social communication theories as the Holy Grail, compared to other means of communication. However, due to busy lives and segregation of interpersonal relationships, because of expanding means of travel, it gets harder to maintain a feeling of connectedness with face-to-face communication, and people are looking at alternatives. The concept connectedness is relatively new in the HCI research, and how people maintain this feeling with communication media is investigated in this research. The growing communication repertoire provides people with a lot of communication alternatives and opportunities, however "*all that glitters is not gold*" (Shakespeare, 1596) which is explained next.

With the growing communication repertoire, people are provided with communication media, which vary in media richness. The use of lean communication media for maintaining a feeling of connectedness seems for most theories unsuitable, because they convey minimal verbal and non-verbal information, which could lead to misinterpretation and depersonalization. In this research the perceived appropriateness of lean communication media and the factors involved are investigated.

Additionally, the growing communication media with its characteristic of anywhere and anytime, could result in a communication overflow. Communication overflow emerged with current communication media, because they seem to heavily equip for just saying "hi" and could lead to a deteriorate appreciation of maintaining a feeling of connectedness. In line with these concerns, this research focuses on the affective costs of communication people experience with maintaining a feeling of connectedness.

To investigate these subjects, two focus groups were conducted to investigate general opinions and attitudes of how people maintain a feeling of connectedness and how to enhance it. The results obtained in the focus group and relational-oriented and conversational-oriented communication were investigated in twenty open-ended interviews with teenagers (14 to 19 years old) and workers (25 to 35 years old). The transcripts obtained of the interviews were analyzed with media richness, social presence, impression management and the affective benefits and costs of communication theory.

In this research it is found that maintaining a feeling of connectedness is possible with lean communication media, however several factors influence media choice: *personal, content, feedback and accessibility*. When people maintain a feeling of connectedness with communication media they experience several affective costs: *effort, financial costs and expressiveness*. Enhancing the feeling of connectedness seems possible, by providing people with the possibility to manage availability information and information between different relationships. Additionally, providing asynchronous audio or video messages (MMS) seems to have a "bright" future.

This research recommends that media choice theories have to distinguish between different connectedness-oriented communication behaviours and combine media capacity theories with the affective benefit and costs of communication, for fully understanding all the factors involved. Additionally, this study recommends further investigation in providing people with ways of managing availability and information between different relationships.

Contents

Preface	I
Summary	III
1 Introduction	1
1.1 Interpersonal needs	1
1.2 Satisfying a feeling of connectedness	1
1.3 Research objective	2
1.4 Structure of report	3
2 Theory and related work	4
2.1 Defining connectedness	4
2.1.1 Social presence	4
2.1.2 Social awareness	4
2.1.3 Connectedness	5
2.1.4 Connectedness, awareness and social presence	5
2.2 Users	6
2.2.1 Close friendship	6
2.2.2 Focusing on teenagers and workers	6
2.3 Maintaining a feeling of connectedness	7
2.3.1 Relational-oriented and conversational-oriented communication	8
2.3.2 Characteristics teenagers and workers	9
2.4 Media choice theory	10
2.4.1 Media richness and social presence theory	10
2.4.2 Impression management model	12
2.4.3 Affective benefit and costs of communication	12
2.5 Enhancing a feeling of connectedness	13
3 Research approach	16
4 Focus Groups	18
4.1 Method	18
4.1.1 Design	18
4.1.2 Participants	18
4.1.3 Apparatus	18
4.1.4 Procedure	18
4.1.5 Analysis	19
4.2 Results working people	19
4.2.1 Maintaining a feeling of connectedness	19
4.2.2 Enhancing communication media	20
4.3 Results teenagers	21
4.3.1 Maintaining a feeling of connectedness	21
4.3.2 Enhancing communication media	22
4.4 Conclusions	23
4.5 Discussion	24
5 Interviews	27
5.1 Method	27
5.1.1 Design	27
5.1.2 Participants	28
5.1.3 Apparatus	28
5.1.4 Procedure	28
5.1.5 Analysis	29
5.2 Results	30
5.2.1 Maintaining a feeling of connectedness	30
5.2.2 Media richness and social presence factors	32
5.2.3 Impression management factors	34
5.2.4 Affective benefit and costs factors	35
5.2.5 Enhancing communication media	37
5.3 Conclusions	39
6 Main discussion	41
7 Recommendations	45
7.1 Recommendation for future research	45

7.2	Recommendations for Vodafone group R&D	46
8	General conclusions and reflections	47
8.1	General conclusions	47
8.2	Reflection on this research	47
9	References	49
	Appendix	52
	Appendix A: relational-oriented communication	53
	Appendix B: prototype 1 Gleams of people	54
	Appendix C: prototype 2 Marmasse watch.....	55
	Appendix D: prototype video Telephone.....	56
	Appendix E: connectedness-oriented communication messages workers	57
	Appendix F: dream means of communication workers	58
	Appendix G: connectedness-oriented communication messages teenagers	59
	Appendix H: dream means of communication teenagers	60
	Appendix I: interview procedure	61
	Appendix J: prototype 1 the photo list.....	67
	Appendix K: prototype 2 the social rabbit.....	68

1 Introduction

1.1 Interpersonal needs

What do you think that the first humans did when they encountered each other? Communicate of course; communication is an important part of our lives. We communicate increasingly and there is a good reason for it; namely it satisfies physical needs (communication with others keeps you healthy), satisfies identity (communication shapes your self-concept), practical needs (communication as a tool e.g., do this) and interpersonal needs (communication for maintaining interpersonal relationships) (Adler and Rodman, 2006). This research focuses on how to satisfy interpersonal needs, and is related to Maslow's human needs of "love and belonging", which is after satisfying safety and physiological needs essential for our well being (1943, as cited in Marmasse, 2004). Aristotle described the importance of satisfying interpersonal needs, by suggesting that humans can not live without each other.

Most interpersonal communication theories state that people engage in communication just to satisfy interpersonal needs (Washington, 2001). Interpersonal communication consists of communication between interpersonal relationships (friends, loved ones or family) and three basic motives for interpersonal communication are generally mentioned: *inclusion*, *control* and *affection* (Schutz, 1958). The interpersonal need for *inclusion* refers to maintaining a satisfactory relationship with others. You need to have the interest of others to feel significant or worthwhile. *Control* is our desire to have control or power over other people around us. People want to feel respected, important and capable. And finally *affection*, which is especially salient in developing interpersonal relationships between two persons, in which love and liking are shared. People want to feel comfortable with the relationships with others. In summary, interpersonal relationships have a need to establish and maintain a positive relationship. Social psychology refers to this fundamental need as maintaining a feeling of connectedness, which is a positive emotional appraisal of the feeling of being in touch within interpersonal relationships (van Lanen, 2003 and van Baren, IJsselsteijn, Markopoulos, Romero and de Ruyter, 2004). The goal of this research is to investigate how people can maintain and enhance a feeling of connectedness with communication media between intimate interpersonal relationships (e.g., close friends), because they have a fundamental need to maintain a feeling of connectedness. To satisfy the feeling of connectedness, interpersonal relationships use various communication media.

1.2 Satisfying a feeling of connectedness

People generally maintained their interpersonal relationships with face-to-face communication, which is perceived by most social communication theories as the Holy Grail compared to other means of communication. However, due to busy lives and segregation of interpersonal relationships, because of expanding means of travel, it gets harder to maintain relationships with face-to-face communication and people are looking for alternatives. Besides the traditional means (e.g., letters) of communication, new means of communication are introduced in our lives, which provided people with a wide communication repertoire. Computer-mediated communication (CMC), which exchanges information via a computer network (e.g., e-mail or Instant Messenger (IM)), the mobile phone and Short Message Services (SMS) are a few examples of the growing communication repertoire. The growing use of the mobile phone and its characteristic of communication anywhere and anytime, suggest that maintaining relationships should not be confounded to one location. This research focuses on how people maintain a feeling of connectedness anywhere and anytime. However, new communication media were not developed specifically to maintain a feeling of connectedness, which seems to attract a growing interest. Several examples of this phenomenon are the development of social networking websites (e.g., Hyves) and online diaries (e.g., a blog). Because connectedness is a relatively new concept in the Human-Computer Interaction research (HCI), this research investigates how people maintain a feeling of connectedness with current communication media. Although, the expanding communication repertoire suggest that people have "plenty" of tools for maintaining a feeling of connectedness, although "*all that glitters is not gold*" (Shakespeare, 1596). Two concerns about the growing communication repertoire emerged, which seem to influence the feeling of connectedness: the perceived inappropriateness of lean communication media and the affective costs of communication. These concepts are clarified in the following paragraphs.

With the proliferation of communication media, communication scholars are investigating how to successfully maintain relationships. Do current communication media fully satisfy people's social needs (Washington, 2001) and how do people perceive the quality of current communication media (Adler and Rodman, 2006)? For example, people are increasingly using CMC for maintaining relationships. CMC is usually accused of filtering emotional or personal cues and referred to as lean means of communication compared to face-to-face communication (O'Sullivan, 2000). Lean means of communication convey minimal verbal and non-verbal information compared to rich means of communication. This filtering in CMC could lead to misinterpretation and depersonalization of communication and interpersonal relationships (Meissner, 2005). CMC seems in this context inappropriate for supporting interpersonal communication needs, because of its complex and emotional nature. In our research it is investigated if lean, compared to rich means of communication, is suitable for satisfying the feeling of connectedness.

With the growing communication repertoire, people are provided with various communication possibilities for maintaining a feeling of connectedness. However, this expansion also results in a communication overflow (Ohguro et al., 2001), which could result in a deteriorate appreciation of maintaining a feeling of connectedness. Communication overflow theory states that most existing means of communication is too heavily equipped for just saying "good morning" (Ohguro et al., 2001). Some even suggest that current information technology is often the enemy of serenity (Weiser and Brown, 1995). In line with these researches, our study focuses on the affective costs people experience with communication media for maintaining a feeling of connectedness. The following affective costs are of interest for this research: social obligation, obtrusiveness, process effort, expectation, expressiveness and privacy, which are defined in the following chapter (van Baren, IJsselsteijn, Markopoulos, Romero and de Ruyter, 2004). In our research it is expected that rich means of communication, bears more affective costs in comparison with lean means of communication, because rich communication media needs direct and full attention of the receiver and sender. This could be a reason why people use lean means of communication, for maintaining a feeling of connectedness.

The problems of existing communication media could lie in their roots i.e., they are originally designed for a work environment. In the work environment it is important to effectively convey written or spoken messages for discussion or notification purposes (content-oriented communication). Although, interpersonal relationships convey more than content-oriented information, they also have a connectedness-oriented aspect (the aspect involved with maintaining a relationship) (Kuwabara, Watanabe, Ohguro, Itoh and Maeda, 2002). The latter aspect is neglected with current technology and to accommodate this, researchers are investigating three interpersonal communication concepts: social presence, social awareness and connectedness (van Lanen, 2003). With these three concepts, researchers try to understand how to enhance interpersonal communication. In our research possible enhancements for maintaining a feeling of connectedness with communication media are investigated, by exploring suggestions made in connectedness-oriented communication systems and related technology literature.

1.3 Research objective

The main research objective is to investigate how people can *maintain* and *enhance* a feeling of connectedness with communication media. The focus of this objective is on providing a feeling of connectedness anywhere and anytime for intimate interpersonal relationships. To investigate this objective, explorative qualitative research is conducted (focus groups and open-ended interviews), because connectedness is a relatively new concept for the HCI research and not all the factors involved are identified. To accomplish the main research objective, two research questions (R.Q.) are investigated, which focuses on *maintaining* (R.Q. 1) and *enhancing* (R.Q. 2) the feeling of connectedness with communication media.

R.Q. 1: Which factors are crucial in order to maintain a feeling of connectedness with communication media?

R.Q. 2: How can we enhance communication media for maintaining a feeling of connectedness?

To answer the first main research question, this research focuses on how people maintain a feeling of connectedness with current communication media (R.Q. 1.1) and two related concerns: the perceived

inappropriateness of lean communication media (R.Q. 1.2) and the affective costs of communication (R.Q. 1.3). These subjects are answered by investigating the following sub-questions.

R.Q. 1.1: How do people maintain a feeling of connectedness with current communication media?

R.Q. 1.2: Are lean means of communication suitable for maintaining a feeling of connectedness?

R.Q. 1.3: Which affective costs do people experience with maintaining a feeling of connectedness?

To answer these sub-questions, general use and media choice of communication media for maintaining a feeling of connectedness is investigated. To answer the second main question (R.Q. 2), solutions as suggested by connectedness-oriented communication systems and related literature, are investigated.

1.4 Structure of report

This report starts by providing a theoretical framework necessary for investigating the research questions, which are described in the second chapter. The second chapter begins with clarifying the concept connectedness (paragraph 2.1), and outlining the users of interest for this research (paragraph 2.2). With the users in mind this chapter investigates media usage (paragraph 2.3), which should provide a theoretical framework of how people maintaining a feeling of connectedness (R.Q. 1.1). This chapter also describes media choice theory (paragraph 2.4) for investigating the factors involved with maintaining a feeling of connectedness. Media richness theory, social presence theory (paragraph 2.4.1) and the impression management model (paragraph 2.4.2) are also used for analyzing if lean means of communication can satisfy a feeling of connectedness (R.Q. 1.2). The Affective Benefits and Costs Questionnaire (ABC-Q) (paragraph 2.4.3) is used for investigating the affective benefit and costs people experience with communication media for maintaining a feeling of connectedness (R.Q. 1.3). Finally, this chapter focuses on how to enhance communication media for maintaining a feeling of connectedness (R.Q. 2), by investigating connectedness-oriented communication and related systems (paragraph 2.5).

Chapter four summarizes the theory, objectives, hypotheses and methodology used in this report. The fifth and sixth chapter outline the results obtained with the focus group and interviews. The focus group is a preliminary research, used for obtaining general information about how people maintain a feeling of connectedness, which are used for further research in the interviews. The information obtained with the focus groups and interviews, which are relevant for the research questions are discussed at the end of this report in chapter six. Chapter eight provide the general conclusions obtained in this report and a reflection of this research.

2 Theory and related work

This chapter starts with defining connectedness and describes the users of interest for this research. With the users in mind this chapter focuses on how and which factors involved with maintain a feeling of connectedness, by investigating media usage and choice literature. At the end of this chapter, several suggestions for enhancing communication media are outlined, which emerged from the connectedness-oriented communication systems literature.

2.1 Defining connectedness

The topic of satisfying social communication needs has been neglected in social communication research, although its importance for people is known for a while, social science researchers seem to have a growing interest in satisfying this need (van Lanen, 2003). To satisfy social communication needs social science researchers investigate three related concepts: social presence, social awareness and connectedness, which are related to the need of interpersonal relationships to be physically together, be informed and to feel in touch (van Lanen, 2003). These concepts provide an additional means for enhancing interpersonal communication and provide new suggestions to accomplish this feeling.

2.1.1 Social presence

Enhancing communication media with social presence emerged with the need to provide a feeling of being physically together between separated people (van Lanen, 2003). Short, Williams and Christie (1976) provided the first definition of social presence: *“the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships”* (Short et al., 1976). Social presence is a broad concept with multiple dimensions, and seems to be based on confusion between different definitions and measurements of social presence. Most current communication media focussed on providing a person with a means to be with another person, for example hearing a voice over the telephone. This kind of research tries to “simulate” virtual presence in a place and create the sense of being with another (Biocca, Harms and Burgoon, 2003). However, what about going beyond the spatial characteristics of communication media and focus on how people sense being together, which is the most essential part for people (Biocca, Harms and Burgoon, 2003). In this research, *the experience of being together with another person* is defined as, in line with most HCI literature, social presence.

Social presence is closely related to the concept of copresence. Copresence refers to the mutual awareness (always two-way communication) of each other; however social presence is possible with one-way communication. For example an one-sided use of a webcam with instant messenger would increase social presence but not copresence (Rettie, 2005A). Social presence is influenced by the differences in richness between media in communicating interpersonal cues (verbal and nonverbal). The richest means of communication is in this theory face-to-face communication, and the “poorest” is asynchronous text-based communication. Though social presence is not only influenced by the capacity of conveying interpersonal cues, however, intimacy (being emotional close to one another) and immediacy behaviour are also relevant for experiencing social presence (van Lanen, 2003). Immediacy describes the degree people feel attracted (or repelled) to others or the amount of interest people have and communicate this to others. Thus social presence is influenced, among other things, by words, appearance of the person, eye-contact or choice of medium. The richer the medium the more immediacy and intimacy a person will experience, because the additional information a person has for expressing him or herself.

2.1.2 Social awareness

Traditionally communication research focused on maximizing social presence with media rich means of communication, though researchers recognized its limitations (do you always want to hear or see your friend?) and social awareness is a complementary way of looking at interpersonal communication (van Lanen, 2003). When trying to define awareness, different and even contradictory definitions and implementations are encountered; this is illustrated by the research article of Schmidt (2002): *“The problem with awareness”*. Christiansen and Maglaughlin (2003) illustrate the versatility of the concept by identifying 41 different awareness phrases and sorting them into four groups (called the WAGC

framework). Confronted with these different concepts this research investigates a definition, which is more in line with our field of interest: social awareness.

Social awareness concerns information about the situation of an individual's physical and social environment (van Lanen, 2003). People just want to know more about their friends or family when they are separated. Social awareness tries to provide answers about their whereabouts (where is he or she?), activities (what is he or she doing?) and wellbeing (how is he or she doing?). Social awareness does not try to substitute face-to-face communication with its information richness of conveying verbal and nonverbal information; however its goal is to provide effortless information (minimizing communication costs) about friends or family.

2.1.3 Connectedness

With the growing interest in maintaining interpersonal communication, researchers investigated further how to maintain, form and enhance interpersonal relationships. Current HCI research seems to have a growing interest in a potential key concept in elaborating how people perceive interpersonal relationships, namely: connectedness. The concept connectedness emerged in the field of HCI-research in the beginning of this century, and it is relatively little explored yet. HCI research generally refers to connectedness as an affective state, which creates a feeling of being in touch (Marmasse, 2004) or as an emotional appraisal of feeling included in some ones live (Corral, 2004). In line with these definitions, this research defines connectedness as a positive emotional appraisal of the feeling of being in touch within interpersonal relationships (van Lanen, 2003 and van Baren et al., 2004). People just want to feel good about their relationship with their friends, loved ones or family and to accomplish this they keep in contact with each other (e.g., by doing things together or calling). However, this feeling can deteriorate when there are too many costs involved with keeping in touch, which influence communication opportunities and appreciation (e.g., always calling at an unsuitable moment).

Connectedness is related to how positive people perceive the quality of intimacy (being emotional close) in their interpersonal relationships. This quality seems to be influenced by being informed (awareness), experience of being together with another person (social presence), interactivity (two way (near) synchronous communication), duration (longer is better), information processing mode (kind of communication means used to keep contact), media richness (the amount of cues conveyed), and communication (Corral, 2004). When people communicate, they feel included in each others lives and experience a feeling of connectedness. The mere fact of communication is sometimes enough for experiencing a feeling of connectedness. To clarify the concepts connectedness, social awareness and social presence, the differences and similarities are discussed next.

2.1.4 Connectedness, awareness and social presence

Social awareness and social presence were the first two concepts recognized for facilitating interpersonal communication. Nevertheless, social presence is not possible without social awareness, because you first need to be aware of another person to generate a feeling of being together with another person. However, social awareness is possible without social presence; this is illustrated by the fact that social awareness is possible with low media richness and asynchronous communication, which evoke minimal social presence. An example is monitoring the availability of IM buddies, which facilitates social awareness with minimal social presence (Nardi, Whittaker and Brander, 2000).

Connectedness is a concept, which just emerged in this century in the HCI research; its relation with social awareness and social presence is still under investigation. Few articles compare connectedness, social awareness and social presence, and they generally agree on that it is possible to create a feeling of connectedness with and without social presence (IJsselsteijn et al., 2003, Rettie, 2003A and van Lanen, 2003). Social presence theory emphasizes the importance of rich media, while connectedness is possible with the simplest means of communication: the mere fact of communication is sometimes enough to facilitate connectedness. For example a short text message with numerous abbreviations or just a friendly greeting will generate a feeling of connectedness, however minimum social presence. Additionally, this research recognizes that only interpersonal relationships try to maintain a feeling of connectedness (the intimate the relationship, the higher the need) and this feeling can remain aware for a while without sharing information. For example, reading a nice note of a girlfriend could result in thinking about her through out the day. However, social presence is possible between different relationships and is instantly salient when aware of the persons' presence. For example, when a sales

person calls, you are aware of his presence, however this immediately stops when the conversations is ended.

Being aware of an interpersonal relationship is usually enough to create a feeling of connectedness, although discrepancies consist between the possibilities of perceiving connectedness without social awareness or that connectedness implies awareness. Rettie (2003) recognizes this distinction by introducing awareness of an object; this is illustrated with the example that a letter creates a feeling of connectedness, while there is little direct awareness of the other present. This is in Rettie's (2003) opinion an experience of awareness to an object instead to a person. This research assumes that connectedness is possible without or with minimal social awareness, because to achieve social awareness, information must be exchanged about people's whereabouts, activities and wellbeing (e.g., a letter with information about the person wellbeing) and connectedness can be accomplished with minimal information exchanged (e.g., a missed call is enough to appreciate that the other is trying to keep in touch). Connectedness is in this research facilitated by both social presence and social awareness, though it is possible without or with minimal social awareness or presence. Before describing how people maintain a feeling of connectedness, this report describes the users which are of interest for this research.

2.2 Users

The main focus of this research is on intimate interpersonal relationships, because they have a fundamental need to maintain a feeling of connectedness. Intimate interpersonal relationships consist of close friends, loved ones or family. This research focuses on maintaining close friendships, because the term speaks for itself: when someone calls you a close friend it says a lot about the relationship. Where being a family member or just a friend says less: some people love and others hate their family. The latter group would not try to maintain a feeling of connectedness. Also, discrepancies in communication needs between different relationships could result in a deteriorate need for maintaining an interpersonal relationship. The term close friend encloses intimate interpersonal relations with whom you want keep in touch and could include loved ones or family members.

2.2.1 Close friendship

Maintaining, enhancing and forming friendships takes a lot of time and effort, still people find it worthwhile. Why all the fuss about something that seems so common to most people? Friendships are important for people, because friendships are good for our wellbeing, social life and a source of help in difficult times (Hartup and Stevens, 1999). Nobody starts as a best friend; it takes a long process to become close friends. Before you become someone's best friend you first have to be a friend, although almost everyone has a friend they vary in degree of interpersonal relationship (e.g., study or best friend) and are setting dependent (e.g., two friends are competitors between two rival teams).

Wise men tried to define the essence of friendship over the centuries; one classical view is provided by Aristotle (350 B.C.E., as cited in Doyle and Smith, 2002), who sees friendship as something everyone needs, even if a person has everything else which he or she desires. Aristotle proposes three kinds of friendships which are based on *utility*, *pleasure* or *goodness*. *Utility* is comparable with a common interest or goal two people have, when this common ground vanishes the friendship also deteriorates (e.g., working on a project together and after the project the friendship dissipates). Young people usually base their friendship on spending a lot of time together and *pleasure*, because their lives are in harmony with their feelings and on the opportunity of the moment (Doyle and Smith, 2002). The ultimate and enduring friendship is based on *goodness* and is very rare; this friendship is related to who people are and on their similarity. In our research close friendships are related with the latter two highest forms of friendships, because they enclose intimate interpersonal relationships. However, investigating into intimate interpersonal relationships is too broad for our research, and a decision has to be made on which users are of specific interest for this research, which is outlined in the following paragraph.

2.2.2 Focusing on teenagers and workers

To focus on people who are of interest for our research objective, this research takes two factors which influence how people maintain close friendships into account: life events and age. When taking age into account, toddlers and kindergartners perceive friends in the amount of time they spend (want to play?) and friends change frequently. Friendship is not recognized as an individual relationship within

a larger network until the age of twelve (Doyle and Smith, 2002). In our study are children excluded below the age of twelve, because they have minimal awareness of friendship and thus have a minimal need for maintaining a feeling of connectedness with communication media, which is incompatible with our research goal. When people get older, the amount of communicative contact moments are less of importance and they feel emotionally close to their friends even when they have not seen them for years (Nussbaum, Pecchioni, Robinson and Thompson, 2000). In our research people older than 70 years old are excluded, because their need for enhancing communication media for maintaining a feeling of connectedness (thus enhancing communication opportunities) seems less important.

Beside age, our research also excludes life changing events (e.g., moving to another city), which influence how people maintain friendships. An example is provided by Oswald and Clark (2003) who found a decrease in satisfaction, commitment, reward and investments within best friends among college students who moved from high school to college. This phenomenon is explained by a change or reduction in communication; an important factor for developing and maintaining friendships (Niffenegger and Willer, 1998). First, the basis of friendship could rely on daily common activities which do not happen anymore when friends get separated. They need to adjust to how they maintain their friendship in this "new" phase. This phase in friendship is "unstable", which could negatively influence the acquired research information about their communication needs for maintaining relationships.

Additionally, our research recognizes the importance of users' adaptation of a wide variety of communication media, which is essential for investigating the differences between the diverse communication media. Especially teenagers and people around thirty years old use a wide variety of communication technology (Smith, Rogers and Brady, 2003), and this adaptation of new technology seems to decline with age (Ling, Yttri, Anderson and Diduca, 2002). These findings are consistent with the findings of the e-Living project (Ling et al., 2001), with more than 1500 participants from the UK, that shows a deterioration of ownership with growing age (especially around 50 years old) of mobile phones and internet use. Thus people over the age of thirty years old seem to use less diverse means of communication and correspondingly, provide less information about the factors involved with media choice for our study. However, this could change in the future, because older people get more acquainted with new communication media.

With these factors in mind, our study focuses on people with a fundamental need to maintain friendship when separated, are in a "stable" life phase and have experience with a wide variety of communication media, which suggests the following age group: people from 14 to 35 years old. Additionally, this research recognizes the importance of the social setting in which people manage their communication, because this restricts how people manage their relationships. For example it is more difficult to maintain a relationship when you are at work compared to being at home. To recapitulate, this research takes into account: age (14 to 35 years old), adaptation of technology (young people) and life events (e.g., excludes people who just moved). These user characteristics are applicable to two groups, which manage their relationships in different settings: college teenagers (14 to 19 years old) and workers (25 to 35 years old). Teenagers maintain their friendship with common social activities at and after school (Hartup and Stevens, 1999), however workers have to rely on alternatives for face-to-face communication (Smith, Rogers and Brady, 2003). Teenagers are in this research defined as teenagers between the age of fourteen and nineteen years old, and still going to high school. Workers are defined in this research as working people between the age of 25 and 35 years old. In the next paragraph, this research focuses on how people maintain a feeling of connectedness, and in specific workers and teenagers.

2.3 Maintaining a feeling of connectedness

Though HCI researchers knew of the existence that people communicate more than only information, they never explicitly focused their research on a second communication goal: maintaining a relationship. Communication can be distinguished into two communication goals: content-oriented communication and connectedness-oriented communication (Kuwabara et al., 2002). Content-oriented communication is defined as communication with the goal of conveying information (formal and practical) for coordinating or sharing information purposes. This kind of communication seems to be sufficiently accomplished with current communication media, because of similar design goals. The characteristics of content-oriented communication are described below.

Characteristics of content-oriented communication

- Conveying information (e.g., making an appointment)
- Content is of “importance” (e.g., conveying time and date for appointment)
- Formal and practical communication (e.g., dear sir)

Connectedness-oriented communication is defined as communication, which has the goal of maintaining a feeling of connectedness. This mode is seen as an opposite mode of content-oriented communication, because the content can be of secondary or trivial importance and the information does not have to be media rich (Kuwabara et al., 2002). The mere fact that a friend tries to contact you is sometimes enough for maintaining a feeling of connectedness. For example a missed-phone call of a friend could result in a positive appraisal, because you know he or she tries to contact you. Connectedness-oriented communication seems to be neglected in most current communication media, because they focus too much on effectively on conveying information effectively (Romero and van Baren, 2003 and Kuwabara et al., 2002). The characteristics of connectedness-oriented communication are described below

Characteristics connectedness-oriented communication

- Informal communication (e.g., sharing a joke)
- Content of message is of “secondary” or trivial importance (e.g., just saying hi)
- Mere fact of communication is enough for relationship (e.g., a missed-call)
- Anywhere and anytime (e.g., sent a message when you think of the other)
- Does not have to be media rich (e.g., an SMS message with greetings)

The latter characteristic is especially important for this research, because it facilitates connectedness with minimal affective costs of communication. To investigate how people maintain connectedness-oriented communication, this research distinguishes between two connectedness-oriented communication behaviours: relational-oriented (ROC) and conversational-oriented communication (COC). In our research it is hypothesized that, in line with Licoppe (2004), both modes maintain a feeling of connectedness, though the way they accomplish this is different, which will be clarified in the next paragraph.

2.3.1 Relational-oriented and conversational-oriented communication

To get a more precise picture of how people maintain a feeling of connectedness, this research investigates relational-oriented and conversational-oriented communication behaviour. These two communication behaviours are linked to Licoppe's (2004) connected and conversational mode, which were found by investigating several studies in fixed line and mobile phones. Although the two modes are subjective and sometimes overlapping, people are able to distinguish between them.

Conversational-oriented communication is defined as connectedness-oriented communication which consists of long and timed messages of which the content is of “importance”. This communication behaviour is sometimes ritualized over the years. The time taken for conveying the message (e.g., an open conversation) is seen as the strength of the relationship and there does not have to be a reason for exchanging the message. Usually these kind of messages are conveyed through fixed phone lines between seven and ten o'clock pm (Licoppe, 2004), an example is calling once a week to update each other or just to talk about various topics. The characteristics of conversational-oriented communication are outlined below.

Characteristics of conversational-oriented communication

- Long messages (e.g., chit chatting)
- Non-frequent communication but recurrent (e.g., once a week or month)
- Content is of “importance” (e.g., conveying news or related events)
- Time taken is sign of strength of the relationship (e.g., talking on the phone for one hour).
- Related to fixed phone line conversations

Relational-oriented communication is defined as connectedness-oriented communication which consists of short and frequent messages of which the content is of “secondary” importance. This communication behaviour is usually spontaneously conveyed through SMS; because of its short content which consist of sharing mood, feelings or state and its characteristic of communication

anywhere and anytime. However, conversational-oriented communication conveys long messages about related events or news (Licoppe, 2004). Other related relational-oriented communication behaviours are “hyperconnectivity” (Ling, 2004) and “ICT-mediated proximity” (Christensen, 2004), which relate to maintaining a sense of connection through frequently conveying messages. Relational-oriented communication helps keeping companionship, full time intimacy and a bond between close relationships with investing in social capital by “staying on top of thing” or “keeps things together” (Christensen, 2004). The characteristics of relational-oriented communication are outlined below.

Characteristics of relational-oriented communication

- Short messages (e.g., good morning)
- Mere fact of communication is enough for relationship (e.g., an SMS message with kisses)
- Frequent communication (e.g., daily or less)
- Content of message is of secondary importance (e.g., just saying hi)
- Anywhere and anytime (e.g., send a message when you think of the other)
- Spontaneous (e.g., share a message when something funny happens)
- Related with SMS messages

Relational-oriented and conversational-oriented communication behaviours were also found by Bankers (2004), who divided different types of telephone call in several categories: social, last minute, call back, appointment, practical and remaining contact. Thirty percent of the reasons indicated by the participants were social interactions, which consist of intimate contacts (4%), special occasions (2%), chit-chat (21%) and share emotions (3%) (Bankers, 2004). The former two reasons are related to relational-oriented communication and consist of short and frequent calls for congratulating someone or letting them know that you think about them. The latter two reasons are related to conversational-oriented communication and consist of long phone conversations for just chit-chatting or sharing emotional problems. In our research it is hypothesized that relational-oriented communication is similar to the characteristics of connectedness-oriented communication and could provide detailed information for enhancing and maintaining these two communication modes. Relational-oriented and conversational-oriented communication behaviour is a relatively new research method, the differences of maintaining a feeling of connectedness with these two behaviours between workers and teenagers are unknown. The next paragraph provides general characteristics of how workers and teenagers maintain a feeling of connectedness.

2.3.2 Characteristics teenagers and workers

Teenagers and workers widely adapt new technologies for their own purposes and these seem to satisfy most of their needs (Ling et al., 2001 and Smith et al., 2003). This fact is indicated by their opinion that the mobile phone improved their social lives; older people are divided in this statement (Mobile life survey, 2006). However, teenagers and workers manage their relationships differently. Teens seem to fully embrace SMS and IM (Ling et al., 2001 and Spot.nl.nl, 2006). Dutch teens share at least 1.5 SMS messages a day, which declines rapidly with growing age (Niekerk, 2007). Teenagers prefer to send 1.5 SMS messages a day, because it is relatively cheap, easy and usually appropriate to use (Boneva, Quinn, Kraut, Kiesler and Shklovski, 2006). Twenty-five percent of the Dutch teenagers use IM for socializing instead of the telephone (Amin, Kersten, Kulyk, Pelgrim, Wang and Markopolous, 2005) which is in contrast with the four percent of workers who use IM (Spot.nl, 2006). Workers seem to have a small preference for e-mail (18%) and the fixed line telephone (13%) in comparison with the teenagers (irrespectively 10.7% and 6.6%) (Spot.nl, 2006). These preferences for communication media and the general characteristics of maintaining friendships, obtained earlier in this chapter, are summarized below.

Characteristics teenagers (14 to 19 years old)

- Friendship based on social activities
- Frequent face-to-face contact
- Manage friendship most of the time at and after school
- Preference for SMS and IM

Characteristics of workers (25 to 35 years old)

- Use a diverse communication repertoire
- Manage friendship at and after work
- Friendship more based on emotion
- Small preference for e-mail and the telephone

With these characteristics of how workers and teenagers maintain a feeling of connectedness, this research outlines in the next paragraphs, which factors influence media choice.

2.4 Media choice theory

This part describes four media choice theories: media richness theory, social presence theory, impression management model and the ABC-Q theory. Media richness and social presence theory are two traditional theories, which are commonly used for explaining media choice. However, in our opinion these two theories do not provide a full picture of the factors involved with maintaining a feeling of connectedness. To fully understand all the factors involved, this research also uses two complementary media choice studies for investigation the different factors involved: impression management model and the affective costs and benefit analysis. Additionally, they provide a means for analyzing if lean means of communication can satisfy a feeling of connectedness (R.Q. 1.2) and which affective costs people experience with communication (R.Q. 1.3).

2.4.1 Media richness and social presence theory

Media richness (Daft and Lengel, 1984) and social presence theory (Short et al., 1976) are two common and related theories, which are fundamental theories for explaining media choice and are sometimes categorized under the media capacity theories (IJsselsteijn, van Baren and van Lanen, 2003).

Social presence theory

Social presence theory focuses on the amount of social presence conveyed through a medium. Verbal and nonverbal means of communication are very important for conveying someone's presence and communication media with high social presence are characterized as social, warm, sensitive and more personal (Short et al., 1976). These characteristics are vague and depend on the interpretation of the user; however there is still no other generally accepted means of measuring social presence (Rettie, 2005). In our research are the following subjective characteristics used: impersonal/personal, cold/warm, insensitive/sensitive and unsociable/sociable, as suggested by Short and colleagues (1976), to analyze media choice for maintaining a feeling of connectedness, because most media choice theories are based on these factors.

Media richness theory

Media richness theory is proposed by Daft and Lengel (1984), and stresses the importance of media richness for solving uncertain or ambiguous tasks. Media richness theory states that lean media are useful for basic tasks (unambiguous tasks) and rich means of communication for complex tasks (uncertain tasks). Factors influencing media choice is determined in our research with four criteria, which are provided by media richness theory: *feedback*, *channel*, *source* and *language*. *Feedback* is the time offered by a media for providing feedback (immediate to very slow). *Channel* refers to the amount of sensory information provided to the communicator (visual, audio and limited visual (e.g., text)). The *source* relates to the sender of the message (personal and impersonal). *Language* is how the message is shared (body, natural and numeric). For example a personal written letter is perceived as moderate in richness, because it is slow in feedback (e.g., it costs time to write an answer), has limited visuals (e.g., written text), though its source is personal (e.g., because it is personally addressed to you) and the language is in words (thus natural and not numbers). Table 1 provides a summary of the different media and characteristics provided by Daft and Lengel (1984).

Table 1 Characteristics of media richness (Daft and Lengel, 1984)

Richness	Media	Feedback	Channel	Source	Language
High	Face-to-face	Immediate	Visual, Audio	Personal	Body, natural
	Telephone	Fast	Audio	Personal	Natural
Moderate	Written, personal	Slow	Limited visual	Personal	Natural
	Written, Formal	Very slow	Limited visual	Impersonal	Natural
Low	Numeric, Formal	Very slow	Limited visual	Impersonal	Numeric

Media richness and social presence theory

Media richness and social presence theory focus on the amount of information conveyed through a medium and suggest that face-to-face communication is the richest means of communication and text-based media such as e-mail, SMS and a letter are lean means of communication. The difference between these two theories is that media richness theory looks at the perceptive properties for the user

(e.g., immediate feedback or visual) and social presence at the result (being with someone) of using a channel. Both theories stress the importance for choosing an appropriate medium for attaining effectively a certain goal which helps determine which means of communication will be used in a given situation (Westmyer, DiCioccio and Rubin, 1998). Choosing mediated means of communication for maintaining interpersonal relationships is less fitting for these theories, because mediated communication contain little social presence or media richness (they convey little nonverbal information, or are asynchronous) which is important for complex, personal and emotional communication (O'Sullivan, 2000). Using e-mail or SMS, a medium which consists of limited social presence and media richness, is in line with these theories, ineffective for maintaining interpersonal relationships.

Workers and teenagers

The communication characteristics of workers and teenagers described previously indicate that especially teens seem to use lean means of communication (SMS and IM) a lot, next to face-to-face communication, to maintain a feeling of connectedness. Adults seem to use a lean and rich communication media (telephone and e-mail) for maintaining a feeling of connectedness. In our research it is investigated if lean means of communication are suitable for maintaining a feeling of connectedness, and hypothesizes that this depends on the communication behaviour: relational-oriented or conversational-oriented communication. Relational-oriented communication behaviour seems sufficiently conveyed with lean means of communication, because the content is of less importance and the act of communicating is enough. However, conversational-oriented communication seems to need rich means of communication, because the content is of "importance" and seems generally conveyed with telephone conversations. Several researchers agree with this hypothesis and do not agree on that media richness and social presence theory can account for all the factors involved with media choice (van Baren et al., 2004, O'Sullivan, 2000 and Dennis and Kinney, 1998), which will be clarified next.

Complementing media choice theory

Social presence and media richness theory focused on the sensory channels of the user, and do not address all the characteristics of different communication media (Heeter, 1999). For example IM provides people with the availability of the receiver. Especially new communication media provide new opportunities, which are not available with the Holy Grail for interpersonal communication: face-to-face communication. In fact, some even suggest that face-to-face communication places several constraints on people for sharing information (Clark and Brennan, 1993), which are outlined next.

- Copresence (people experience being at the same location),
- Visibility (people see each other in a conversation),
- Audibility (people need to speak to each other),
- Cotemporality (people communicate directly with no delay),
- simultaneity (people can send and receive at the same time)
- Sequentiality (people speak usually on turns).

Additionally, current communication media introduces other constraints to people for conveying information: reviewability (an e-mail or letter provides the possibility to review a message whereas speech fades quickly) or revisability (an e-mail or letter can be revised before sending). These constraints force people to use alternative ways for conveying information. Corresponding with this view is the research of Heeter (1999), which outlines several characteristics of communication media which are not conveyed by face-to-face communication. These characteristics are outlined next.

- Temporal ubiquity (e.g., it is usually not inappropriate to send an asynchronous message),
- Choice of channels (e.g., choosing not to use video with a videophone),
- Anonymous (e.g., people can convey a message anonymously),
- Control representation (e.g., using a specific photograph to present yourself on a website)
- Self-monitoring (e.g., video-phones facilitate monitoring of own behaviour by providing a window with their own picture).

Additionally, she recognizes that most current technology fails to convey immediacy and facial expressions, which are essential for providing feedback. Current technology also fails to convey the embodiment of persons, which refers to how you perceive a person (e.g., choosing a specific nickname influences how others think of you) (Heeter, 1999). These new characteristics provide people with new costs and benefits, which need new ways for evaluating how people choose between different communication media. Two new theories for evaluating media choice are described next.

2.4.2 Impression management model

The impression management model provides a new way for analyzing the factors involved with media choice, which seems neglected in media richness and social presence theory. Key concepts of the impression management model are image management and self-presentation. Image management is a person's goal or action to influence somebody's opinion of an object, company or ourselves. The latter example is related to self-presentation, which focuses on influencing consciously or unconsciously the impression of how people appear to perceive them (O'Sullivan, 2000). It is best compared with a play, with people being actors that are constantly trying to control the impression of their own on their audiences. For example, why do you wear your clothes or hair the way you do? Self-presentation helps us to obtain goals, maintain our self-concept and helps us in our social live (Kenrick, Neuberg and Cialdini, 2005). In the context of image management people use mediated communication to present their self-concept accurately (O'Sullivan, 2000). Mediated communication is in this view not imperfect; it is just one of the means of communication with specific costs and benefits, which could regulate information of our self-concept. The impression management model tries to unravel the factors involved with choosing between different means of communication and their specific costs and benefits. To answer this question, image management uses the "ambiguity-clarity" concept.

The "ambiguity-clarity" concept relates to the conflicting needs in interpersonal relations of conveying or concealing certain information. When a relation evolves people want to know more of each other (e.g., each others hobbies), though we do not want to let the other know everything (e.g., bad habits). People thus manage certain information to facilitate their relationship and conceal other information to protect their self-concept. Media choice could facilitate self-presentation by using the different costs and benefits of specific communication media which provide possibilities for conveying or concealing information (O'Sullivan, 2000). An example is the use of asynchronous ("lean") means of communication for conveying embarrassment information to avoid negative reactions or provide control to the receiver. Irrespectively, the choice of synchronous ("rich") means of communication could facilitate positive messages when the sender feels a need to perceive the reaction in full richness (e.g., hear the reaction of the receiver). Thus in the view of impression management model, channel selection offers people a means for conveying or concealing information in relation with the kind of self-presentation they seek.

People are presumed to maximize the benefits and minimize the negative effects on their own or partners self-concept, by choosing an appropriate channel. The impression management model suggests three important factors for choosing a specific channel: *interactional control*, *symbolism and social skill* (O'Sullivan, 2000). *Interactional control* suggest that people sometimes prefer mediated communication, because it provides control of timing, duration and kind of information exchanged for controlling their self-concept (O'Sullivan, 2000). *Symbolic meaning* refers to the appropriateness of a channel for a specific goal, for example it is usually rude to end a relationship with just a small SMS message. *Social skills* relates to personal preference of the individual which is influenced by their skills to use different means for managing their self-concept (e.g., someone shy would not use the telephone) and their technical ability in using the channel (e.g., someone who types slow, would not use e-mail for a long message). These factors lead to a selection of a specific channel, an evaluation of the interaction which leads to a satisfactory protection of their own or other's self-concept and ultimately their relationship (O'Sullivan, 2000).

Research with this model suggests that people sometimes prefer lean means of communication to protect their own or partners self-concept (e.g., with privacy concerns or embarrassing information) and rich means of communication when supporting (e.g., sharing good news) their own or their partner's self-concept (O'Sullivan, 2000). Thus people sometimes seek uncertainty in certain situations, by choosing lean means of communication when they want to protect their or the other's self-concept, which is in contrast with social presence and media richness theory. In our research, the factors involved with a preference for a specific means of communication when the self-concept is negative or positive affected of either the sender or receiver, are investigated.

2.4.3 Affective benefit and costs of communication

In line with the growing research for complementing social presence and media richness theory, a new evaluation method emerged: the ABC-Q (van Baren et al., 2004). The ABC-Q is developed for evaluating the affective benefits and costs, which emerged with communication and appeared to be overlooked in social presence and media richness theory. Social presence and media richness theory are

developed with the notion of conveying information effectively. This implies that conveying more information is usually better and ignores how people indirectly experience and feel after communication (van Baren et al., 2004). For example how do you experience receiving a SMS message with "I love you"? The ABC-Q investigates the following costs and benefits.

Costs

- Privacy
- Social obligation
- Social expectation
- Process effort

Benefits

- Thinking about each other
- Situational awareness
- Sharing experiences
- Recognition
- Group attraction
- Personal effort
- Connectedness

In our research the affective costs of communication media for maintaining a feeling of connectedness with conversational-oriented and relational-oriented communication are investigated. Additionally, this study hypothesizes that conversational-oriented communication bears more affective costs compared to relational-oriented communication, because the former communication behaviour is usually conveyed with rich means of communication, it conveys more information and the content is of more importance. To test this hypothesis the concepts provided by the ABC-Q (van Baren et al., 2004), are used for analyzing media choice.

- **Obtrusiveness:** disturbing a person in ongoing work (Go et al., 2000).
- **Obligation:** Social obligations felt or created as a result of a message. (Markopolous, Romero, van Baren, IJsselsteijn, de Ruyter, Farshchian, 2004).
- **Process effort:** the time, energy or financial costs necessary (van Baren et al., 2004).
- **Privacy:** The extent to which the medium threatens privacy (Markopolous et al., 2004).
- **Expectations:** expectations for communication are raised or unmet as a result of using a medium (Markopolous et al., 2004).

In line with media richness theory, our study also investigates if messages are effectively conveyed with mediated means of communication. CMC is accused of filtering verbal and non-verbal information, which is important for interpreting information (O'Sullivan, 2000). To cope with this concern people use for example "emoticons" or "smiley faces" for conveying messages with sarcasm, happiness or sadness (Ohguro, 2001). The expanding use of SMS and IM seems to indicate that people can work with these restrictions in expressiveness, although how they perceive them, still remains a question. Walther and D'Addario (2001) found indications that emoticons, which are used for additional information for conveying thought and feeling, can not replace verbal content. Expressiveness is an affective cost of communication and is defined as: effectively conveying thought or feeling through a communication media. In our research it is hypothesized that expressiveness is more a concern with relational-oriented, compared to conversational-oriented communication because conveying less information could result in misinterpretation of feelings or thoughts. To facilitate the feeling of connectedness, HCI researchers are trying to accommodate the affective costs of communication with connectedness-oriented communication systems, which are described in the following paragraphs.

2.5 Enhancing a feeling of connectedness

With the emerging interest in facilitating interpersonal communication, research is beginning to focus more on facilitating the feeling of connectedness. Several related systems are described in the literature for facilitating this feeling: connectedness-oriented communication systems, awareness systems and Familyware. This report is specifically interested in the suggested functions, as suggested in the literature, for enhancing communication for maintaining a feeling of connectedness.

Connectedness-oriented communication systems

Kuwabara and colleagues (2002) recognized that current communication technology provide connectedness-oriented communication possibilities, however only as a secondary design purpose. They propose several design features for facilitating connectedness-oriented communication with the main purpose to maintain and foster interpersonal relationships as a result of communication activities facilitated with connectedness-oriented communication systems. Connectedness-oriented

communication systems should convey user's presence, availability or mood (feeling), which ought to be symbolically represented for facilitating 'lightweight' means of communication (providing information easy, informal and quick). Additionally, they recognize the importance of feedback to the user (e.g., knowing when the receiver reads a message) and minimal interruption (e.g., minimal disruption of attention). Preliminary experimental findings with connectedness-oriented communication systems suggest it is difficult to find the right degree of detail to present availability, mood and presence information for every kind of user. Conveying this information abstractly results in interpretation difficulties for the receiver. The amount of information conveyed is also important for protecting people's privacy, and depends on who receives the information (e.g., to your mother or your best friend). Another issue emerged from the experimental findings for enhancing communication opportunities; inter-operability, which is the possibility to select the appropriate means of communication to the user's situation (e.g., receiving an SMS message and calling back). Finally, the preliminary findings emphasize the possible importance of exchanging symbolic representations and providing people with 'lightweight' means of communication to improve the feeling of connectedness. Few attempts have been made to implement a connectedness-oriented communication system as suggested by Kuwabara and colleagues (2002), two attempts are: the WatchMe (Marmasse, 2004) and Clique Here (Corral, 2004) project.

The Clique Here project (Corral, 2004) is a design that tries to address the human social communication needs by enhancing a mobile phone with awareness and expressive communication without disruption and social obligation. The WatchMe project of Marmasse (2004) is an attempt to design a lightweight connectedness oriented device for insiders (e.g., close friends or family). The main difference with the Clique Here (Corral, 2004) project is the possibility of automatic awareness and presence. They implement this with the use of a Global Position System (to provide location information), audio analysis (presence of conversation) and wireless accelerometers in your clothes (providing cues for locomotion). Both the projects emphasize the importance of enhancing communication opportunities (though not create communication obligations) with communication anywhere and anytime, by enhancing mobile phones with connectedness-oriented communication functions suggested by Kuwabara and colleagues (2002). Additionally, both projects emphasize the importance of human-centric design and minimizing the costs (e.g., obtrusiveness, privacy or social obligation), which are related with enhancing communication opportunities by providing availability, whereabouts and wellbeing (social awareness). Though the question arose if social awareness should be conveyed automatically with a system or exclusively handled by the users. The Clique Here (Corral, 2004) provided users the possibility of automatic awareness and presence and most users indicated to have no problem with conveying automatically availability and presence information although they would not keep the functions always on. Complementary to the goal of connectedness-oriented communication systems are Familyware and awareness systems.

Familyware

Go, Carrol and Imamiya (2000) proposed the concept Familyware, which seeks to increase the feeling of connection between family members and close friends with unobtrusive simple messages. Familyware tries to design a system, which balances privacy (e.g., communication between sibling and divorced parents), unobtrusiveness (e.g., communication between work and home) and emotions (e.g., just sending a hug). Familyware is specifically designed for supporting small and intimate relationships by providing a feeling of connection by sharing objects with simple signals (Go et al., 2000). A key feature of Familyware is not to disturb the receiver by using asynchronous interactions and lean means of communication for conveying affective messages to express feelings. It focuses on sharing feelings by sharing interactive physical objects and not for example text messages. These interactive devices should be mobile and incorporated in personal or everyday things like a teddy bear.

Awareness systems

The goal of awareness systems is to provide people effortlessly with awareness of others activities and location by facilitating lightweight, emotional and informal means of communication (van Baren et al., 2004). People just want to be informed in someone's others physical and social environment. These systems try to let you know that you are not alone and make communication opportunities possible. Awareness systems are based on "Calm technology", which provides conscious and unconscious monitoring of information (Weiser and Brown, 1995). Calm technology uses people's skill of unconsciously detecting most differences in our surroundings, by shifting our attention from periphery to central, for monitoring information about our social and physical environment. An example with

current technology is how people monitor IM services for availability and presence of co-workers without even exchanging information (Nardi et al., 2000).

Connectedness-oriented communication system functions

This paragraph summarizes and reviews the functions indicated in the previous paragraphs, which will be investigated in this research. The use of social presence is not commonly mentioned in the literature, because social presence is depending on the amount of information conveyed (media richness) and a feeling of connectedness can be accomplished with “simple” messages. An example of social presence in connectedness-oriented communication systems is: the interactive teddy bear used in Familyware (Go et al., 2000). Connectedness-oriented communication technology preferably accomplishes social presence with lean means of communication for minimizing costs and facilitating lightweight communication (provide informal, easy and quick communication).

Providing inter-operability (e.g., receiving a short message service and calling back to the sender) is a function, which is often mentioned although this function is important, it could result in social obligation for the receiver (e.g., do I call back when I missed a telephone call). Connectedness-oriented systems have to be mobile (communication anywhere and anytime), because interpersonal relationships are not bound to one location and to facilitate communication opportunities, which could result in obtrusive communication (e.g., being busy at work and receiving a message); a possible solution could be to provide social awareness. Social awareness (availability, whereabouts and wellbeing) is a basic function, which is generally mentioned in the literature, because of its importance for providing communication opportunities and minimizing the related affective costs. Though, discrepancies consist if awareness information should be conveyed with rich or lean means of communication (e.g., seeing a person picture being sad), automatic or manual detection of information (e.g., detecting availability with a sense detector) and high or low amount of information (e.g., providing full details of wellbeing). Below the characteristics of connectedness-oriented communication technology are outlined.

Characteristics of connectedness-oriented communication technology provide

- Availability, whereabouts and wellbeing information (social awareness)
- Interactivity (social presence)
- Informal, easy and quick communication (lightweight communication)
- Multiple means of communication (inter-operability)
- Communication anywhere and everywhere (mobile)
- Minimal obtrusiveness, obligation, effort and privacy concerns (affective costs)

In our study the following enhancements of communication media for maintaining a feeling of connectedness are investigated: providing availability, whereabouts, wellbeing information and interactivity to the users. Additionally, different dimensions for providing these functions: synchronous or asynchronous, rich or lean means of communication, automatic or manual detection of information and low or high amount of information are investigated.

3 Research approach

People have a fundamental need to communicate and with a good reason, it satisfies physical, identity, practical and interpersonal needs (Adler and Rodman, 2006). In our research the focus lies on maintaining the interpersonal need connectedness between two intimate interpersonal relationships anywhere and anytime. Connectedness is defined as a positive emotional appraisal of the feeling of being in touch within interpersonal relationships. While communication opportunities grow, because of the expanding communication repertoire, so are the costs. Therefore, in this study we investigate how people maintain the feeling of connectedness and two related concerns; the affective costs of communication people experience with current communication media and the perceived inappropriateness of lean communication media. These concerns are related to the development of communication media, which are originally designed for the work environment and focuses on effectively conveying information. In this research the focuses lies on how to enhance the feeling of connectedness, by investigating suggestions made in connectedness-oriented communication technology and related system literature. Based on the discussed literature, the following research questions and hypotheses are investigated in this research.

Research questions and hypothesis

The main research objective is to investigate how people can *maintain* and *enhance* a feeling of connectedness with communication media. To accomplish this research objective, two main research questions are investigated, which are described next.

R.Q. 1: Which factors are crucial in order to maintain a feeling of connectedness with communication media?

R.Q. 2: How can we enhance communication media for maintaining a feeling of connectedness?

To answer the first main research question, media choice and usage for maintaining a feeling of connectedness are investigated with several sub-questions, which are described below. The second main research question is explored by investigating several solutions, which are suggested in connectedness-oriented communication systems and related literature.

R.Q. 1.1: How do people maintain a feeling of connectedness with current communication media?

To answer this question, media usage of connectedness-oriented communication is explored. Connectedness-oriented communication is defined as communication with the goal of maintaining a feeling of connectedness. This study distinguished between two connectedness-oriented communication behaviours: relational-oriented and conversational-oriented communication. Relational-oriented communication is defined as connectedness-oriented communication that conveys short and frequent messages, which the content is of “secondary” importance. Conversational-oriented communication is defined as connectedness-oriented communication that conveys long and timed messages, which the content is of “importance”. This research hypothesis that both maintain a feeling of connectedness, which leads to the following hypotheses.

Relational-oriented communications satisfies a feeling of connectedness.

Conversational-oriented communications satisfies a feeling of connectedness.

To test these hypotheses, this research investigates the affective benefit of maintaining a feeling of connectedness for relational-oriented and conversational-oriented communication.

R.Q. 1.2: Are lean means of communication suitable for maintaining a feeling of connectedness?

To answer the second sub-question, media choice for maintaining a feeling of connectedness with lean or rich means of communication is investigated. This research disputes the fact that lean means of communication are unsuitable for maintaining a feeling of connectedness, and hypothesizes that this depends on the communication goal: relational-oriented or conversational-oriented communication. Conversational-oriented communication needs rich means of communication, because it conveys long messages of which the content is of “importance”. Although, relational-oriented communication

behaviour is sufficiently conveyed with lean means of communication, because it conveys short messages of which the content is of “secondary” importance. This leads to the following hypotheses.

Lean means of communication are sufficient for relational-oriented communication.

Lean means of communication are not sufficient enough for conversational-oriented communication.

To test these hypotheses, media usage and choice of lean and rich means of communication for relational-oriented and conversational-oriented communication is explored.

R.Q. 1.3: Which affective costs do people experience with maintaining a feeling of connectedness?

To answer this question, the affective costs of communication for maintaining a feeling of connectedness are investigated. In our research it is hypothesized that rich means of communication, bears more affective costs in comparison with lean means of communication, because rich communication media needs direct and full attention of the receiver and sender. In line with this statement, this research hypothesizes that people experience fewer affective costs with relational-oriented communication, compared to conversational-oriented communication, which leads to the following hypotheses.

People experience fewer affective costs with relational-oriented communication.

People experience more affective costs with conversational-oriented communication.

To test these hypotheses, the affective costs of communication with relational-oriented and conversational-oriented communication are studied. A note has to be made that only expressiveness is, compared to the other affective costs, to be perceived more a concern with relational-oriented communication, because lean means of communication convey less information. The factors investigated with media richness theory, social presence theory, the ABC-Q and impression management model, are summarized in Table 2.

Table 2 Summary factors influencing media choice

Theories				Factors
Media richness	Social presence	ABC-Q	Impression management	
Richness scale	Personal	Connectedness	Interactional control	
Feedback	Warm	Obtrusiveness	Symbolic meaning	
Channel	Sensitive	Obligation	Social skills	
Source	sociable	Process effort		
Language		Expressiveness		
		Expectation		
		Privacy		

Methodology

With the main research objective in mind this research starts with two focus groups, which consisted of college teenagers (14 to 19 years old) and working people (25 to 35 years old). The goal of the focus group is twofold. Firstly, to explore participants’ general opinions, media use and media choice for maintaining a feeling of connectedness with communication media. Secondly, gather opinions and thoughts about suggestions made by connectedness-oriented communication technology. The information gathered in the focus group, is used for the final discussion and further investigated with twelve interviews which focus further on relational-oriented and conversational-oriented communication. The transcripts of the interviews are analyzed on media usage and with the factors provided by media choice theory (which are summarized in Table 2). Additionally, the interviews are used for further investigation of the suggested enhancements for communication media for maintaining a feeling of connectedness.

4 Focus Groups

Research on how people experience and maintain a feeling of connectedness is still in an explorative phase and a focus group is a perfect method for exploring general opinions. The results found in the focus groups provide a focused direction for elaborated exploration conducted in the interviews, which are better suitable for investigating further into the subject. The goal of this focus group is to explore the following subjects.

Maintaining a feeling of connectedness

To explore how people maintain a feeling of connectedness, participants' general opinions about, communication media, media use and media choice, are investigated.

Enhancing communication media

To investigate in how to enhance communication media for maintaining a feeling of connectedness, this research investigates in participants' perfect means of communication (dream means) and provides participants with scenarios about prototypes with availability, whereabouts, wellbeing information and interactivity. Additionally, the following dimensions of these enhancements are investigated: synchronous or asynchronous, rich or lean means of communication, automatic or manual detection of information and low or high amount of information.

4.1 Method

4.1.1 Design

Two focus groups were conducted with teenagers and workers, because they differ in how (face-to-face communication or diverse means of communication) and where (school or work) they maintain their friendships. Additionally there is an indication that teenagers' friendship is based on social activities and workers friendship is based on emotion.

4.1.2 Participants

All the participants had experience with multiple means of communication and received an incentive of ten euro for taking part of the research. Two focus groups with six teenagers and four workers were conducted and their characteristics are outlined next.

Workers

Four workers, two women and two men, participated in the focus group. Their age varied from twenty-six to twenty-eight years old. Three participants had a master's degree; one participant had a bachelor's degree. Every participant lived together with a loved one and two participants had a friendship together.

Teenagers

Six teenagers, three girls and three boys, participated in the focus group. Their age varied from fifteen to eighteen years old. All four participants had a pre-university education and lived with their parents. Two girls and two boys were friends of each other.

4.1.3 Apparatus

The focus groups were conducted at the University of Eindhoven in the "use lab", which is equipped with video cameras for recording purposes. The participants were recorded from two angles and the recordings were mixed to one recording. The prototypes used at the end of the session were made with Photo Story 3 for Windows, which resulted in a continuous presentation of slides, with the story explained in audio.

4.1.4 Procedure

The focus groups started with a small explanation of the goal of the research: maintaining friendships between best friends with communication media. The duration of the focus group was approximately one and half hours and the focus group discussed the following topics.

Maintaining a feeling of connectedness

The participants were asked to write down their main means of communications on Post-Its, which were then posted on a board. The different advantages and disadvantages of these communication means were discussed with the participants. Additionally the participants were asked to provide several connectedness-oriented messages and the moderator provided afterwards several relational-oriented communication examples (appendix A), which were discussed.

Enhancing communication media

The participants were asked to draw and discuss their ultimate dream means of communication in a fictional situation where everything was possible. Additionally, participants were asked to discuss connectedness-oriented communication functions and related dimensions (which are described in paragraph 2.5), which were presented with the following prototypes.

Prototype 1 Gleams of people (appendix B)

- Sharing asynchronous text messages
- Symbolic messages about wellbeing
- Symbolic feedback when reading a message
- Symbolic history of communication

Prototype 2 Marmasse watch (appendix C)

- Sharing synchronous vibrating messages
- Personalize avatar
- Automatically conveying implicit availability, wellbeing and location information

Prototype 3 Video telephone (appendix D)

- Sharing synchronous audio and video messages

4.1.5 Analysis

The results below are general opinions of the discussion between the participants. A general opinion consist of a stated opinion of one participant and two others confirming with this opinion by nodding. If one participant refuted openly a general opinion, it was added to the discussion although indicated as an individual opinion. Quotes provided in this chapter are literally translated from Dutch quotes. The analysis was conducted mainly by one researcher, who also conducted the focus groups. The research analysis was verified by a second researcher.

4.2 Results working people

4.2.1 Maintaining a feeling of connectedness

The workers were asked to put their main means of communication to keep in contact with their best friends on Post-Its. They indicated the following communication media: telephone (4 times), e-mail (3 times) and SMS messages (3 times). The advantages and disadvantages of these three communication media were discussed with the workers, the results are outlined next.

SMS

SMS messages are viewed by the workers as being free of time and place restrictions, which facilitate conveying a short message immediately (e.g., wishing somebody good luck). The workers perceive SMS messages as synchronous communication, because most people always have their cell phone turned on. The problem with sharing short messages is the possibility of miscommunication, because an SMS message is limited in the amount of information it can convey and does not provide extra information (e.g., verbal and non-verbal) compared to a telephone call. Miscommunication is less of concern with strong friendships as one of the workers stated: "*you only need half a word for somebody you know*".

E-mail

Workers perceive e-mail more asynchronous compared to SMS. Workers found the disadvantage of e-mail that you do not receive feedback about when the receiver reads an e-mail. E-mail is generally used for conveying formal messages with friends who workers see less often, because you can put more

information in the message compared to an SMS message. Workers perceive e-mail less personal than a written letter.

Telephone

All the workers used the telephone as their main means of communication for keeping in touch with their best friends; because they can hear their friends' voice and have the possibility to explain their words better compared to asynchronous text messages. The possibility to provide immediate feedback is also a disadvantage, because it is difficult to keep a conversation short when the sender does not have a lot of time. Workers perceive this more a concern with friends with whom you have less often contact, because you have a lot to talk about and the conversation goes less smooth.

Connectedness-oriented communication messages

The workers were asked to provide an example of a message, which resulted in a positive emotional appraisal of ongoing friendships (connectedness-oriented communication). The general discussion is stated next.

The four examples (appendix E) provided by the workers emphasize the use of the different means of communication. Workers generally use a telephone when they have a long message and have the time for it. SMS messages were used for conveying short messages and when there is limited time to communicate.

Relational-oriented communication examples

The workers were provided with four examples of relational-oriented communication messages, which could result in a positive emotional appraisal of ongoing friendships. The general discussion is stated next.

Workers could not relate with the IM example, because none of them used IM. The men could relate with the soccer example and one of the working men provided a similar SMS example. The other man provided an example of calling his friends while being in a loud football stadium to let them listen to the ambient sounds so they knew how the match was going (e.g., hearing cheering of fans). All the workers indicated that timing was very important for conveying the message and that is why they preferred to use SMS (, which is perceived near-synchronous) instead of e-mail (e.g., sending a good morning message must be received in the morning). One of the women indicated to share nice notes with her friend or colleague to keep in touch.

4.2.2 Enhancing communication media

The workers were asked to draw and discuss their ultimate dream means of communication for maintaining their friendship in a fictional situation where everything was possible. Additionally, workers were asked to discuss connectedness-oriented communication functions and related dimensions, which were presented with the following prototypes. The drawings and discussion of the different prototypes are outlined next.

Dream means of communication

The drawings of the workers dream means of communication (appendix F) provided a good indication of the differences between the communication needs of men and women. The men drew a functional telephone with only video calling as an additional feature (although one drew a 3D video-telephone), and the two women drew a telephone, which had several extra non-existing functions.

One woman drew the sense-telephone, which had the following goal: "*communicating the different aspect of emotions*". The sense-telephone (besides the basic functions) could communicate smell (e.g., smelling fresh pie), video images and touch (conveyed through pads and it was important to know that the communication partner received this). The women indicated that they would like this as an additional feature and all the workers agreed that perceiving someone's handwriting is very personal. The other woman described a telephone that could print handwritten notes. One of the men indicated that people usually just throw the notes away.

All the workers indicated that they did not find extra features on their mobile phones necessary, although some pointed out that video-calling would be a nice additional feature. However, one of the women had a concern about how she appeared on a video telephone. All the workers agreed it is important to have control over when and with whom you would share this information. This made the

importance of shutting your mobile telephone off, which they missed on a cellular telephone. Another feature, which all the workers found interesting, was caller-id. Caller-id provides the workers with information about the content and duration of the telephone call, which resulted in control over if they should take the call or call back later.

Prototype 1: Gleams of people

All the workers recognized that conveying only emotions with colours is a minimal way of communication and misinterpretation was a great concern. The workers wondered why the sender would not just call. Conveying emotions between friends was seen as an interesting additional feature (although one of them indicated not to use it or set it on a negative emotion), because you can anticipate on the mood of the receiver and maybe decide not to call. The workers indicated that they would only share emotions with best friends. Recording the history of communication was found by all the workers unnecessary, because people know for themselves how good they know their friends.

Prototype 2: Marmasse watch

The workers did not want to share automatically mood, availability and location information, because of privacy concerns and social pressure. One of the women indicates these concerns with: *"It provides too much control to another."* The workers preferred to control the information about their mood and found the options provided with current IM software interesting (by manually setting your own mood). The workers found the avatar funny, though it would be better if it was a photo of the sender and conveyed the mood by changing the face on the photo (e.g., by a smiling photo). The problem with sharing synchronous vibrations is that they could be missed or misinterpreted and the workers preferred the asynchronous communication. The women indicated that synchronous communication could be interesting if you are sure the receiver received the message immediately.

Prototype 3: Video telephone

The workers indicated that the video telephone would be interesting to use outside working hours and wanted to have control over when they want to convey video images (e.g., to turn it off).

4.3 Results teenagers

4.3.1 Maintaining a feeling of connectedness

The teenagers were asked to put their main means of communication on Post-Its to keep in contact with their best friends. This indicated the use of the following communication media: telephone (3 times), e-mail (6 times), IM (4 times) and SMS (5 times). The advantages and disadvantages of these four communication media were discussed with the teenagers, the results are outlined next.

IM

With IM it is easy to make contact with a lot of different "friends" at the same time although this could result in useless and even annoying conversations. Two of the girls even stopped using IM, because of the useless conversations; a boy of 15 years old pointed this fact out with: *"people on IM communicate to communicate"*. Because of the annoying conversations the teenagers would block certain people or put their own IM availability on busy or away, which provided the possibility of choosing with whom and when they wanted to communicate. Because more people put their availability on busy or away it led to the problem that most people were not available for communication. Another side effect emerged: people behave different on IM than in real life (e.g., had another attitude).

E-mail

The three boys did not use e-mail for informal contact much and used it mainly for making appointments. The boys did not find it necessary to write long e-mails and think about the content, in contradiction with the girls who found these characteristics an advantage. The girls liked to write long e-mail messages, because it is possible to convey more information, though they missed synchronous communication. One of the girls indicated that the receiver can read the message when he or she likes and thus used e-mail more with friends she sees less often.

SMS

Only one girl indicated to use SMS messages generally for maintaining friendships. The main advantage of SMS is the possibility to communicate everywhere you want. SMS messages are perceived near-synchronous, because the receiver receives them immediately on their mobile

telephone, which feels more personal although a few teenagers missed hearing the voice. One of the girls indicated that SMS is restricted in the amount of information you can convey with it.

Telephone

The boys did not use the telephone much for keeping in contact with their friends however the girls used the telephone for long conversations about anything and nothing. One girl indicated that long conversations provided her with a good feeling about the person and she found telephone conversations pleasant to use when she did not see a person very often. The financial costs were for most of the teenagers a concern.

Connectedness-oriented communication messages

The teenagers were asked to provide an example of a message, which resulted in a positive emotional appraisal of ongoing friendships (connectedness-oriented communication). The general discussion is stated next.

The examples (appendix G) provided by the teenagers provide a good indication of the contrast between the girls and boys. Only one of the three boys provided an example of talking about music over IM with his friends. The other two boys did not use mediated messages much, because they saw their friends almost every day. However, the girls liked to send SMS messages and e-mail with their friends. SMS is preferred, because it is a more personal and immediate way of communicating with someone. For example one of the girls provided an example of sending an SMS message immediately after a concert about how she felt. The advantage of e-mail is the possibility to convey more information in a message, for example one girl got an e-mail of two and a half pages. Another girl provided a good example of both advantages: sending multiple SMS messages through internet, because of the financial costs.

Relational-oriented communication examples

The teenagers were provided with four examples of relational-oriented communication messages, which could result in a positive emotional appraisal of ongoing friendships. The general discussion is stated next.

The teenagers could not relate with the examples provided by the moderator of sharing messages on Post-Its or by vibrating the mobile phone, which they found too vague. Although, two boys indicated that they could recognize with the latter example by conveying an SMS message. Another example was provided by a girl about an SMS message with how the other felt immediately after they met (letting her know he liked meeting her). This SMS message resulted in a positive feeling about the person, because the sender made effort to let them know how he felt. The example of monitoring an IM nickname provided by the moderator started a discussion about annoying IM nicknames, which were usually to long or useless. A girl indicated she used her IM name as a nickname and she adds extra information when it was something important or special. For example she changed her nickname with 7/9, which meant that she had conducted 7 final exams of 9. This information was mostly understood by her friends who also were conducting final exams.

4.3.2 Enhancing communication media

The teenagers were asked to draw and discuss their ultimate dream means of communication in a fictional situation where everything was possible. Additionally, teenagers were asked to discuss connectedness-oriented communication functions and related dimensions, which were presented with three prototypes. The drawings and discussion of the different prototypes are outlined next.

Dream means of communication

Most teenagers drew a prototype of a mobile telephone (appendix H), except one boy who tried to simulate face-to-face communication with a 3D projecting of a friend (appendix H). The prototypes usually facilitated all options currently available in mobile phones (e.g., SMS messages, telephone call, IM or listening to music). One of the boys indicated that he would like to have a one-button telephone, which could be controlled with his voice (e.g., sending and dictating an SMS message or e-mail) and another boy a wireless headphone. Most of the teenagers drew a video calling function although, which was followed by a discussion if these functions were necessary and if it would be strange to see the other person. All the teenagers liked the possibility of sending an audio or video SMS message immediately to the receiver. Additional teenagers would like to send a long SMS message but speech dictation would then be necessary, because mobile phones are not suitable for typing long messages.

Face-to-face communication was generally preferred by the teenagers for maintaining friendships and the mediated means of communicating were perceived as additional means for supporting contact with their friends.

Prototype 1: Gleams of people

The teenagers did not find the function to communicate emotions with colours interesting, especially to let others know when they were sad. Only one boy indicated that he found it interesting to share emotions as an additional function. The function to record communication history (amount of contact moments) was rejected by the teenagers. This does not provide extra information, because teenagers know how much they communicated with a friend and how good the friendship is. The feedback function was seen as very interesting especially for SMS and e-mail. However the teenagers indicated that this would result in obligation to return a message, which should be less of a concern with best friends.

Prototype 2: Marmasse watch

The teenagers found the possibility to share vibrating messages to each other useless, because the danger of misinterpretation of signals. A teenage boy found it impractical and indicated it as using "...morse codes", which referred to the necessity of learning codes to send messages. To share location and availability information was perceived by a few teenagers (especially the two boys) as informative, because it enabled them to take the receiver into account (e.g., if you are in the class). The two girls found sharing location and availability information less necessary and one girl indicated that sharing spontaneous messages would fade away, which she found important for maintaining friendship. The teenagers found personalizing the avatar (preferable a photo instead of an avatar) as interesting, when they could manage the appearance of the avatar and with whom.

Prototype 3: Video telephone

Teenagers would use the video telephone after school hours; because it is a more appropriate time (else they would send an SMS message), although it has to be mutually shared.

4.4 Conclusions

In this final section the general discrepancies and equivalent communication needs of working people (26 to 28 years old) and teenagers (15 to 18 years old) are discussed, followed by suggestions for further research.

Maintain a feeling of connectedness

Both workers and teenagers have experience with a wide variety of communication media for maintaining a feeling of connectedness (IM, telephone, SMS and e-mail). The main discrepancy between teenagers and workers are that, teenagers generally maintain their friendships with face-to-face communication, and workers with the telephone. The main conclusions of teenagers and workers are summarized below.

IM teenagers

- Used for socializing
- Used with different relationships
- Conveys sometimes annoying or useless conversations, which they manage by:
 - setting their IM availability to busy or away
 - stop using it

Telephone teenagers

- Is not used by the teenagers, because of the financial costs

Telephone workers

- Provides verbal and non-verbal information
- Provides feedback
- Not always suitable or appropriate, which they manage by:
 - conveying telephone conversations at night
 - sending an SMS message to make an appointment
- Takes usually longer than expected to convey a message
- Short telephone conversations are only conveyed with close friends with a high contact frequency

E-mail workers

- Used for conveying formal messages
- Used with diverse friends
- Perceived asynchronous and less personal as an SMS message

SMS workers and teenagers

- Perceived as near-synchronous
- More personal than e-mail
- Is anytime and anywhere possible
- Usually conveyed with close friends with a high contact frequency (only workers)

Enhancing communication media

The conclusions based on the results of the workers and teenagers are summarized below.

- Most participants were satisfied with the basic functions of the mobile telephone
- Providing implicit information seems not interesting
- Enhancing communication with audio or video seems interesting
 - The teenagers preferred to convey this asynchronous, because of obtrusiveness and social obligation
- Providing automatically availability, location or emotion information is not interesting, because:
 - Privacy concerns
 - Social obligation
 - Provides too much control to another person
- Conveying manually emotion with a photo was seen as interesting (only workers)
- Providing manually location and availability information (only teenage boys)
- Providing feedback information about receiving and reading a message seems less interesting (only teenagers), although it could result in social obligation

4.5 Discussion

The findings found in these two focus groups are not a statistical representation for teenagers and workers, which is usually the goal of quantitative research and not of focus groups. Although the two focus group sessions were conducted in a different way (the workers had a spontaneous session and the teenagers a more controlled session), comparison is still possible. The discussion stated next is used for further research with interviews, which are described in the successive chapter.

Relational-oriented and conversational-oriented communication

When discussing how the participants maintained friendships, relational-oriented and conversational-oriented communication emerged in both focus group sessions. Relational-oriented communication generally consisted of SMS messages and short telephone calls, which usually were mentioned in the context of sharing an experience immediately (e.g., at a sport match or after a concert). Additionally, IM nicknames were used by the teenagers to inform others and one working woman mentioned sharing notes with a fellow colleague and her boyfriend. Conversational-oriented communication messages are usually conveyed through e-mail, IM (mainly used by the teenagers) and the telephone, because it is possible to convey more information and therefore more suitable to update each other about everyday life. This is only possible when people have time for it. Most participants perceived it as annoying when both communication intentions collide (e.g., the receiver has little time and the sender too much time for a telephone call). It can be expected that in the interviews relational-oriented communication should consist of SMS messages and short telephone calls, however conversational-oriented communication consists of e-mail, IM and telephone calls.

Workers and teenagers

The characteristics of how workers and teenagers maintain friendships obtained in the focus groups and the characteristics suggested from the literature seem to have a lot of similarities. The teenagers have a lot of face-to-face communication and the workers prefer the telephone to keep in touch. However, it was expected that teenagers generally use SMS messages to maintain friendships. There were differences in communication behaviours between teenage girls and boys. The teenage boys generally maintained friendships with face-to-face communication and the girls also use diverse means of communication to keep in touch with different friends. This discrepancy could be a result of a difference in friendships. The boys generally maintained friendships with daily face-to-face communication, however the girls maintained with different friends who differed in contact frequency and history. For example, one girl knew that only classmates would understand her nickname (7/9, which meant 7 final exams conducted of 9), because they were in the same situation. The workers also indicated to change their communication behaviour for maintaining friendships between different friendships. The working people indicated this by sending an SMS message or short telephone call only to close friends, because *“you only need half a word for somebody you know”* and *“you don not have to explain everything”*. Relational-oriented communication seems more salient within close friendships (high contact frequency or history), which is in the interviews further investigated.

Media richness and social presence theory

Two characteristics, which are related to media richness and social presence theory, for conveying relational-oriented communication messages, emerged from the focus group sessions: near-synchronous (feedback) and personal. The relational-oriented communication examples of SMS messages provided by the participants' indicated that communication media, which are perceived as personal and near-synchronous, can maintain a feeling of connectedness with relational-oriented communication. SMS messages are perceived as personal and near-synchronous, because most people have their mobile telephone always switched on and with them. People want to share an emotional experience immediately when it happens and timing is very important. The problem with synchronous communication is that the receiver is not always available. The fact that people receive short SMS messages immediately on their own mobile telephone is important, because they feel that a person is thinking of them at a specific time.

The participants use mediated means of communication for maintaining friendships beside face-to-face communication. Especially the teenagers use lean means of communication when they are separated from their friends. The workers prefer to use rich means of communication, although they also use lean means of communication for different reasons (making an appointment or just sharing a joke) to keep in touch. This indicates that people maintain friendships with lean and rich means of communication. However, almost all the participants felt a need for video calling, because of the extra information you receive, although it would only be appropriate when it is mutual and suitable. The perfect means of communication seems suggested by a teenage boy: the possibility to send a short audio or video message immediately to a persons' telephone like an SMS message. This provides some indication that people want rich, near-synchronous and personal means of communication, which is in the interviews further explored.

Affective costs of communication

The affective costs of the two communication modes were generally not a subject of discussion. The workers indicated that the telephone is used when it was suitable or appropriate, which suggests their concern for disturbing someone (obtrusiveness). The teenagers were mostly concerned with the financial costs of the telephone. The participants discussed the advantages and disadvantages of communication media usually in the context of the specific technical characteristics and their related behaviour. This resulted in little awareness of the reason why they use specific communication media and their specific affective costs. For example, SMS messages are used for conveying short messages, though participants did not specifically indicate why. However the communication behaviour and diverse connectedness-oriented communication examples, provided by the research participants, indicate that both modes satisfy a feeling of connectedness. To obtain more specific information about the affective costs and benefit with maintaining a feeling of connectedness, the interviews should focus more on why (instead of how) people use different means of communication.

Enhancing communication media

The connectedness-oriented communication prototypes started a discussion between participants about providing communication with availability, mood and location information (social awareness). Almost all the participants rejected the possibility of conveying social awareness automatically, because of privacy and social obligation concerns. All participants indicated that it would be better that people could set their availability, location and mood information manually, which is possible with current IM programs. The working people liked to share emotions with a best friend on a picture (e.g., a smiling or sad photo) and the teenage boys found availability and location information interesting, because of the possibility of taking the availability of the receiver into account. Additionally, all the participants recognized that messages consisting of only vibrations or colours lacked information and could be easily misinterpreted. Participants did not want to learn new codes to communicate a message. Thus, messages should consist of content, which can be easily interpreted without the concern of misinterpretation. SMS messages seem to be sufficient enough to convey a message with minimal concern for misinterpretation. These findings suggest that it is disputable if people want to share symbolically social awareness and especially if it should be conveyed automatically. The debate about the suggested functions indicated the importance of control over, which and with whom you want to convey information. These results suggest that people want to manually share explicitly messages (text), emotion, location and availability information, although further investigation in the interviews seems necessary.

5 Interviews

The interviews are conducted to elaborate the findings of the focus group and literature research. To accomplish this, interviews with teenagers and workers were conducted, which investigates further in two communication modes: relational-oriented and conversational-oriented communication. The following subjects are investigated in this interview.

Maintaining a feeling of connectedness

To explore how people maintain a feeling of connectedness, participants are asked how they maintain a feeling of connectedness with relational-oriented and conversational-oriented communication. Additionally, this research focuses on the importance of the kind of relationships (history and contact frequency) with relational-oriented and conversational-oriented communication, which emerged from the focus group.

Media richness and social presence factors

To investigate which factors influence media choice for lean or rich means of communication, for maintaining a feeling of connectedness, this research analyzes the transcripts with media richness and social presence theory. Additionally, this research focuses on the importance of near-synchronous and personal for relational-oriented, which emerged from the focus group.

Impression management factors

To investigate which factors influence media choice when the self-concept is negative or positive affected of either the sender or receiver, this research analyzes the transcripts with impression management theory.

Affective benefit and costs factors

To investigate which affective costs and benefit people experience with maintaining a feeling of connectedness, this research asks the participants to describe the appreciation and the affective costs of communication they experience with relational-oriented and conversational-oriented communication. The answers of the participants are analyzed with the affective costs and benefit theory.

Enhancing communication media

To investigate in how to enhance communication media for maintaining a feeling of connectedness, this research discusses with the participants the following functions with paper prototypes, which emerged from the focus group.

- Providing automatically/manually and implicitly/explicitly social awareness.
- Sharing an asynchronous or synchronous and implicit or explicit message
- Providing social presence
- Establishing implicitly contact
- Converting text messages to speech

5.1 Method

Twelve semi-open interviews were conducted with a maximum of two participants (two best friends) at the same time. Interviews with two participants can be compared to a small in-depth focus group, which provide the advantages of both methods: a dynamic discussion between the two friends and in-depth information. In our opinion this should provide additional information, compared to single participant interviews.

5.1.1 Design

Twelve interviews were conducted with teenagers and workers, which vary in how (face-to-face communication or diverse means of communication) and where (school or work) they maintain their friendships. The participant groups (six working women, four working men, four teenage boys and six teenage girls) were selected to consist of different education degrees, age and gender.

5.1.2 Participants

Twenty participants, who consisted of ten teenagers (14 to 19 years) and ten workers (25 to 32 years old), were interviewed in a total of twelve sessions. Eight interviews were conducted with two close friends at the same time, and only one interview [WW6 and WM3] consisted of a mixed gender, which had a relationship. The other four interviews were conducted with a single participant [TG3, TG4, WM4 and WW5]. The interviews were conducted either at their home or at the University of Eindhoven and an incentive of ten euro was provided. The abbreviations used in this chapter are:

- WWX: Working Woman, X stands for participants' number.
- WMX: Working Man, X stands for participants' number.
- TGX: Teenage Girl, X stands for participants' number.
- TBX: Teenage Boy, X stands for participants' number.

5.1.3 Apparatus

A memo-recorder was used to record the interviews. All the interviews and transcriptions were conducted, transcribed and analyzed by one and the same person.

5.1.4 Procedure

The goal of the research was explained before starting the interviews and the participants were provided with characteristics of relational-oriented and conversational-oriented communication. The interview was a semi-open interview and the goal of the moderator was to talk as less as possible and to ask questions in relation with the provided answers of the participants. Although the interviews were semi-open, an interview procedure (appendix I) was provided. The interviews lasted approximately one and a half hours and the following topics were discussed.

Maintaining a feeling of connectedness

Participants were asked to describe how, when, what, where and with whom they share relational-oriented and conversational-oriented communication messages.

Affective benefits and costs of relational-oriented and conversational-oriented communication

Participants were asked to provide positive experiences with relational-oriented and conversational-oriented messages and why they appreciated it. Additional participants were requested to provide negative experiences with relational-oriented and conversational-oriented messages. The moderator mentioned different affective costs of interest for this research (e.g., privacy or social obligation) to make them salient for the participants.

Enhancing communication media

The participants were asked to provide suggestions for enhancing relational-oriented communication and discussed the following functions of two paper-prototypes.

Prototype 1: the photo list (appendix J)

- Providing automatically and explicitly location, wellbeing and availability information.
- Leaving explicitly a text message behind on the photo list.

Prototype 2: the social rabbit (appendix K)

- Conveying implicit information by rotating ears, which also provides presence.
- Providing implicit a message with colours.
- Seeking contact with blinking light.
- Converting text messages to speech.

The participants were asked to discuss the different functions, where they would put the prototype and with whom they would share it. At the end the moderator asked if participants could indicate the differences between the two prototypes. The first prototype provided no control to the sender (automatically conveying information), however the second provided control to the sender (manually sharing information).

5.1.5 Analysis

The analysis was conducted by only one researcher, who also conducted the interview sessions and provided a means for analyzing, which the labelling analysis is partly based on Baarda, de Goede and Teunissen (2001). The general results in the following section are obtained in a deductive manner. Twelve transcripts were separately investigated on individual statements, which matched different labels and were grouped in a table, which provided the foundation for a summary of the transcript. The labels used in this research emerged from the theories (e.g., impression management), which are described in the former chapter. The labels and their definitions used for analyzing the transcripts are provided in the following sections. Interesting and frequent mentioned statements, which emerged from the transcripts are also analyzed and provided with a label. A summary consists of general statements about specific labels, which are determined with the following rules.

- Statements about a specific label are interesting when a participant indicates they are of importance.
- When statements about a specific label are mentioned several times, they are included in the summary.
- When statements about a specific label is mentioned spontaneously and not addressed by the interviewer, they are perceived as interesting.
- Statements about a specific label are less interesting when they became salient after being mentioned by the interviewer.
- Statements about a specific label are less interesting when the interviewer steers the participants too much (for example with too much questions).
- Statements are less interesting when participant indicates them of less of importance.

This resulted in twelve interview summaries of statements about specific labels, which are divided into two groups (workers or teenagers). The groups consisted of six interviews with workers (ten participants) and six interviews with teenagers (ten participants). Finally, a general opinion of each label for the workers and teenagers were obtained, which contained labels that emerged in at least half the interview summaries. Individual interesting statements about labels were also included, although this is explicitly indicated in the summary (e.g., participant WMX said). Quotes provided in this chapter are literally translated from Dutch quotes.

Maintaining a feeling of connectedness

This analysis provides a summary of general media use for relational-oriented and conversational-oriented communication. The information obtained resulted from analyzing the transcript on labels, which indicated common use (e.g., I usually use IM, because) of different means of communication. The label consisted of statements referring to:

Common usage: frequent, general or interesting use of a specific means of communication for relational-oriented or conversational-oriented communication and between different relationships (history and contact frequency).

Social presence and media richness factors

This analysis provides conditions for specifically choosing a lean or rich means of communication for maintaining a feeling of connectedness. This is determined with a choice for a specific means of communication based on statements, which are related to the following labels.

Media richness scale: face-to-face – telephone – written/personal – written/formal – written/numeric (from rich to lean).

Feedback capability: the extent to, which a medium provides an immediate reply to the receiver (immediate, fast, slow or very slow).

Communication Channels utilized: amount of cues conveyed through a specific channel (Visual, Audio or limited visual).

Source: depends on if the message is personally addressed to receiver (Personal, Impersonal).

Language: conveying body cues (verbal or non verbal cues), natural (normal language) or numeric (numbers).

Social presence scale: impersonal/personal, cold/warm, insensitive/sensitive and unsociable/sociable.

Impression management factors

This research investigates the factors involved with a preference for a specific communication media when the self-concept is negative or positive salient for either the sender or receiver. Statements about the following labels are analyzed in the transcripts and summarized.

Interactional control: suggest that people sometimes prefer mediated communication, because it provides control of timing, duration and kind of information exchanged for controlling their self-concept (O'Sullivan, 2000).

Symbolic meaning: refers to the appropriateness of a channel for a specific goal (O'Sullivan, 2000).

Social skills: relates to personal preference of the individual, which is influenced by their skills to use different means for managing their self-concept and their technical ability in using the channel (O'Sullivan, 2000).

Affective benefit and costs factors

The following labels for analyzing the transcripts on statements about different affective costs and benefit (which is defined first) of communication media are used.

Connectedness: a positive emotional appraisal of the feeling of being in touch within interpersonal friendships (van Lanen, 2003 & van Baren et al., 2004).

Obtrusiveness: disturbing a person in ongoing work (Go et al., 2000).

Obligation: Social obligations felt or created as a result of a message (Markopolous et al., 2004).

Process effort: the time, energy or financial costs necessary (van Baren et al., 2004).

Privacy: The extent to, which the medium threatens privacy (Markopolous et al., 2004).

Expectations: expectations for communication are raised or unmet as a result of using a medium (Markopolous et al., 2004).

Expressiveness: effectively conveying thought or feeling.

Enhancing relational-oriented communication

The different functions are discussed with the participants and statements, which half the participants agree on are summarized or indicated otherwise. There are no tables used for this analysis, because of the closed-end nature of the questions.

5.2 Results

The results of the interviews are discussed below. The information contains a vast amount of qualitative information, which makes it necessary to only provide a summary of the most interesting and general findings as indicated in the analysis section.

5.2.1 Maintaining a feeling of connectedness

Participants were asked to describe how, when, what, where and with whom they share relational-oriented and conversational-oriented communication messages. The discussion is analyzed on common usage of communication media for relational-oriented and conversational-oriented communication. The results of this analysis are outlined next.

Teenagers

Media usage conversational-oriented communication

The teenagers maintain their relation mainly with face-to-face communication. One teenage girl [TG4] used generally e-mail to keep in touch with her friends. Most teenagers used, beside face-to-face communication, IM and in lesser degree the telephone for maintaining friendships for conveying conversational-oriented communication. These two communication media are described next.

Almost all the teenagers use IM to maintain contact with diverse friends. IM conversations are similar to telephone conversation, because teenagers are able to react immediately to each other's answers (instead of taking time for replying). Teenagers use IM when they are back from school and are working on the computer. The disadvantage of IM is that the receiver and sender have to be available. The advantage of IM is that it is free of charge, less immediate than a telephone call and you can communicate with several persons or do other tasks at the same time (e.g., surfing on the internet). IM is used for socializing (e.g., chit chatting) with a lot of people and there has to be "no reason" for communicating. This can also be a disadvantage as two teenage boys [TB3 and TB4] pointed out:

"... with IM you type really quickly. With SMS you stop and think about it. With IM it is gone before you know it." [TB4] "...Although the threshold is higher with SMS and with IM you talk with everybody who is online if you feel like talking. You only send an SMS message when you have something to tell." [TB3]

“Yes, if somebody starts to talk to you on IM is, because that you especially sat down to communicate, which is how I go and sit behind IM. SMS is immediate and I receive them immediately, because I have my mobile phone always on. If people send useless messages on my telephone, I would not like that, because I will receive them everywhere and even when I am working, I will receive a useless conversation.” [TB3] “Those borders must stay I think, else it would be too much and you would receive everywhere a useless message.” [TB4]

Almost half of the teenagers indicated that they use the telephone to maintain their friendship with conversational-oriented communication at night with good friends, because they need time to convey. The telephone is used to convey immediately important, personal or emotional messages, because of the additional information feedback (“*you get a listening ear*” [TB3]) and the vocal communication provides (“*for example when I am on holiday I like to hear my father and mothers voice*” [TG6]). The disadvantage of using the telephone is that it costs money, you do not have time to think about an answer and it is obtrusive. A few teenagers indicated to be always available for good friends when it was an important message.

“... when I disturb somebody than they just tell me. Although I call them usually at night and than most people are than available.” [TG3]

“I almost never turn off my phone and I have agreed with my girlfriends that we leave our telephone on. If something happens than we can call each other” [TG4]

Media usage relational-oriented communication

IM is commonly used by the teenagers for relational-oriented and conversational-oriented communication. Three out of ten teenagers commonly use SMS to maintain friendship with relational-oriented and content-oriented communication. These two communication media were usually described and compared when discussing relational-oriented communication. The summary of the discussions are described next.

In general teenagers use IM, because it is free of charge, immediate and easier to convey a message in comparison with SMS. Nevertheless teenagers like using SMS, because you can reply when you want (e.g., provide thinking time), the possibility of communicating anywhere and anytime and it is unobtrusive. Most teenagers perceive SMS messages most suitable for conveying relational-oriented communication although it costs money and process effort to convey a message compared to IM. SMS is compared to IM more personal, because a person specifically thinks about you and makes personal effort to send you a message (e.g., looking up your telephone number). This personal effort influences the appreciation of an SMS message: it is perceived as a “thinking about you” message, a small postcard or small boost. Personal effort influences media choice and teenagers share SMS messages with close friends and IM with different “friends” (also people they hardly know). IM contains less personal effort and is less appreciated, because people do not specifically think about you until they are available with IM and they perceive your nickname for example. The importance of personal effort is illustrated with the following statement.

“With an SMS you have to think about that I want to SMS him and you have to do effort to type a message. Not that it is much effort; it is more effort to that person.” [TG6] “Also, because you think specifically about that person to send him an SMS message.” [TG5]

Short telephone calls and e-mail are generally used for content-oriented communication. Other means of conveying relational-oriented communication are:

- IM nicknames are used by two boys [TB3 and TB4] for conveying relational-oriented messages with all their IM contacts.
- Hyves is used by a girl [TG4] to maintain contact with diverse friends. Hyves is an online personal site, which is used for keeping in touch with friends with short message that people can leave on your site. The girl found it more personal than an e-mail, because it is a personalized site with pictures.

Workers

Media usage conversational-oriented communication

Workers generally use the telephone for conversational-oriented communication to keep in touch with best friends, whom they do not see as often, and to make appointments with friends that live nearby. Workers find the telephone very personal, because vocal communication provides additional information, which is important for personal messages. Long telephone conversations are usually conveyed at a suitable moment (e.g., at night or in the weekend), because workers perceive that the other is available and do not want to disturb them during the day. To convey conversational-oriented communication with the telephone you need to be in the mood and have time for it. To manage this some workers [WW1, WW2 and WW5] use caller-id to perceive who it is and what it is about before they take the telephone call. Two working women [WW1 and WW2] do not use the telephone for a while, when they felt social weak. Instead the two working women use e-mail and IM, because it is not obtrusive and they could hide their feelings and perceived e-mail as an “old fashioned letter” [WW1]. Two working men [WM1 and WM2] perceived the disadvantage of IM that you need to sit behind a computer, which they did all day at work and they disliked talking with numerous people when they do not feel like it.

Media usage relational-oriented communication

Workers convey relational-oriented communication messages with SMS and e-mail. Half the working people use e-mail at home and work, because it is fast, easy and free of charge compared to SMS. The decision to use e-mail or SMS depends on the availability to access a computer and the importance of the message (e.g., a “good morning” message must not be received at night). When workers have access or know if the receiver is not behind the computer they send an SMS message instead of an e-mail.

Half the working people use SMS to keep in touch with friends, they have high contact frequency (e.g., once a week). Half the workers use SMS to send short, “impersonal” and spontaneous messages (e.g., wishing good luck). SMS is perceived by a working man [WM2] to be more immediate and personal, compared to an e-mail (“it is near your body” [WM2]). Working people use relational-oriented communication with the telephone for content-oriented messages (e.g., making an appointment) or personal messages where they prefer vocal communication (e.g., to inform how the dentist went).

Other kinds of communications for relational-oriented communication are:

1. Hyves is used by one working men [WM2] to keep in touch with old friends by leaving short messages on a personal website.
2. Only one working man [WM4] called daily with his family (especially with his mother) to inform how the day went.
3. Changing the welcome text message of the mobile telephone of her husband [WW2].
4. Missed telephone calls were used by a couple [WM3 and WW6] to let the other know that they were thinking about each other. They shared missed calls after a long telephone conversation or when they do not perceive each other for several days.
5. Four workers [WM4, WM1, WM2 and WW5] shared postcards for a special occasion (e.g., finding a job) or special attention (“because I like her” [WM2]) next to the traditional celebrations (e.g., a birthday).

5.2.2 Media richness and social presence factors

This section summarizes the factors mentioned by the participants, which influence media choice for rich or lean means of communication. The factors mentioned in this section emerged from analyzing the transcripts with media richness and social presence theory.

Teenagers

Feedback and accessibility

Teenagers perceive receiving immediate feedback makes a communication media (e.g., the telephone) more personal and is an important factor for conveying personal or important messages. However, teenagers do not always want an answer immediately, because they do not always have time for it or when it is an inappropriate moment. IM is generally used when the receiver is available otherwise teenagers would send an SMS message or just call.

“Yes, when I am not at home and for example at the Efteling and I got an SMS message. Then I can not communicate with IM, thus I had to send an SMS message back.” [TB1]

".. it is more personal if you can hear each other or with IM to react immediately to each other." [TG1]

".. you hear an answer that it is all fine and so ... This is certainly the advantage of the telephone in comparison with e-mail where you can write the emotions away although you never know for sure if the other provides a listening ear. He can read the message but also throw it away." [TB3]

Process effort

The main reasons for using IM are: it is free of charge, easy (compared to sending an SMS message) and it is possible to communicate with different people at the same time.

"I prefer to use IM, because you can talk to more persons at the same time". [TB2]

Content

The content of a message influences the choice of media: when it is an important or personal message teenagers prefer to use the telephone. The telephone is compared to other media more personal, because you can perceive vocal information and receive immediate feedback. However, e-mail, SMS messages and IM are used for "less" personal, "less" emotional or "less" important messages. Especially SMS messages seem ideal for sending short messages (e.g., wishing good luck), which teenagers perceive as less personal messages.

"IM conversations are usually about sharing everything and nothing. A telephone conversation also although you usually have something meaningful to tell, which is not necessary with IM." [TG3]

"I would use IM sooner than a phone call, unless it is important and you have to know for certain." [TB1]

Channel (audio)

Hearing the receivers' voice is an important factor, when conveying important and personal messages, or when teenagers do not spoke to their friends for a while.

"Yes, you use the telephone faster when you have intense conversations" [TG2] *"and more serious"* [TG1]

Personal

The teenagers vary in their opinion on, if IM is more personal compared to SMS, because IM is received immediately. Some teenagers perceive SMS messages as more personal, because you have someone's telephone number and you think specifically about that person. Most teenagers perceive the telephone very personal for several reasons: it is immediate received and you can perceive vocal information, which is an important factor for important and personal messages. Although, two girls [TG5 and TG6] do not totally agree with the statement that telephone conversations are more personal than IM conversations. This is illustrated with the following statement.

"I can imagine that people find the telephone more personal, because you can hear the person although IM is for me almost the same. ... You can also make conversations with it." [TG5]

Workers

Feedback and accessibility

Immediate feedback and accessibility are important factors when workers want to convey emotional, important, provide explanations and personal messages. The workers take the receivers accessibility in concern when sending an e-mail or SMS message (e.g., not sending an e-mail when you know a person does not have after work).

"...SMS is more for household messages." [WW2]

"If you just experienced something or just went somewhere. For example you just went to the hospital and they want to know the results than I would call them instead sending an SMS message. An e-mail or SMS message is so impersonal." [WW3]

Channel (audio)

To hear somebody's voice is an important factor, which helps conveying the message better and makes a communication media more personal. Workers prefer hearing the voice when they want to know how the other is doing or just feel like hearing it.

"I do not always have a need for an update conversation. When I am in the mood I like to have interaction and like to hear how they are doing, what they have done and tell them what happened to me." [WW5]

Personal

Perceiving a communication media to be personal is an important factor for conveying personal, emotional or important messages. The telephone and IM are perceived more personal than e-mail, because you get feedback and can hear someone's voice. Workers use because of these reasons e-mail for "less" personal, formal or "less" important messages. One working men [WM2] perceived SMS messages more personal than e-mail, because of the personal effort invested in the message, which is indicated in the following statement.

"It is more effort, personal effort. SMS is closer to me than e-mail." [WM2]

Content

The content of the message influences media choice in different ways. Emotional, important or personal messages are usually conveyed with rich means of communication and "less" personal, practical, "less" important, fun or "less" emotional messages with lean means of communication. Especially feedback and audio are important for conveying the former messages.

"Yes, that are usually SMS messages, which are short messages with informing how a person is doing or just let them know that PSV has bought a new soccer player. Those are not very important messages, just to communicate" [WM4]

"I call with someone when that person has a difficult time. Someone who I know who wants to share something and has a need to talk." [WW6]

5.2.3 Impression management factors

This section outlines the factors mentioned by the participants by analyzing the transcripts with impression management theory. However, the factor function is an additional factor, which emerged from analyzing the participants' answers if they would like to share their emotions automatically with their friends.

Workers and teenagers

Functions

Fourteen of the twenty participants indicated specifically that they do not want to share immediately negative emotions with friends. They found it important to convey negative emotions when they feel a need for it, because it is very personal. The following statement provides a general indication of most of the participants' opinions.

"For example, you are at work and you feel sad for what ever reason. Than it does not have any meaning to change your availability, to get reactions. Because you will get them, people see your availability changing and wonder what happened. ... If I have a need for it than I will call them myself and let them know I am sad. I would take the initiative for myself. ... And ask them to join me for some chocolate." [WW5]

Interactional control

One teenage girl [TG4] used the time to provide feedback to a received SMS message to indicate how much she liked a person. The faster the teenage girl replied, the more she liked a person. One working man [WM4] indicated that he preferred e-mail when he do not know the receiver, because he felt uncomfortable calling. Five participants [TG4, WW1, WW2, TB3 and TB4] indicated that they sometimes preferred to use e-mail or SMS message when they do not feel like sharing a negative experience. Two participants [TG4 and WW2] provided with several reasons.

"The distance is very safe.".. "Than people can hear I am emotional and that is my weak spot, which I do not want to share. ... Than I prefer e-mail" [WW2]

"Yes, it is more with e-mail that you can write personal things, but that is more when you are embarrassed or do not want to talk about it, which goes very easy with e-mail" ... "You do not have to perceive that person immediately, like do you know what I just did?" [TG4]

Symbolic meaning

One working girl [WW5] preferred to use the telephone to call friends she do not perceive often, because this is special compared to an SMS message. A postcard or handwritten letter is sometimes preferred if participants want to let the other know they appreciate the person or the event, because it is more personal and does not happen as often.

"I send a card this week, although that does not happen often. ... Because I like her." [WM2]

"I just like a postcard more. Yes, it just looks nice and somebody can notice that you put some effort in it. You must buy the postcard and mail it. AN SMS message is done quickly..." [WM4]

5.2.4 Affective benefit and costs factors

This section summarizes the affective costs and benefit of communication factors for maintaining a feeling of connectedness with relational-oriented and conversational-oriented communication.

Workers and teenagers

Obtrusiveness

Both groups indicated the obtrusive nature of the telephone, for conveying conversational-oriented communication. Participants manage the obtrusive nature, by calling at "suitable" moments (e.g., at night or in the weekend), using caller-id or alternative means of communication. For example the working people generally use e-mail or SMS (e.g., to make an appointment) and teenagers IM or SMS because they are less obtrusive. These means of communication are perceived to be less obtrusive, because of their asynchronous characteristic. However, a few participants indicated that a relational-oriented communication messages with SMS sometimes could interrupt work or ongoing conversation when made salient of the message (e.g., by making a sound when a message arrives). Teenagers found it difficult to resist looking at the message, a teenage girl illustrated this with the following quote.

"That is sometimes a disadvantage of receiving an SMS message. They are always so sweet, that you feel uncomfortable with the person who you are with. ... Yes you have immediately a small conversation with the other, the other girlfriend. She gets full attention and I feel happy, which feels like we are for a few minutes together" [TG4]

"I just find it fun sending an e-mail or SMS, because it easy to keep in touch with people. They open or receive the message and read it on the moment when it is suitable for them. You do not bother people." [WW5]

"You have a long telephone conversation and you can share everything. You can hear how the other is doing although you need to plan the long telephone conversations but that is usually at night when you are at home or in the weekend thus the planning is usually no problem." [WM3]

Process effort

Conversational-oriented communication messages need time and effort to convey all the information, which is usually only possible at suitable moments e.g., at night or in the weekend. Conversational-messages are best conveyed with the telephone, because it takes less effort to convey a message compared to IM, e-mail and especially SMS. However, telephone conversations costs money and both communicators have to be available and willing. IM does not take a lot of effort, is free of charge and teenagers do other tasks or talk with more people at the same time. A specific disadvantage for relational-oriented communication with IM is provided by two teenage boys [TB1 and TB2] who indicated that the computer has to be put on just for a short message and with the risk that the receiver is not online. Especially SMS messages are perceived to be not suitable for conveying long messages, because it takes a lot of effort for the sender (e.g., typing the message) and receiver (e.g., to read it).

"The disadvantage is certainly with short messages that you want to put too much information in it, which results in three SMS messages. Than I think that it is better to just call instead of sending three messages and they do not even consist of everything I want to say exactly. Than it is just call and it is quicker also." [WW3]

"Mainly the computer, I use IM a lot. I usually look before I call if somebody is online, because if he is, than it is easier and cheaper." [TB4]

Expressiveness

Expressiveness is important for conveying personal, emotional or important messages, which are best conveyed, next to face-to-face communication, with the telephone. Teenagers found it important for conveying these kinds of messages that they are not misinterpreted and to provide feedback. Misinterpretation can be best avoided with the telephone because it provides additional information for the sender (e.g., *"getting a listening ear"*) and receiver (e.g., how someone really feels). Important messages were usually mentioned in relation with conversational-oriented communication, because it takes time to convey this kind of message. Nevertheless, text based means of communication (e.g., IM, SMS and e-mail) are better suitable for informal messages and are salient in both modes of communication (e.g., just chit chat or wishing good luck) though misinterpretation is still salient (e.g., trying to be sarcastic). As two teenage boys indicated, the use of a smiley can not always compensate for the lack of sharing emotions. SMS is perceived by both groups not to be suitable for conveying long messages though suitable enough for relational-oriented communication (e.g., conveying good luck!). Most relational-oriented communication are not used for conveying personal and emotional messages (e.g., wishing good luck), though the workers indicated to make a short phone call for personal messages (e.g., inform how it went at the dentist [WM4]).

"For example a smiley is used these days so often that they do not mean anytime anymore." [TB4]
"Exactly." [TB3] *"People put them everywhere and feel obliged to put them after each sentence, even when it is not necessary."* [TB4] *"That is why they become useless."* [TB3]

"I think it is different for both. The long messages are conveyed with the telephone and short messages with e-mail or SMS. The disadvantage of e-mail and SMS is just as we spoke before about, it can be misunderstood or you have to wait a long while. It is more in the system and not in the message." [WM4]

".. for example when we were both sick at home than I would not send an SMS message to her, because that would be misunderstood. Than it is better to send an e-mail in, which you can describe you feelings and elaborate them. Yes you would not send than an SMS message, because that would be rude." [WW2]

Privacy

Privacy was only salient when conveying message with IM. The teenagers indicated that you do not know who is at the receiver end or that there is someone with the receiver, which is illustrated with the following example provided by two boys.

"Yes or somebody is sitting next to her. I had that once when I was talking to somebody and the other was not typing anymore but her girlfriend. than I found out." [TB4] *"Yes than you feel a bit betrayed."* [TB3] *"Yes the telephone is for such things handy."* [TB4]

Benefit

The workers indicated that they appreciate a telephone call only if it is at a suitable time or moment. Both groups appreciate a short SMS message, because it is a sign that someone is thinking about you, they call it a "boost". The teenagers especially appreciated that someone made personal effort for you by sending a personal message with SMS. E-mail is appreciated by the workers, because it contains more information compared to a SMS message.

"Actually, I appreciate long messages more although the short ones are also fast. I do not know if there is a difference between the two. Because the short messages happen more often, that is why I think that I appreciate them more. Although the long ones are on that moment also nice." [TB4]

5.2.5 Enhancing communication media

Summary suggestions

The workers and teenagers indicated the following suggestions for relational-oriented communications:

- More and advanced emoticons with SMS. [WM2 and WW1]
- Provide a message with mood with a sound or vibration so you know what to expect. [WM2]
- To perceive a reaction of the face or with an icon when a person receives an SMS message. [WW6]
- To save messages received on SMS like a photo album. "Just like a letter". [WW6]
- Sending sound or photo's if it is easy to use. [WW5]
- To perceive that a person had read an SMS message. [WM4]
- To send an SMS with speech, because they find it more personal and easier than typing. [TB3 and TB4]

The workers and teenagers indicated the following suggestions for relational-oriented communications:

- To perceive each other on the telephone. [WM1, WM4 and most teenagers]

Prototype 1: Social rabbit

The opinions of most participants, on the usage of the photo list are divided. Most participants do not want to convey automatically emotion information and in lesser degree location information. A participant indicated this fact with the following statement.

"Yes, okay you will not be happy with that, because you get a kind of big brother feeling." [WM1]

Availability

Most of the participants indicated to have no problem with sharing manually availability with their friends, which is possible with current IM programs. Though the teenagers indicated that they usually knew what their friends were doing so it would be of no real additional information. The teenagers had no problem with sharing this automatically, because they probably would forget to change the information.

"...it is like IM." [WW5].

Location

Sharing automatically location information was usually a problem, because of privacy problems even between best friends. Half of participants indicated to have no problem with sharing location information manually with best friends, although they had concerns about forgetting to share or change the location information. This is indicated by a participant who wants to meet with his friend, who occasionally comes back to his hometown (Eindhoven).

"Something as indicated here, I just thought about it. The name of my friend on this screen with Eindhoven, Amsterdam or on vacation and when I sometimes want to meet him and I know he is in Eindhoven than I will call him sooner than that I know he is still in Amsterdam." [WM4]

Emotion

All participants do not like to share their emotion and most of them explicitly mentioned not to want to share negative emotions.

"The only disadvantage is the emotion, if I would perceive a sad emotion I would feel obliged to react." [WW6]

Message

Half the participants indicated that they liked sharing an asynchronous text message and all of them compared it with an SMS.

"Yes that is funny indeed, a small message just like a SMS message. That is what I am used to." [WW5]

Prototype 2: Photo list

Some teenager indicated that they do not like the photo list because you can not share information with more than one friend and that it is more a coddle toy for kids that you do not want.

Speech

Most of the participants indicated they liked the function to convert a text to a voice message. Most participants wanted to hear the voice of the sender and compared it to a voice mail. Though most of the teenagers dislike hearing a computer generated voice, which some had already experienced with.

“That looks like fun, somebody sends a message and you can hear the voice.” [WW4]

Blinking

Most of the participants do not like blinking lights to try to establish contact, because it is obtrusive or results in obligation.

“Yes, that blinking is so obtrusive, it is more like saying: Hello are you there?” [WW1]

Lights

Half the participants indicated to have no problem with conveying messages (e.g., busy) with the lights. Some participants indicated that they would like to convey availability (e.g., relax, going home, availability and away) and functional messages (e.g., appointments, and reason for contact).

“It seems a good idea although it needs more work. To provide the lights with a meaning for going home or relax is not what I would use them for. I would use them to let the other know why I am looking for contact.” [TB4]

Ears

Half of the working participants indicated they found it interesting as an extra function. Most of the teenagers generally do not found it interesting, because it is not personal and does not have any meaning.

“Yes, I do not see what the function is if it moves and the other perceive the movement. Nice (sarcastically), but for the rest nothing” [TG3]

Comparison prototypes

Most participants preferred the social rabbit more than the photo list because the latter prototype conveyed automatically emotion, which all the participants rejected.

Intention

Almost all the participants indicated to prefer the social rabbit, because the intention of sharing information lies with the sender.

“You can use with this (the social rabbit) when you want to share something and with the photo list you will always share how you feel. This is the advantage of the social rabbit compared to the photo list” [TB3]

Explicit/implicit

The teenagers indicated that the photo list is more personal, because of the picture of someone you love. Especially the teenagers liked the option of leaving a message on the photo list. Four working participants indicated that they found the social rabbit more implicit, which felt more distant and provided the opportunity to hide. Especially the colours were found more explicit, which the following statement indicates.

“No, more emotional distance. With this (the photo list) you can perceive more than with that (social rabbit).” [WW2] “It is more a mask” [WW2]

5.3 Conclusions

Maintaining a feeling of connectedness

The general findings of media usage (at least used by half of the two participant groups) of workers and teenagers for relational-oriented and conversational-oriented communication are summarized in Table 3. However, a note has to be made that teenagers mainly maintain a feeling of connectedness with face-to-face communication.

Table 3 General media usage relational-oriented and conversational-oriented communication

General media usage		
Media	General mode used for media	General users of media
Telephone	COC	Workers
IM	ROC + COC	Teenagers
E-mail	COC	Workers
SMS	ROC	Workers

When investigating media usage between different relationships, the following conclusions can be made. Teenagers indicated they use SMS specifically with close friends with which they maintained a high contact frequency, because you make personal effort for that person. IM is used by the teenagers mainly for maintaining friendships with diverse friends; however they share telephone conversations only with close friends. The workers use the telephone with good friends, which they have low contact frequency with, and SMS with friends they have high contact frequency.

Media richness and social presence factors

The use of SMS, IM and e-mail for conveying relational-oriented communication confirms the research hypothesis that lean means of communication can be sufficient for this behaviour. However, the hypothesis that lean communication is not sufficient for relational-oriented communication is only disconfirmed by the teenagers. Teenagers generally use IM for conversational-oriented communication, although they generally use face-to-face communication for maintaining conversational-oriented communication. Workers seem to prefer the telephone for this mode, which confirms our research hypothesis that lean means of communication, is not sufficient for conveying conversational-oriented communication. Although, the preference of lean and rich means of communication depends on the following factors, which are determined with social presence and media richness theory: *feedback*, *accessibility*, *channel (audio)*, *personal* and *content*. Table 4 provides a summary of the findings with media richness and social presence theory, related to the different communication modes and media.

Table 4 Results media richness and social presence theory (scale: from high ++ to low --)

General media usage		Media richness and social presence theory				
Mode	Media	Content	Personal	Feedback	Accessibility	Channel (audio)
COC	Telephone	++	++	++	++	++
ROC+COC	IM	-	0	+	+	-
ROC	E-mail	-	-	-	-	-
ROC	SMS	-	0	-	0	-

Two new factors, which are not described in media richness and social presence theory, emerged from the analysis: *feedback* and *accessibility*.

Feedback does not only depend on the communication media capacity to provide feedback, it has also a subjective part, which emerged in this research: *accessibility*. Accessibility depends on how fast participants perceive that the receiver receives the message, which is sometimes perceived as near-synchronous. Workers perceived less difference in accessibility between e-mail and SMS, because they work often behind a computer and thus have immediate access to e-mail.

How *personal* a communication media is perceived, is influenced by the time taken to receive feedback, audio and personal effort. Teenagers vary in their opinion if IM, which provides immediate feedback, is more personal than SMS messages which need more personal effort to convey. E-mail is less personal than IM and SMS, because it takes minimal personal effort and used for informal messages.

Content is an important factor for media choice. Rich means of communication seems, compared to lean means of communication, more suitable for conveying personal, important or emotional messages. However, lean means of communication are suitable for conveying “less” important, “less” personal or “less” emotional messages.

Impression management factors

Three factors, which provide participants with means for managing self-presentation, were found: *symbolic meaning*, *interactional control* and *function*.

Symbolic meaning was used for self-presentation with making personal effort for the receiver, by selecting a nice post card or hand written letter, which results in a positive appreciation (four participants).

Interactional control is used for protecting their own self-concept by using asynchronous communication media, when they felt sad (six participants).

Function, is a factor which emerged in this research by analyzing the discussion about automatically conveying emotions. Most participants spontaneously indicated that they do not want to share negative emotions, because it is very personal and you do not always feel like sharing it. Control over when you convey negative emotions seems more salient than with positive emotions.

Affective benefit and costs factors

Relational-oriented and conversational-oriented communications are both appreciated for maintaining a feeling of connectedness, which is in line with this research hypothesis. Although participants experience three general affective costs when maintaining friendships with communication media for relational-oriented and conversational-oriented communication: *obtrusiveness*, *process effort (financial costs and effort)* and *expressiveness*. The conclusions of this research are summarized in Table 5.

Table 5 Results affective costs of communication analysis (scale: from high ++ to low --)

General media usage		Affective costs of communication			
Mode	Media	Expressiveness	Obtrusiveness	Effort	Financial costs
COC	Telephone	++	++	--	y
ROC+COC	IM	+	-	-	n
ROC	E-mail	0	-	-	n
ROC	SMS	--	-	++	y

Effectively conveying thought or feeling (*expressiveness*) is best accomplished with rich communication media, which is in line with our research hypothesis. SMS is less expressive compared to e-mail and IM, because it provides limited space for sharing a message and takes more *effort* to convey because of the small “keyboard”. *Obtrusiveness* was mainly salient with the telephone and more difficult to manage, because of its synchronous nature. In this research it was hypothesized that conversational-oriented communication bears more affective costs, compared to relational-oriented communication, however this is only found when comparing the telephone with the other means of communication.

Enhancing communication media

The following functions seem NOT interesting, by most participants.

- Sharing emotion manually or automatically, because of:
 - Privacy concerns
 - No practical use
- Seeking contact with blinking lights, because of:
 - Intention of seeking contact has to lie with sender
- Sharing implicit messages

The following functions seem interesting, by most participants.

- Conveying manually location information although only with best friends
- Conveying manually or automatically availability information
- Sharing asynchronous audio messages
- Converting text to speech
 - Speech has to be of sender's voice
- Improving conversational-oriented communication with video

6 Main discussion

To recapitulate, our main research objective is to investigate how people can *maintain* and *enhance* a feeling of connectedness with communication media. To accomplish this objective, two main research questions are investigated with the focus groups and interviews, which the results are discussed in this chapter.

R.Q. 1: Which factors are crucial in order to maintain a feeling of connectedness with communication media?

R.Q. 2: How can we enhance communication media for maintaining a feeling of connectedness?

To answer our first research question, this research investigated how people maintain a feeling of connectedness with current communication media and two related concerns: the affective costs of communication and the perceived inappropriateness of lean communication media. These three topics are discussed in R.Q. 1.1, R.Q. 1.2 and R.Q. 1.3, which are described in the next paragraphs. After discussing these three topics, the first research question is answered. To answer our second main research question, this research explored suggestions made by the connectedness-oriented communication systems literature, which are discussed at the end of this chapter.

R.Q. 1.1: How do people maintain a feeling of connectedness with current communication media?

To investigate how people maintain a feeling of connectedness, two communication modes were investigated: relational-oriented and conversational-oriented communication. Both modes, as expected, maintain a feeling of connectedness, although the way participants maintain this feeling is different. SMS messages are found in both research methods to be related to relational-oriented communication, and in the interviews are telephone conversations related to conversational-oriented communication, as found by Licoppe (2004). In line with Bankers (2004), who only found that 6 % of the relational-oriented communication is conveyed with the telephone, this research found minimal indications in the both research methods, that relational-oriented communication is conveyed with the telephone. These findings are in contrast with Licoppe (2004), which distinguishes short mobile telephone calls between content-oriented and relational-oriented communication, however they do not provide how these communication goals are divided between the two. The findings in this research and Bankers (2004) provides evidence that short telephone conversations, only consist of a small part of relational-oriented communication behaviour and most of it is content-oriented communication. IM and e-mail are used for both modes and investigation of these two communication media, with these two communication behaviours, was a first time. Media preference of relational-oriented and conversational-oriented communication differed between workers and teenagers, which is described next.

Workers and teenagers differ in communication media preference, which could be the result of different social environments in which they manage their relationships. In both our research methods it is found that teenagers maintain their relationships mainly with face-to-face communication, which is in line with Hartup and Stevens (1999). In our research it was expected to find a small preference for SMS with teenagers, as indicated by several articles (Ling et al., 2001 and Spot.nl, 2006), which is not found in both research methods. The financial costs of SMS could be the reason of this finding and could also explain for the popularity of IM and emphasize the importance of financial costs for teenagers. In both our research methods it is found that workers prefer to use the telephone for maintaining relationships, which is in line with the survey of Spot.nl (2006). Additionally, in both methods it is found that sharing relational-oriented communication messages seems mainly suitable for maintaining relationships with high contact frequency, which is in line with Licoppe (2004), and Licoppe and Smoreda (2005). Especially, the workers were aware of this fact. This could be explained by the fact that they do not have to share a lot of information, because they perceive each other often, which could emphasize the importance of contact frequency for media choice.

R.Q. 1.2: Are lean means of communication suitable for maintaining a feeling of connectedness?

This research found in both research methods that lean and rich means of communication can maintain a feeling of connectedness (in line with Licoppe, 2004); however the *content* of the message influences this preference. The factors *personal*, *immediate feedback*, *accessibility*, *personal* and *audio (channel)*, which are characteristics of rich means of communication, are important factors for conveying “complex” messages with important, personal and emotional content. However, these factors are of less

importance when conveying messages with “less” important, “less” personal and “less” emotional content, which could be referred to as a “simple” task. This is in line with media richness theory (Daft and Lengel, 1984), which emphasizes the importance of rich communication media for ambiguous tasks, and lean means of communication for “simple” tasks. These findings indicate that filtering of emotional and personal cues is not always perceived as a concern for maintaining a feeling of connectedness for “simple” messages. Especially teenagers seem to be less concerned with media richness, because they use IM, beside face-to-face communication, a lot for maintaining a feeling of connectedness.

In line with the impression management model (O’Sullivan, 2000), indications were found in the interviews of participants, which sometimes prefer to use lean communication media, when the sender’s or receiver’s self-concept is negative or positive affected. Although, participants want to inform their friends, they do not always want to show their emotional “weak spot”, and prefer to use asynchronous text-based communication for informing their friends. This finding is not in line with media richness theory, because participants prefer to use lean communication media for a complex task. Additionally, post-cards are used for enhancing their self-concept, because of the symbolic meaning, which is related to the personal effort a person makes for the other. Personal effort is recognized as an affective benefit in the ABC-Q, which refers to meaningful effort that is enjoyed by the receiver (van Baren et al., 2004).

R.Q. 1.3: Which affective costs do people experience with maintaining a feeling of connectedness?

In line with the expectations of the ABC-Q (van Baren et al., 2004), this research found several factors, which are not accounted for in media richness or social presence theory, and influenced media choice: *process effort (financial costs and effort), expressiveness and obtrusiveness.*

Process effort

Process effort is divided into financial costs and effort. Financial costs, was found in both research methods and were mainly a concern with the teenagers, who used IM, because it is free of charge and easy to use. The workers were also aware of this characteristic, although they were less concerned with it. Effort was only a concern when conveying a SMS message, which is unsuitable for conveying long messages, because it takes time to process a message with a “small” keyboard. Research participants manage this, together with the financial costs per message, by using SMS mainly for conveying short messages.

Expressiveness

Expressiveness is a new concept, suggested in this research, which is the characteristic of communication media for conveying effectively thought or feeling. This research found in the interviews that rich means of communication conveys expressiveness more effectively, compared to lean means of communication, which is in line with media richness theory. The lack of expressiveness results in the use of lean means of communication media for sharing mostly “less” emotional, “less” personal or “less” important messages.

Obtrusiveness

In both research methods it is found that participants perceive telephone conversations as obtrusive. The obtrusiveness nature of using the telephone was a major concern of all participants and they managed this by using caller-id, asynchronous, text-based communication or by calling at suitable moments.

R.Q. 1: Which factors are crucial in order to maintain a feeling of connectedness with communication media?

The answer to the first main research question is based on the result of the three research questions, which were discussed above. In this research, two communication behaviours: relational-oriented and conversational-oriented communication, are investigated. The findings of media use for the related communication behaviours, between workers and teenagers are summarized in Table 6, and explained in the former chapter. Additionally, this research investigated with media richness, social presence and the affective costs of communication, the factors influencing media choice. Five factors emerged from analyzing the interview transcripts with media richness and social presence theory: *content, personal, feedback, accessibility and channel*, which are outlined in Table 7, and explained in the former chapter. Five factors emerged from analyzing the interview transcripts on the affective costs of communication:

effort, financial costs, expressiveness and obtrusiveness, which are outlined in Table 8, and explained in the former chapter.

Table 6 General media usage relational-oriented and conversational-oriented communication

General media usage		
Media	General mode used for media	General users of media
Telephone	COC	Workers
IM	ROC + COC	Teenagers
E-mail	COC	Workers
SMS	ROC	Workers

Table 7 Results media richness and social presence theory (scale: from high ++ to low --)

General media usage		Media richness and social presence theory				
Mode	Media	Content	Personal	Feedback	Accessibility	Channel (audio)
COC	Telephone	++	++	++	++	++
ROC+COC	IM	-	0	+	+	-
ROC	E-mail	-	-	-	-	-
ROC	SMS	-	0	-	0	-

Table 8 Results affective costs of communication analysis (scale: from high ++ to low --)

General media usage		Affective costs of communication			
Mode	Media	Expressiveness	Obtrusiveness	Effort	Financial costs
COC	Telephone	++	++	--	y
ROC+COC	IM	+	-	-	n
ROC	E-mail	0	-	-	n
ROC	SMS	--	-	++	y

The factors found in this research, are discussed below in relation with relational-oriented and conversational-oriented communication behaviour. However, a note has to be made about the importance of the content of a message: important, personal or emotional messages and “less” important, “less” personal or “less” emotional messages. The latter content is in this research related to *relational-oriented communication*, and the former to *conversational-oriented communication*, which are discussed next separately.

Relational-oriented communication

In the interviews it is found that relational-oriented communication behaviour is generally shared with SMS, IM or e-mail, which are asynchronous or text-based communication media. An important factor of these media is that they are unobtrusive, which enhances communication opportunities for keeping in touch. The asynchronous nature is also a disadvantage, because it is perceived as less personal, although SMS and e-mail is sometimes perceived as near-synchronous (accessibility) and more personal, when they know that the receiver receives the message “directly”. This emphasizes the importance of providing communication opportunities, anytime and anywhere, which can only be accomplished with mobile communication media. However, asynchronous and text-based communication media lack expressiveness and costs more effort to convey. However, this concern is less relevant for participants, because they use them for conveying short messages with “less” personal, “less” important or “less” emotional content.

Conversational-oriented communication

In the conversational-oriented communication mode, participants share a lot of information and to convey these kinds of messages, workers prefer to use the telephone and teenagers prefer, beside face-to-face communication, IM. Both communication media provide participants the possibility of conveying information effortlessly. However, when the content is more personal, important or emotional, the telephone is generally preferred, because of the following factors: expressiveness, personal and feedback. The telephone provides participants immediately with vocal feedback, which is important for expressiveness and how personal participants perceive the media to be. However, using the telephone is very obtrusive, which participants manage in various ways: by sharing telephone conversations at suitable moments, caller-id to identify the reason of the messages and alternative communication media for managing availability.

R.Q. 2: How can we enhance communication media for maintaining a feeling of connectedness?

Providing people with social awareness (sharing location, welfare and availability information) seems an interesting function for enhancing a feeling of connectedness. Social awareness provides people with a means for managing availability, which results in more communication opportunities with lower affective costs. However, the findings in both research methods, refute the need for sharing emotions (manually or automatically), as suggested by Corral (2004) and Kuwabara and colleagues (2002). Sharing location and availability information seems interesting, although conveying them automatically seems questionable. Research participants wanted to manage when, what and with whom they share information. Control over information is very important for preventing affective costs, and should be exclusively handled by the user, instead automatically by a system. However, this could result in not using or forgetting to change the information.

Additionally, the findings of the interviews indicate that it is important to manage availability and location information between different relationships, to prevent “misuse”. For example participants who use IM, indicated that they set their IM availability always on busy or just stop using it, because they were bothered with useless conversations. These enhancements seem particularly of interest for conversational-oriented communication because they help people manage availability for communicating at suitable moments.

In both research methods it is indicated that conveying implicit messages, seems unsuitable for maintaining a feeling of connectedness, because interpretation is difficult, which contradicts suggestions made by Kuwabara and colleagues (2002). Although asynchronous and text-based messages support a feeling of connectedness, there is also a need for conveying asynchronous audio or video messages (MMS), which is found in both methods. Sharing asynchronous audio or video messages reflects the need for minimizing the obtrusiveness, although maximizing the amount of information conveyed (expressiveness). These enhancements seem particularly of interest for relational-oriented communication, because people referred to these enhancements mainly for improving SMS messages. Figure 1 provides an overview of our main research objectives and the results obtained by answering both main research questions.

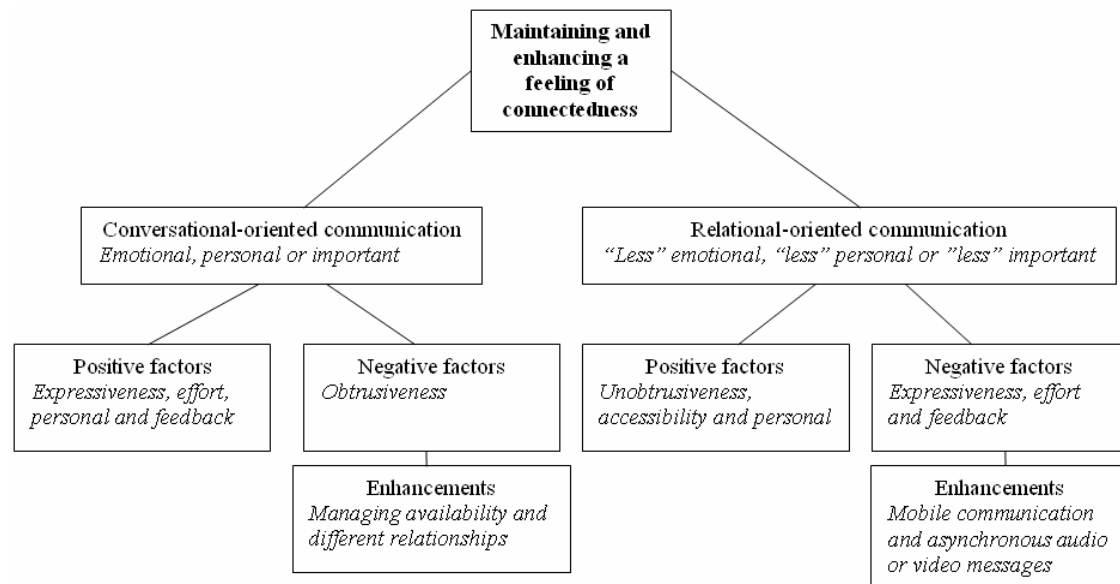


Figure 1 Overview of results for main research objectives

7 Recommendations

7.1 Recommendation for future research

Relational-oriented and conversational-oriented communication

Two concerns emerged when analyzing with relational-oriented and conversational-oriented communication. Firstly, people use the same communication media for both behaviours, which makes it difficult to make a distinction between the different communication behaviour. Secondly, as indicated by Licoppe (2004) and in this research, differences between long and short or frequent and non-frequent messages are subjective, and could vary between participants. However, participants perceived these subjective characteristics of little concern and mentioned the communication goal, when choosing between different communication media. In this research relational-oriented communication is referred to as long and non-frequent message, and conversational-oriented communication as short and non-frequent messages, it would be better to emphasize in future work on the content of the message or communication goal. However, it is questionable if just chit-chatting, which is related to conversational-oriented communication, is more emotional, important or personal compared to just wishing somebody good luck. Distinguishing between different connectedness-oriented communication behaviours is not always clear; there are always exceptions, which need considerations. This concern can also be reflected on media richness theory, which emphasizes the importance of rich communication media for complex messages, which also can vary among users (expert and novel users) and messages.

Analyzing the affective costs of communication

The affective costs investigated in this research were mainly extracted from the ABC-Q (van Lanen et al., 2004). The ABC-Q is a relatively new research method, which still need further research for fully understanding all the affective costs involved with communication. For example expressiveness, which is not mentioned in the ABC-Q, seems an important factor for maintaining relationships, although further investigation of the concept is necessary. Additionally, the concepts obligation and expectation were difficult to discuss with the participants and could not fully recognize these concepts in their communication behaviour. Although participants had knowledge of the affective costs, they manage the affective costs in their routine behaviour. Thus it is important for future work to fully understand the reasons and behaviour of people with different communication media.

Analyzing with social presence and media richness theory

Though media richness and social presence theory are commonly used and recognized for analyzing media choice, several theories emerged (e.g., impression management) which try to complement media richness theory. In this research the question arose about the appropriateness of social presence and media richness theory for media choice, because of the growing communication arsenal and related characteristics, which are not fully accounted for in these 'traditional' theories. For example, e-mail is in this research indicated as lean means of communication, because it conveys asynchronously text messages. However, e-mail can also contain attachments, which makes it "richer", although most participants in this research did not mention e-mail with attachments. Additionally, in this research are also additional factors found, which are not mentioned in media richness and social presence theory.

In this research it is found that feedback also contains a subjective factor: accessibility. Accessibility, concerns the subjective experience of the receiver receiving a message and sometimes referred to as near-synchronous. This was especially salient with sharing SMS messages, which are perceived immediately on the receiver mobile, which is usually near the receiver. Accessibility influences the richness of a media, especially when comparing SMS with e-mail. SMS is usually found more personal because it is perceived immediately by the receiver on his mobile phone. Additionally, this is also influenced by the personal effort made by the sender. The teenagers indicated the importance of personal effort by comparing SMS messages and IM conversations, which differed in spontaneous conversations. SMS messages were perceived more personal, because somebody specifically thought about you. However IM conversations were less spontaneous, because people can perceive their nickname. These findings provide doubts about the appropriateness of only using media richness and social presence theory, for analyzing media choice for maintaining a feeling of connectedness.

7.2 Recommendations for Vodafone group R&D

Several recommendations emerged, which are interesting for further investigation.

- Managing availability
- Managing information between different relationships
- Sharing asynchronous video or audio messages
- Investigation of communication between working people

These recommendations need further investigation, because this research consisted of a small participant group, which is only suitable for explorative research purposes. To find more significant information, quantitative research is necessary. The topics are discussed below.

Managing availability and relationships

Managing availability is very important, although people have more ways of keeping in touch, they do not always establish it. Availability would help participants manage communication and minimize the telephone's obtrusive nature. People could call each other more frequently, instead of waiting for appropriate moments, which enhances communication opportunities. However, availability should be provided "automatically" instead of letting the user handle it exclusively; else it would deteriorate its effect, because people would forget to change their availability. In this research it is suggested that availability should automatically change with the status of the telephone, for example conveying when the telephone is on, off, busy or silent. However, people should always be provided with the choice of not using the function.

Managing information between different relationships

Participants do not want to share availability with everyone, and managing this information between relationships seems vital. In general, current communication media do not provide people with possibilities of managing information between different relationships. Although participants want to be in touch, they do not always want this with all their relationships. The use of IM is a good example of this phenomenon; although IM provides availability, participants set it mostly on "busy" or "away" to avoid useless conversations of people they do not want to communicate with. The side effect of this behaviour is that most people set their availability on "busy" or "away", which results in that nobody is available.

Sharing asynchronous audio or video messages

Sharing asynchronous video or audio messages seems to balance media richness and obtrusiveness. Participants seem to have a need for sharing these kinds of messages with their relationships, which indicates that MMS has big potential. Although, most participants found this interesting, most of them did not refer to MMS, which indicates that MMS needs more promoting. The unfamiliarity could be, in my opinion the result of the financial costs involved or that it is still not user-friendly to use. Further investigation is necessary to find the specific factors involved of why MMS is not used as often, although there seems to be a need for it.

Investigation of communication between working people

When investigating workers and teenagers' communication needs, it seems that workers are the most interesting group for the Vodafone group for further investigation. Teenagers are less interesting for investigation, because they are more concerned about the financial costs of communication and manage their relationship mainly with face-to-face communication and IM. Workers are less concerned with the financial costs of communication and have a preference for the telephone. Additionally, workers have low contact frequency relationships, with which they want to maintain relationships, by using long telephone conversations. In contrast with teenagers, workers have to better manage the obtrusive nature of the telephone, because they have a preference for using the telephone for maintaining a feeling of connectedness.

8 General conclusions and reflections

8.1 General conclusions

The following general conclusions can be drawn from this research.

- Media choice theory has to combine media capacity theories with the affective benefits and costs of communication people have when using communication media, for fully understanding the factors involved.
- Managing the growing communication repertoire seems to have a growing importance.
- Maintaining a feeling of connectedness is possible with lean means of communication, however only under certain circumstances.
- Distinguishing between different connectedness-oriented communication behaviours is important to fully understand the factors involved.

8.2 Reflection on this research

In this research are focus groups and interviews used, which are both qualitative research methods. Qualitative research is used for exploring attitudes and reflections of people in its context. The goal of this research was to identify the different factors involved with maintaining and enhancing a feeling of connectedness, for further research. This section discusses criteria which indicate how well the research is designed and conducted. Guba (1981, as cited in Kairuz, Crump and O'Brien, 2007) developed four general criteria for evaluation of the "trustworthiness" of a qualitative research: truth-value, applicability, consistency and neutrality.

Truth-value

Truth-value is related to the criteria of internal validity, which is used for assessing quantitative research. The criteria truth-value refers to the amount of confidence a researcher has in his results or credibility it has. Using different research methods strengthens the truth-value, which is called triangulation. In this research is a literature research, focus groups and interviews conducted to investigate the main research question. Although, the focus groups provided interesting results for further investigation, the findings were less applicable for answering the main research question. The focus group consisted of only two groups, which are to minimal to provide a general picture. However, the discussion of the connectedness-oriented functions in the focus groups and interviews provided similar findings. The literature research and interviews provided a good combination for strengthening the results.

Member checking is another way of strengthening the truth-value, and consists of confirming the conclusions with the participants. The final conclusions in this research were not checked by the participants. However, the general communication behaviour of the participants was checked by the interview moderator after each subject. This was accomplished by summarizing the general communication behaviour and asking the participants for feedback about if the moderator understood the statements made by the participants.

Another way to increase the truth-value is by using diverse participants, who all state the same issue. In this research are participants used, which differed in age (14 to 19 years old and 25 to 35 years old) and education (intermediate vocational education, higher vocational education and university), who provided a good indication of the workers and teenagers group under investigation. General statements in this research are based on minimal half the participants or indicated otherwise. However, individual statements, which disconfirm general statements, were also mentioned in the analysis.

Applicability

Applicability is related to the quantitative research criteria external validity, and refers to if the findings can be used in other situations. The general findings in this research are applicable in other similar situations, because the contexts in which the answers are provided are included in the analysis. For example, a telephone call will be obtrusive on work, which indicates it will also be obtrusive in other sensitive situations. When a result is only applicable for specific situation, this is indicated. For example, the findings with the impression management model are only applicable when the negative or positive self-concept is affected.

However, it is questionable if the findings can be generalized with other groups, than investigated in this research (teenagers (14 to 19 years old) and workers (25 to 35 years old)). The findings found in this research are opinions and attitudes of the participants, which makes it difficult to generalize to other groups. The amount of participants used (twenty in the interviews and ten in the focus group) seem to provide a fairly general overview of the communication behaviour of the workers.

Consistency

Consistency is similar to the reliability of a quantitative research, and describes the strength of a research, if it was conducted with similar participants. The consistency depends on the amount of observers used for attaining the results. In this research is one observer used for obtaining the data of the focus group and another for verifying the findings. The interviews were transcribed and analyzed by one and the same researcher. This makes the interpretation of the findings less strong, because they are based on the interpretation of one researcher. However, the interviewer also transcribed the findings provided additional information, because the transcribed materials could be placed in the context in which the participants described.

Consistency also depends on the amount and quality of information provided to replicate the research. This research provides full explanation of how the data was acquired by extensively describing the method used (design, participants, apparatus and procedure). The definitions used for analysis are all provided for replication. The interviews and tables are all fully transcribed to provide insight in the context of statements, and can be obtained on request.

Neutrality

Neutrality refers to the quantitative research criteria objectivity, which refers to the amount of bias present in a research. A neutral research is a research, which tries to report the findings non-judgemental. To accomplish this, researchers have to provide all information (e.g., notes) used for examination by other researchers. This report provides the transcripts, analysis scheme, analysis tables and all other information to other research for maximizing neutrality. Although, the conclusions are judged by the research supervisors, the full data analysis was not completely examined.

9 References

- Alder, R.B. and Rodman, G. (2006). *Understanding Human Communication*. 9th ed. New York: Oxford University Press, 114-149.
- Amin, A. K., Kersten, B. T. A., Kulyk, O. A., Pelgrim, P. H., Wang, C., Markopoulos, P. (2005). The SenseMS: Enriching the SMS experience for Teens by Nonverbal Means. *Presented at MobileHCI 2005*, Salzburg, Austria, 19-22 september 2005.
- Baarda, D. B., de Goede, M. P. M. and Teunissen, J. (2001). *Basisboek kwalitatief onderzoek*, Stenfert Kroese, Leiden.
- Bankers, J. (2004). *Understanding the usage of voice calls: An exploration of Motivations, Barriers and Preferences*. Unpublished Masters Thesis. Eindhoven University of Technology.
- van Baren, J., IJsselsteijn, W.A., Markopoulos, P., Romero, N. and de Ruyter, B. (2004). Measuring Affective Benefits and Costs of Awareness Systems Supporting Intimate Social Networks. In: Nijholt, A. and Nishida, T. (eds.), *Proceedings of 3rd workshop on social intelligence design*. CTIT Workshop Proceedings Series WP04-02, 13-19.
- Biocca, F., Harms, C. and Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Journal of Teleoperators and Virtual Environments*, 12, 456–480.
- Boneva, B. S., Quinn, A., Kraut, R. E., Kiesler, S., and Shklovski, I. (2006). Teenage communication in the Instant Messaging era. In R. Kraut, M. Brynin, and S. Kiesler (Eds.), *Oxford University Press, Computers, phones, and the Internet: Domesticating information technology* (pp. 201–218).
- Christensen, T., K. (2004). *ICT-mediated proximity - being far away and close together*. Innovation and Sustainability Department of Manufacturing Engineering and Management Technical University of Denmark
- Christiansen, N. and Maglaughlin, K. (2003). Crossing from Physical Workspace to Virtual Workspace: be AWARE!, *Proceedings of HCI International Conference on Human-Computer Interaction*, New Jersey, Lawrence Erlbaum Associates, 1128–1132.
- Clark, H. H., & Brennan, S. E. (1991). Grounding in communication. In L.B. Resnick, J. Levine, & S.D. Teasley (Eds.), *Perspectives on socially shared cognition*. Washington, DC:APA. Reprinted in R. M. Baecker (Ed.), *Groupware and computer-supported cooperative work: Assisting human-human collaboration*. San Mateo, CA: Morgan Kaufman Publishers, Inc.
- Corral, J., (2004). *Clique Here: Exploring the Use of Mobile Multi-Media to Support Connectedness*. MIT M.Eng Thesis.
- Daft, R. L. and Lengel, R. H. (1984). Information richness: a new approach to managerial behavior and organizational design. In: Cummings, L.L. and Staw, B.M. (Eds.), *Research in organizational behavior* 6, Homewood, IL: JAI Press. (191-233).
- Dennis, A. R., and Kinney, S. T. (1998). Testing media richness theory in the new media: The effects of cues, feedback, and task equivocality. *Information Systems Research*, 3, 256–274.
- Doyle, M. E. and Smith, M. K. (2002) 'Friendship: theory and experience', *the encyclopaedia of informal education*, Last update: January 28, 2005.
- Go, K., Carroll, J. and Imamiya, A. (2000). Familyware: Communicating with Someone You Love. *Proceedings of the IFIP TC9 WG9.3 International Conference on Home Oriented Informatics and Telematics, HOIT2000*, pp. 125-140.

- Hartup, W. W. and Stevens, N. (1999). Friendships and adaptation across the life span. *Current Directions in Psychological Science*, 8, 76-79.
- Heeter, C. (1999). Aspects of Presence in Telerelating, *Cyberpsychology and Behavior*, 2, 225-325.
- IJsselsteijn, W.A., van Baren, J., & van Lanen, F. (2003). Staying in touch: Social presence and connectedness through synchronous and asynchronous communication media. In: C. Stephanidis and J. Jacko (eds.), *Human-Computer Interaction: Theory and Practice (Part II)*, volume 2 of the Proceedings of HCI International 2003, pp. 924-928.
- Kenrick, D. T., Neuberg, S. L., and Cialdini, R. B. (2005). *Social psychology: Unraveling the mystery* (3rd ed.). Boston, MA: Allyn and Bacon.
- van Lanen, F. (2003). *Staying in touch over distance: An exploration of the concept of connectedness*. Unpublished Masters Thesis. Eindhoven University of Technology.
- Kuwabara, K., Watanabe, T., Ohguro, T., Itoh, Y., and Maeda, Y. (2002). Connectedness oriented communication: Fostering a sense of connectedness to augment social relationships. *IPSJ Journal*, 43, 3270 – 3279.
- Licoppe, C. (2004). “Connected” presence: The emergence of a new repertoire for managing social relationships in a changing communication technoscape. *Environment and Planning D: Society and Space*, 22, 135–156.
- Ling, R. (2004). *The mobile connection: The cell phone's impact on society*. San Mateo, CA: Morgan Kaufmann.
- Ling, R., Yttri, B., Anderson, B., and Diduca, D., (2002) Age, gender and social capital- a cross sectional analysis. *D7.4, a public deliverable of the e-Living IST project*. August 2002.
- Markopoulos, P., van Baren, J., Romero, N., IJsselsteijn, W.A., de Ruyter, B., Farschian, B. (2004). Keeping in touch with the family: Home and away with the ASTRA awareness system. *Extended Abstracts of ACM CHI 2004*, 1351-1354.
- Marmasse, N. (2004). *Providing Lightweight Telepresence in Mobile Communication to Enhance Collaborative Living*. Ph.D. dissertation, MIT Media Laboratory, 2004.
- Meissner, J. (2005). Relationship Quality in the Context of Computer-Mediated Communication - A Social Constructionist Approach. *WWZ*, Working Paper No. 01-05.
- The mobile life report (2006). Retrieved November 2006, from <http://www.mobilelife2006.co.uk/>
- The mobile life youth report (2006). Retrieved November 2006, from <http://www.mobilelife2006.co.uk/>
- Nardi, B.A., Whittaker, S. and Bradner, E. (2000). Interaction and outeraction: Instant messaging in action. *CSCW 2000: ACM Conference on Computer Supported Cooperative Work, Philadelphia, Pennsylvania, USA*, 2–6 December 2000. New York: ACM Press, pp. 79–88.
- Niekerk, P. (2006). Retrieved November 2006, from http://www.spot.nl/publicaties_6.html
- Niffenegger, J.P. and Willer, L.R. (1998). Friendship behaviors during early childhood and beyond. *Early Childhood Education Journal*, 26, 95-99.
- Nussbaum, J. F., Pecchioni, L. L., Robinson, J. D. and Thompson, T. L. (2000). *Communication and aging* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum associates.
- Ohguro, T., Kuwabara, K., Owada, T., and Shirai, Y. (2001). FaintPop: In Touch with the Social Relationships. *JSAI-Synsophy International Workshop on Social Intelligence Design*, pp. 59-66.

- O'Sullivan, P. B. (2000). What you do not know won't hurt me: Impression management functions of communication channels in relationships. *Human Communication Research*, 26, 403–431.
- Oswald, D. B. and Clark, E. M. (2003). Best friends forever? High school best friendships and the transition to college. *Personal Relationships*, 10, 187–196.
- Rettie, R. (2003). A Comparison of Four New Communication Technologies, in *Human-Computer Interaction: Theory and Practice, Part I*, Mahwah, Lawrence Erlbaum Associates, Inc., NJ, 686 - 690.
- Rettie, R., (2003A), Connectedness: A New Dimension of CMC? *IADIS Internet Conference WWW 2003*, Portugal.
- Rettie, R., (2005A). Presence and Embodiment in Mobile Phone Communication, *Psychology Journal*, Vol. 3.
- Rettie, R., (2005). Social Presence as Presentation of Self, Sketch, Working Paper, 8th Annual International Workshop on Presence, London.
- Romero, N. and van Baren, J. (2003). *ASTRA: Design of an Awareness Service and Assessment of its Affective Benefits*. MTD Thesis, ISBN 90-444-0291-9. User System Interaction, Technical University of Eindhoven, The Netherlands.
- Spot.nl, (2006). Retrieved November 2006, from <http://n0.noties.nl/spottime/?q=33cc7d14-5ef881bd>
- Schmidt, K. (2002). The Problem with 'Awareness', *Computer Supported Cooperative Work: The Journal of Collaborative Computing*, 11, 285-298.
- Schutz, W. C. (1966). *The interpersonal underworld*. Palo Alto, CA: Science and Behavior Books Inc..
- Short, J.A., Williams, E., and Christie, B. (1976). *The social psychology of telecommunications*. New York: John Wiley and Sons.
- Smith, H., Rogers, Y. and Brady, M. (2003) Managing one's social network: Does age make a difference? in *Proceedings of INTERACT 2003*, Zurich, 551-558.
- Walther, J. B., and D'Addario, K. P. (2001). The impacts of emoticons on message interpretation in computer-mediated communication. *Social Science Computer Review*, 19, 323–345.
- Washington, W. (2001). *Exploring Ambient Media Presence Awareness*. Masters Thesis, University of Washington.
- Weiser, M. and Brown, J. (1995). Designing Calm technology. *PowerGrid Journal*, 1. Available online: <http://powergrid.electriciti.com/1>.
- Westmyer, Stephanie A., Rachel L. DiCioccio and Rebecca B. Rubin (1998), "Appropriateness and Effectiveness of Communication Channels in Competent Interpersonal Communication", *Journal of Communication*, Summer, 48, 27-48.

Appendix

Appendix A: relational-oriented communication

Voorbeeld 1

Je moet vroeg op om naar werk/school te gaan, je zet je computer aan en ziet een berichtje van je beste vriend. Hij wenst je goede morgen en hij laat weten dat hij ook vroeg moet werken. Je hebt het gevoel dat je niet de enige die vroeg op is en hard aan het werken is. Voor de lol stuur je hem goede morgen terug.

Voorbeeld 2

Je zit naar een sportwedstrijd te kijken en je favoriete ploeg scoort net, je weet dat je beste vriend ook ergens zit te kijken. Je bent erg blij en je wilt hem dit laten weten zonder de wedstrijd hoeven te missen. Je belt hem op en legt na 1x dat de telefoon is overgegaan de telefoon op. Je vriend weet dat je ook net zo blij bent als hem.

Voorbeeld 3

Je zit thuis achter de computer en wil graag weten hoe het met je beste vriend gaat, je ziet dat hij wel online is maar dat hij op bezet staat. Hij heeft wel zijn IM naam veranderd naar dat hij bijna op vakantie gaat naar Spanje, zonder maar een bericht verstuurd te hebben weet je genoeg hoe het met hem gaat.

Appendix B: prototype 1 *Gleams of people*



Story

Lisa en haar beste vrienden hebben een nieuw programma gedownload op hun communicator. Met het programma kan je manueel je eigen stemming instellen door middel van een kleur. De grote van de ballen geven aan hoe vaak ze berichten met haar vrienden heeft uitgewisseld. Berichten bestaan uit het delen van stemmingen die door een kleur worden vertegenwoordigd. Lisa ziet aan de kleur van Sander dat hij treurig is. Ze besluit om Sander op te fleuren door hem te laten weten dat ze aan hem denkt. Dit doet ze door de rode bal van Sander aan te raken waardoor deze bij Sander gaat knipperen.

Wanneer Sander het bericht bekijkt zal zijn bal de stemming krijgen van Lisa, deze wordt blauw. Hij weet dat Lisa aan hem dacht omdat de bal van Lisa op zijn communicator gaat knipperen.

Zodra Sander het bericht van Lisa bekijkt, gaat bij Lisa de bal van Sander tijdelijk knipperen. Zodat zij weet dat Sander het bericht heeft gezien.

Appendix C: prototype 2 Marmasse watch



Story

Lisa en haar vrienden wilden iets meer met hun communicator en besloten daarom hun communicator te upgraden. Nu moeten ze niet meer alles handmatig in te voeren, de communicator stelt zelf alles automatisch in.

Je kunt je eigen avatar samenstellen; kleur haar, gezicht en kleding.

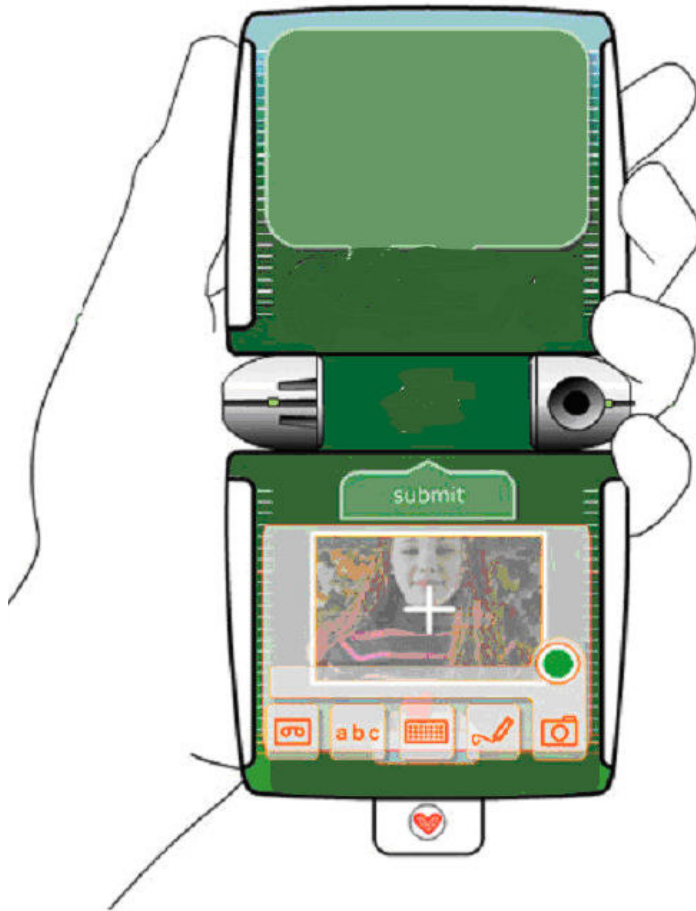
De communicator verandert wel automatisch de stemming van de avatar. Dus wanneer Lisa zich blij voelt, heeft zij een lachend gezicht.

Niet alleen wordt de stemming automatisch bijgehouden door de communicator maar ook waar iedereen zich bevindt (bijvoorbeeld thuis) en de availability (bijvoorbeeld of ze het erg druk heeft).

Lisa ziet dat Marc het erg druk heeft en besluit hem een bericht te sturen. Ze kan Marc een bericht sturen door de avatar van Marc aan te raken.

Elke keer dat ze zijn avatar aanraakt gaat zijn communicator immediate trillen. Ze besluit hem twee trillingen te sturen om zo te laten weten dat ze aan hem denkt.

Appendix D: prototype video Telephone



Story

Marc vindt het erg leuk dat Lisa aan hem denk en besluit haar terug te bellen. Hij kiest er voor om haar met zijn videotelefoon terug te bellen.

Appendix E: connectedness-oriented communication messages workers

Message 1 of man 27 years old

Best friend living in Belgium that he did not see for a while and he spontaneously called him to ask how it was going. E-mail and SMS was used for formal communication, because he did not like typing long messages.

Message 2 of woman 26 years old

Girlfriend was on holiday and she called her immediately when she was back, although she should see her the next day. When the girlfriend was on holiday they kept in contact with SMS by asking how it was or just letting the other know how the weather was. When they see each other they sometimes call each other.

Message 3 of woman 28 years old

Pregnant girlfriend over the telephone about missing person over e-mail and calling back about reading it that the person died. Sometimes they call or meet each other.

Message 4 of man 28 years old

Girlfriend called to ask more about a friendship and it was inconvenient so he had to cut off the call.

Appendix F: dream means of communication workers

The sense/sensory telephone of woman 26 years old

“The primary goal of the sense telephone is to communicate the different aspects of emotions”. The telephone has all the common telephone functions like SMS and calling but also functions that conveys smell (e.g., “the smell of apple pie”), video images and touch. Touch is mediated by moving pads on the telephone that are moved by the sender.

The video 3D mobile telephone of man 28 years old

The only thing that he missed on a telephone was the addition to see somebody. They agreed on that it than only was for best friends and also agreed with him that control is very important about, which friends may use it. One of the women disagreed and did not see it as something extra. He indicated that they did not want fancy features on their telephone and that it already provided enough for them and that video would be sufficient as additional feature.

The video mobile telephone of man 27 years old

The same as the 3D telephone

The hand written note telephone of woman 28 years old

This telephone can print hand written notes and the receiver has the choice to print the notes and in what kind of handwriting. Handwritten notes are very important, because it is personal.

Appendix G: connectedness-oriented communication messages teenagers

Message 1 of boy 15 years old

IM message about music and long messages. Often with more people at once, with people he knows.

Message 2 of girl 15 years old

E-mail of two and a half pages from a girlfriend that she sees everyday about that she is a bisexual. She sent an e-mail, because she wanted to know how she will react to this fact. She would than reply with a long e-mail back. When somebody lives near her she goes to her friend or uses SMS (usually for meetings).

Message 3 of girl 17 years old

Receiving e-mail from her girlfriend about a boy and going to the gala.

Message 4 of girl 18 years old

Sending an SMS message immediately after a concert to a friend. She found it nice to receive immediately a reaction. With her girlfriend, that she did not saw so much, she also sends SMS through internet to save costs (2 a 3 times a day) about how it was going. She used SMS like an e-mail, longer message (approximately five SMS messages), because than she knew that the girlfriend immediately received the message.

Message 5 of boy 17 years old

Short telephone call from a friend about going with them on holiday. It was short, because he saw hem the next day.

Message 6 of boy 16 years old

He indicated that, he did not have long messages with any means of communication

Appendix H: dream means of communication teenagers

Prototype 1 of girl 15 years old

She draws a kind mobile telephone and found the following characteristics important:

- The more the better
- Photo/video, because you can see the other person immediately. (provides more emotion)
- Sound
- A video screen
- Music
- Original design instead of the usual design

Prototype 2 of boy 17 years old

One-button telephone: he wanted a telephone that could function with one button and for the rest with speech recognition (e.g., dictating an e-mail or SMS message).

Prototype 3 of boy 15 years old

PDA telephone, which has a wireless headphone, which has the following functions: SMS, Internet, IM, e-mail, calling, video calling, (must be possible through the whole world), to be connected everywhere and spoken messages. He also wanted video calling, not only synchronous but also the possibility to send an asynchronous audio or video message (just like an SMS). He found it important that, instead of voice mail, that it was a kind of audio/video message that the other can listen to when he wants. The problem with voice mail is that the receiver has to pay for it and that there is not always a message for the receiver, because the sender stopped the message.

Prototype 4 of boy 16 years old

A 3D projection of a friend. He indicated that he preferred to see emotional expressions on the face and hand gestures. He preferred to simulate the face-to-face communication contact.

Prototype 5 of girl 17 years old

She also draws a telephone and really wants to send longer SMS messages, photos and listening to music and calling. She does not want to see other through a screen also when the images are almost perfect to face-to-face communication she does not see the importance, because she wants to see as much as possible her friends face-to-face communication. She sees the telephone and other communication as a support and not as a substitute of face-to-face communication for keeping contact with her friends.

Two boys found that video calling was important, because it provided extra information that helped communicating with the receiver. There was a discussion about the video function and if it was necessary or that it was strange to see the other person.

Prototype 6 of girl 18 years old

This was also a telephone with the following characteristics:

- listening to music and sending
- e-mail
- call
- optionally IM
- photo camera
- Programs like Word
- Not expensive

She found also speech recognition interesting and the option of sending sound or video messages. The financial costs were also very important. Another girl indicated the problem of typing an e-mail on an SMS, although some of them indicated that this could be solved with speech recognition.

Appendix I: interview procedure

Inleidend verhaal

Eerst zal ik mezelf voorstellen en wat vertellen over het doel van dit interview. GSM uit a.u.b.! Daarna zou ik graag willen dat jullie jezelf voorstellen.

Mijn afstudeeropdracht gaat over communicatie tussen twee beste vrienden met als doel een beter beeld te krijgen hoe jullie communicatiemiddelen gebruiken om je band met je beste vriend of vriendin te onderhouden. De beste manier om een band te onderhouden is door samen dingen te doen, bijvoorbeeld samen te gaan stappen. Helaas is dit niet altijd mogelijk en daardoor worden communicatiemiddelen gebruikt om de relatie te onderhouden. Ik wil het in dit interview niet hebben over boodschappen om bijvoorbeeld afspraken te maken of 1 op 1 gesprekken. Maar meer over communicatie om je band of relatie te onderhouden, je kunt dan bijvoorbeeld denken aan elkaar te informeren over hoe het met je gaat of laten weten dat je iets leuks hebt meegemaakt. Eerst wil ik het kort hebben over jullie en je vriendschap en daarna wil ik dieper in gaan op twee soorten boodschappen, namelijk korte frequente boodschappen of lange minder frequente boodschappen. Ik zal deze twee manieren van een relatie onderhouden straks verder uitleggen. Als je vragen hebt, wees vrij om ze te vragen wanneer je maar wilt.

Gegevens deelnemers

Eerste deelnemer

Naam:

Geslacht: man / vrouw

Leeftijd: jr.

Opleiding: WO/HBO/ HAVO/VWO/VMBO

Ervaring comm middelen: Alle / IM / e-mail / SMS / GSM / vaste telefoon

Beschikb comm middelen thuis? Alle / IM / e-mail / SMS / GSM / vaste telefoon

Welke comm middelen gebruik je voornamelijk? Alle / IM / e-mail / SMS / GSM / vaste telefoon

Tweede deelnemer

Naam:

Geslacht: man / vrouw

Leeftijd: jr.

Werk (aard/omvang):

Afgeronde opleiding: WO/HBO/ HAVO/VWO/VMBO

Ervaring comm middelen: Alle / IM / e-mail / SMS / GSM / vaste telefoon/
MMS

Beschikb comm mid thuis? Alle / IM / e-mail / SMS / GSM / vaste telefoon/
MMS

Welke comm middelen gebruik je voornamelijk? Alle / IM / e-mail / SMS / GSM / vaste telefoon/
MMS/ briefjes

Vriendschap

Hoe lang kennen jullie elkaar ongeveer? _____ jr

Waar van? Werk / familie/ studie / sport / _____

Hoe vaak zien jullie elkaar? Wekelijks, dagelijks, weekenden, maandelijks of _____

Om een beter beeld te krijgen van hoe jullie contact houden wil ik graag ingaan op twee verschillende manieren van communiceren, namelijk: korte frequente of lange minder frequente boodschappen. Ik zal eerst het verschil uitleggen en daarna wil ik ze beide apart behandelen en vergelijken. Op het laatst wil ik kijken naar mogelijke verbeteringen en wil ik enkele suggesties geven waar ik jullie mening over wil horen. Om een band te onderhouden gebruiken mensen diverse manieren om contact te onderhouden. Ik wil graag op twee manieren van onderhouden van een relatie in gaan:

Uitleg verschillende boodschappen

Korte frequente boodschappen

Korte frequente boodschappen doe je meer spontaan en zijn erg informeel. Het feit dat je vaak een kort boodschapje krijgt onderhoud je band met je beste vriend of vriendin. Je kunt dan denken aan spontane boodschappen waar je laat weten hoe je je voelt (bijvoorbeeld als je net iets leuks heb mee gemaakt), hoe je situatie is (bijvoorbeeld ik heb het erg druk) of je wilt iets delen (bijvoorbeeld een vriend goede morgen of succes wensen). Deze soorten boodschappen zijn meestal in korte smsjes, e-mails, kleine briefjes, briefkaarten, korte IM of korte telefoon gesprekken te vinden.

Lange minder frequente boodschappen

De andere manier van communiceren zijn lange boodschappen die minder frequent zijn. Deze boodschappen onderhouden je relatie met je beste vriend door de tijd te nemen voor het communiceren. Ze zijn soms ritueel en gebeuren minder vaak. Je informeert bij lange minder frequente boodschappen over hoe het gaat en de inhoud gaat soms over alles en niets. Voorbeelden zijn lange telefoon gesprekken, lange e-mails of lange brieven.

Vragen Onderzoek

Zijn er vragen over het onderzoek of de twee manieren van communiceren?

Kunnen jullie je eigen herkennen in deze manier van communiceren?

Kunnen jullie wat vertellen over hoe jullie lange minder frequente boodschappen tussen jullie beide of met anderen delen?

Vragen over communicatiemiddelen

Welke communicatiemiddelen gebruiken jullie om contact te houden voor lange minder frequente boodschappen te delen?

Waarom gebruiken jullie deze communicatiemiddelen?

Wat vinden jullie belangrijke eigenschappen aan communicatiemiddelen voor lange minder frequente boodschappen te delen?

*Vind je het dan bijvoorbeeld belangrijk dat het **direct** aan komt, **persoonlijk** is of dat je **meer kwijt wilt** (bijv. video of audio) in een communicatiemiddel?*

Vragen over inhoud boodschap

Wat voor informatie delen jullie voornamelijk in lange minder frequente boodschappen?

Situatie

Waar gebruiken jullie voornamelijk deze communicatiemiddelen voor lange minder frequente boodschappen te delen?

- o Waarom bij deze situaties?

Relatie

Met wie deel je lange minder frequente boodschappen voornamelijk?

Zie je deze vrienden veel of weinig? (hoe vaak?)

Ken je deze vrienden erg lang? (hoe lang?)

Waarom voornamelijk naar deze vrienden?

Korte boodschappen

Nu wil ik het hebben over korte boodschappen die je spontaan (bijv. als je iets leuks mee maakt dat je wilt delen) en frequent met elkaar deelt.

Kunnen jullie wat vertellen over hoe jullie korte frequente boodschappen tussen jullie beide of met anderen delen?

Communicatiemiddel

Welke communicatiemiddelen gebruiken jullie om contact te houden voor korte frequente boodschappen te delen?

Waarom gebruiken jullie deze communicatiemiddelen?

Wat vinden jullie belangrijke eigenschappen aan communicatiemiddelen voor korte frequente boodschappen te delen?

Vind je het dan bijvoorbeeld belangrijk dat het **direct** aan komt, **persoonlijk** is of dat je **meer kwijt wilt** (bijv. video of audio) in een communicatiemiddel?

Inhoud boodschap

Wat voor informatie delen jullie voornamelijk in korte frequente boodschappen?

Situatie

Waar gebruiken jullie voornamelijk deze communicatiemiddelen voor korte frequente boodschappen te delen?

Waarom bij deze situaties?

Relatie

Met wie deel je korte frequente boodschappen voornamelijk?

- Zie je deze vrienden veel of weinig? (hoe vaak?)
- Ken je deze vrienden erg lang? (hoe lang?)
- Waarom voornamelijk naar deze vrienden?

Ervaringen met lange niet frequente boodschappen

Positieve ervaringen met lange niet frequente boodschappen

Nu wil ik het eerst hebben over jullie positieve ervaringen met lange minder frequente boodschappen en daarna de nadelen die jullie ervaren met lange minder frequente boodschappen.

Kunnen jullie voorbeelden geven van lange minder frequente boodschappen die jullie positief waarderen voor het onderhouden van je relatie met een goede vriend of vriendin?

- Waarom waardeerde je dit positief?

Je kunt dan denken aan boodschappen waardoor je, je verbonden, betrokken of geïnformeerd voelde met je vriend of vriendin.

Waarom waardeerde je dit positief?

*Zit er een verschil in waardering met **verschillende vrienden**?*

- Waarom was dit een positieve ervaring?

Als ik het goed begrijp dan waarderen jullie lange niet frequente boodschappen als,

Negatieve ervaringen met lange niet frequente boodschappen

Welke nadelen ondervinden jullie met lange minder frequente boodschappen voor het onderhouden van je relatie met een goede vriend of vriendin?

Je kunt dan denken aan ervaringen waar je gestoord werd in je werkzaamheden, problemen met privacy, dat je geen zin had in reageren, het veel moeite of tijd kost om een boodschap te versturen, dat een boodschap niet goed overkwam. Als ik het goed begrijp dan kan ik stellen dat lange niet frequente boodschappen vooral de volgende nadelen heeft:

Privacy

- Welk communicatiemiddel gebruik je om een lange minder frequente boodschap te sturen zodat je je beste vriend niet in zijn privacy schaadt?
- Waarom dit communicatiemiddel?
- Voelde je je wel eens in je privacy geschonden met een lange minder frequente boodschap? (Kan je een vb geven?)

Storend

- Welk communicatiemiddel gebruik je om een lange minder frequente boodschap te sturen zodat je je beste vriend niet stoort in zijn werk?
- Waarom dit communicatiemiddel?
- Kan je een voorbeeld geven van een lange minder frequente boodschap dat je stoorde?
- Waarom stoorde dit je?

Sociale verwachting

- Stuur je altijd een boodschap terug als je lange minder frequente boodschappen ontvangt?
- Verwacht je altijd een boodschap terug bij lange minder frequente boodschappen? (expectations?)
- Bij welk communicatiemiddel heb je dit minder? (waarom?)

Expressiviteit

- Komen gevoelens en gedachten goed over met de gebruikte communicatiemiddelen voor lange minder frequente boodschappen?
- Bij welk communicatiemiddel heb je dit minder? (waarom?)
- Zou je graag meer willen overbrengen op de ontvanger met de gebruikte communicatiemiddelen voor een lange minder frequente boodschap?
- Zo ja wat?

Proces effort

- Kost het je veel tijd om contact te houden met de gebruikte communicatiemiddelen voor een lange gepland boodschap?
- Bij welk communicatiemiddel heb je dit minder? (waarom?)
- Kost het je veel moeite om contact te houden met de gebruikte communicatiemiddelen voor een lang gepland boodschap?
- Bij welk communicatiemiddel heb je dit minder? (waarom?)

Ervaringen met korte frequente boodschappen

Positieve ervaringen met korte frequente boodschappen

Kunnen jullie voorbeelden geven van korte frequente boodschappen die jullie positief waarderen voor het onderhouden van je relatie met een goede vriend of vriendin?

- Waarom waardeerde je dit positief?

Je kunt dan denken aan boodschappen waardoor je je verbonden, betrokken of geïnformeerd voelde met je vriend of vriendin.

- Waarom waardeerde je dit positief?

Zit er een verschil in waardering met verschillende vrienden?

- Waarom was dit een positieve ervaring?

Als ik het goed begrijp dan waarderen jullie korte frequente boodschappen als,

Vershil lange niet frequente en korte frequente boodschappen

Zit er een verschil in positieve waardering tussen lange niet frequente en korte frequente boodschappen?

- *Waarom wel of niet?*
- *Zit er een verschil tussen vrienden?*
- *Zit er een verschil met communicatiemiddelen?*

Positieve ervaringen met korte frequente boodschappen

Welke nadelen ondervinden jullie met korte frequente boodschappen voor het onderhouden van je relatie met een goede vriend of vriendin?

Je kunt dan denken aan ervaringen waar je gestoord werd in je werkzaamheden, problemen met privacy, dat je geen zin had in reageren, het veel moeite of tijd kost om een boodschap te versturen, dat een boodschap niet goed overkwam.

Welke verschillen in nadelen ervaren jullie met het onderhouden van je relatie tussen lange niet frequente en korte frequente boodschappen?

- *Waarom ervaren jullie dit?*

Als ik het dus goed begrijp dan ervaren jullie de volgende verschillende nadelen tussen lange niet frequente en korte frequente boodschappen

Privacy

- Welk communicatiemiddel gebruik je om een lange minder frequente boodschap te sturen zodat je je beste vriend niet in zijn privacy schaadt?
- Waarom dit communicatiemiddel?
- Voelde je je wel eens in je privacy geschonden met een lange minder frequente boodschap? (Kan je een vb geven?)

Storend

- Welk communicatiemiddel gebruik je om een lange minder frequente boodschap te sturen zodat je je beste vriend niet stoort in zijn werk?
- Waarom dit communicatiemiddel?
- Kan je een voorbeeld geven van een lange minder frequente boodschap dat je stoorde?
- Waarom stoorde dit je?

Sociale verwachting

- Stuur je altijd een boodschap terug als je lange minder frequente boodschappen ontvangt?
- Verwacht je altijd een boodschap terug bij lange minder frequente boodschappen? (expectations?)
- Bij welk communicatiemiddel heb je dit minder? (waarom?)

Expressiviteit

- Komen gevoelens en gedachten goed over met de gebruikte communicatiemiddelen voor lange minder frequente boodschappen?
- Bij welk communicatiemiddel heb je dit minder? (waarom?)
- Zou je graag meer willen overbrengen op de ontvanger met de gebruikte communicatiemiddelen voor een lange minder frequente boodschap?
- Zo ja wat?

Proces effort

- Kost het je veel tijd om contact te houden met de gebruikte communicatiemiddelen voor een lange gepland boodschap?
- Bij welk communicatiemiddel heb je dit minder? (waarom?)
- Kost het je veel moeite om contact te houden met de gebruikte communicatiemiddelen voor een lang gepland boodschap?
- Bij welk communicatiemiddel heb je dit minder? (waarom?)

Verbeteren van korte frequente boodschappen

Nu we het hebben gehad over deze twee manieren van communiceren wil ik jullie vragen hoe korte frequente boodschappen beter kan? Denk daarbij aan dat alles mogelijk is.

Suggesties verbeteringen korte frequente boodschappen

Ook wil ik graag enkele suggesties doen om je relatie te onderhouden naast de al bestaande communicatiemiddelen. Ik zou graag jullie mening over deze prototypes willen weten. Denk daarbij aan hoe je vind om je band hier mee te onderhouden en welke kosten er aan hangen die we besproken hebben.

Prototype 1 het fotolijstje

*Wat vinden jullie van de **functies**?*

- Automatisch vs manueel?
- *Constant info?*
 - *Locatie?*
 - *Emotie?(gezicht?)*
 - *Availability?*
- Bericht achterlaten?
- 1 op 1 communicatie?

Hoe zou je het vinden om je relatie te onderhouden naast de communicatiemiddelen die je nu al gebruikt?

Waar zou je hem zetten? (waarom?)

Met **wie** zou je dit willen delen?

Hoe zou je het vinden om je relatie te onderhouden naast de communicatiemiddelen die je nu al gebruikt?

Prototype 2 het sociale konijn

Wat vinden jullie van de **functies**?

- OREN? (geen betekenis)
- Kleuren? (met zelf verzonden betekenis?)
 - o Wat zou je zelf voor betekenis willen geven aan de kleuren?
- ZELF contact zoeken door knippen van lichtje?
- Tekst omzetten in spraak?

Hoe zou je het vinden om je relatie te onderhouden naast de communicatiemiddelen die je nu al gebruikt?

VERSCHIL tussen twee prototypes?

Appendix J: prototype 1 the photo list

De fotolijst

Beschrijving

Pieter heeft een fotolijstje met een foto waar hij en zijn beste vriendin op staan. Zijn beste vriendin heeft er ook één op haar kamer staan. In het fotolijstje is niet alleen een foto van zijn beste vriendin te zien maar ook haar status (bezet, telefoon, beschikbaar of lunch) en locatie (thuis, werk of uit etc.). Hun emoties (blij, neutraal of triest etc.) worden door hun gezichten in de foto duidelijk gemaakt. De gezichten in het fotolijstje veranderen mee naar hoe ze zich voelen op het moment. Deze wordt constant automatisch ingesteld via diverse sensoren. Onderaan de foto heeft zijn vriend de mogelijkheid om een klein berichtje achter te laten.



Appendix K: prototype 2 the social rabbit

Het sociale konijn

Beschrijving

Het sociale konijn heeft meerdere functies en je beste vriend of vriendin heeft er ook één. Als je aan zijn oren beweegt zullen de oren van het konijn van je beste vriend ook direct dezelfde kant op mee bewegen. De kleuren van het konijn zullen rustig knipperen zodat je vriend weet dat je ze hebt bewogen.

Aan de diverse kleuren hebben ze verschillende betekenissen gegeven, bijvoorbeeld rood om naar huis te gaan, geel is dat hij/zij aan het relaxen is en zwart dat hij/zij weg is. Hij/zij kan deze zelf instellen.

Wanneer de lichtjes snel gaan knipperen, weet je dat hij/zij graag met jou in contact wil komen.

Het konijn heeft ook de mogelijkheid om tekst berichten van SMS of e-mail direct om te zetten naar spraak. Als een bericht is aangekomen verandert het konijn van kleur. Door het konijn aan te raken kan je het bericht afluisteren.

