Using the theory of planned behavior to explain teenagers' adoption of text messa...

Using the theory of planned behavior to explain teenagers' adoption of text messaging services Per E. Pedersen Professor Agder University College Email: per. pedersen@hia. no HerbjÃ¸rn Nysveen Associate Professor Norwegian School of Economics and Business Administration Email: herbjorn. nysveen@nhh. no Abstract Text messaging in the form of SMS has become one of the most successful mobile services in Europe, and the use of this service is now well integrated into the everyday life of young Europeans. To explain the widespread adoption of this service, findings from diffusion, uses and gratifications, information systems and domestication research are reviewed and integrated into a re-specified and extended model based upon the theory of planned behavior. The model is tested on a sample of young users of text messaging services. We conclude that the suggested respecifications and extensions are justified. The final model shows good fit and explains 74% of the variance in intention to use text messaging services. The results support including elements of enjoyment and expressiveness in models of text messaging adoption, show little support for including subjective norm, and indicate that users may perceive some form of deficient selfregulation in the use of these services. The results also show interesting differences between the adoption models of male and female users. 1. Introduction Users are now offered a variety of electronic messaging services with different forms of interactivity (e. g. synchronous vs. asynchronous), delivered over different electronic channels (e. g. traditional Internet vs. mobile networks) and with different levels of media richness (e. g. text vs. graphics-supported). Among these services, traditional email services, instant messaging, and text messaging services

have been most widely adopted. While the adoption of email services have been widely studied applying traditional models of ICT-adoption and media use, instant messaging and, in particular, text messaging have been given less attention in traditional information systems (IS) research. Text messaging services in the form of SMS (Short Messaging Services) are now some of the most successful mobile services. SMS may be used for accessing mobile end-user services, but is most often used for mediating person-to-person communication using mobile terminals. This form of mediated communication is now a part of the everyday life of teenagers in most European countries. Explaining the adoption and use of these services is important in understanding the mediated communication of young people, but as these messaging services become widely adopted, their importance to the general user in professional and working life is also likely to increase (Grinter and Eldridge 2001). Our aim is to contribute to this understanding by proposing and empirically testing a model of young users' adoption of text messaging services. Three research traditions have been identified of relevance to individuals' adoption of text messaging services. Uses and gratifications research (Blumler and Katz 1971) has its foundation in media and communication theory, and studies the gratifications sought by adopters of media of different kinds. Adoption (Davis 1989) and computer mediated communication (CMC) research (Webster and Trevino 1995) have their foundations in IS-research, and study the adoption and use of information and communication technology in general and in organizations in particular. Finally, domestication research (Silverstone and Hirsch 1992) has its foundation in sociology, and studies the adoption, use and domestication of

technology in society with a particular focus on the societal consequences of technology domestication. Of these traditions, only uses and gratifications, and domestication research have been particularly occupied with studying mobile services. So far, few attempts have been made at integrating the findings of these traditions into an explanatory model of mobile service adoption. We approach this situation by applying a well defined model of ICT-adoption - the theory of planned behavior, and respecify and extend the model using significant findings of the traditions indicated above. In section 2, we review relevant literature and present our re-specified and extended model. In section 3 and 4 we present the methodology and results of a study testing the proposed model on young users' adoption of text messaging services. In section 5 we conclude and discuss the implications and limitations of our study. 2. Theory In uses and gratifications studies, the individual user or adopter is focused, and the general idea is that adopters seek gratifications in technology use based upon their individual " needs" or " motivations" (Lin 1996). Many gratifications have been identified that are believed to be particularly relevant for young users. For example, Arnett (1995) identified the gratifications " identity formation, high sensation, coping, and youth culture identification" (Arnett 1995, p. 520) to be more important for adolescents than for children or adults. Of particular relevance here are the recent uses and gratifications studies of messaging services both on the Internet and on mobile terminals. Focusing particularly on email gratifications, Dimmick et al. (2000) found that while the telephone was superior in fulfilling the interpersonal gratifications, email was superior in fulfilling utilitarian gratifications. In a study of college students' gratifications

from using instant messaging services (ICQ), Leung (2001) identified seven gratifications termed " express affection", " entertainment", " relaxation", " fashion", inclusion", " sociability" and " escape". These findings oppose the utilitarian gratifications identified by Dimmick et al. (2000) for email, and suggest that traditional media gratifications like entertainment and escape are also sought from messaging services. Leung (2001) found that ICQ use was positively related to mobile pho ne and email use, supporting the hypothesis that messaging services are complementary rather than substitutes. Leung (2001) also found that female users used ICQ more than male, and that they use ICQ for sociability reasons while male users use it more for relaxation and entertainment reasons. In a comparison of light and heavy users, heavy users were motivated by affection and sociability while light users were more motivated by fashion. One may expect other gratifications to be sought from mobile voice services than traditionally sought from fixed telephony. Leung and Wei (2000) found seven gratifications of the mobile phone; " fashion/status", " affection/sociability", " relaxation", " mobility", " immediate access", " instrumentality" and " reassurance". Thus, gratifications related to fashion, relaxation and entertainment, flexibility and mobility were identified in addition to traditional telephony gratifications identified by Dimmick and Sikan (1994). In a study of pager use among young users in Hong Kong, Leung and Wei (1998) found the general gratifications from pager use to be; " sociability", " information seeking", " entertainment", " utility", and " fashion/ status". Thus, the gratifications of pager use were very similar to those sought from mobile phones, but the " fashion and status" gratification was found to be

very important . Consistent with findings for instant messaging services, the " fashion and status" gratification was more important for light users than for heavy users. In addition, the sociability gratification was more important to female users and entertainment was more important to adolescent users. Höflich and Rössler (2001) studied text messaging gratifications of German teenagers and identified the following gratifications; " reassurance" (rückversicherung), " sociability" (kontaktpflege), " immediate access /availability" (verfügbarkeit), " instrumentality" (lebenshilfe) and " entertainment/enjoyment" (nutz-spaz). Of these gratifications, only " instrumentality" significantly predicted the use of text messaging services. In information systems research o n messaging services, we identified two research areas of relevance - CMC-research and traditional adoption research. Even though no studies in CMCresearch has been identified on text messaging, it may be suggested that, due to less media richness, text messaging is more likely to be used for task-oriented than socially-oriented communication (Hinds and Kiesler 1995, Walther 1996) and for unequivocal rather than equivocal tasks (Trevino et al. 2001). However, it seems that low channel capacity may be compensated by high interactivity and adaptiveness as long as the distribution is low (Te'eni 2001). Thus, high interactivity of a messaging medium may make it suitable for socially-oriented communication as well (see Walther 1996). This may be one of the attributes that distinguish more interactive messaging services like instant messaging and text messaging from email. Te'eni (2001) proposes that in general, messaging services will be most efficient for communication goals of control and for formal messages. However, when comparing different

messaging services, email, instant messaging and text messaging are mainly different when it comes to interactivity and length of message. In this case, Te'eni (2001) suggests that higher interactivity will lead to shorter messages, suited for text messaging, and that senders will adjust their goals towards more testing and adjusting and by increasing affectivity. Haythornthwaite (2001) studied the use of email, discussion forums and IRC in a distance learning class. Discussion forums were used as a forum for diffuse, background information exchange in oneto-many communications, and IRC was used for class-wide communication, but " more to named others " (Haythornthwaite 2001, p. 221). Users seemed to combine messaging services with other forms of mediated communication as well as other messaging services. Nardi et al. (2000) found that chat services were used for the purpose of negotiating availability, sustaining social connections, switching media, and retaining context. Consequently, different messaging services seem complementary rather than substitutes. Some of the earliest adoption studies applied the technology acceptance model (TAM) to the adoption of messaging services (Davis 1989). Adams et al. (1992) found the model useful for explaining the use of both voice mail and email services. The model discriminated the subjects' perceptions of voice mail and email, but predicted usage of the two services with very similar models consistent with Davis' (1989) original findings. Usefulness was found to be a far more important predictor of use than ease of use. However, when comparing the TAM of these technologies with the model explaining the use of dissimilar technologies like spreadsheets, Adams et al. (1992) found the models very different. Gefen and Straub (1997) studied gender differences in the

adoption of email. They suggested that women perceive social presence in email use different from men and thus, that they perceive email as more useful and easy to use than men due to their perceived social presence. They found support for perceived differences in social presence and usefulness. They also found a difference in perceived ease of use, but in the opposite direction of what was proposed, and no difference in actual use was found between men and women. Later, Karahanna and Straub (1999) suggested that in general, social presence, social influence and support are important determinants of usefulness, and support and accessibility are important determinants of ease of use of email. However, they found that support did not influence usefulness and ease of use, but that social influence variables and accessibility did. Karahanna and Limayem (2000) replicated Adams et al.'s (1992) study, and found the adoption model different for email and voice mail services. While ease of use and social influence explained use of email, usefulness and ease of use explained the use of voice mail. Few studies are found on the use of mobile services in IS-research (for some exceptions see Hinds and Kiesler 1995, Manning 1996). However, some studies have applied adoption models to explain the intention to use telemedicine applications. Hu et al. (1999) suggested that the TAM model may be too parsimonious when being applied to explain the adoption of such specific technologies as telemedicine applications. The model showed good fit and reasonable explanatory power when explaining intention to use, but had to be re-specified to explain an acceptable percentage of the variance in attitude towards use. Kwon and Chidambaram (2000) applied the TAM model to explain the general adoption of mobile

phones. They suggested the TAM model should be extended, and included social pressure as an additional variable. Somewhat surprising, the authors did not find support for the social pressure variable, and contrary to many other studies applying TAM, they found that ease of use was perceived to be more influential in explaining intentions to use than usefulness.

Domestication research has a long tradition of studying everyday life technology as the object being adopted (see Silverstone and Hirsch 1992). An early study of in this tradition was conducted by Rakow and Navarro (1993). They asserted that, at an early point in the diffusion of the device, the mobile telephone was a device that replicated preexisting gender patterns, i. e. the role of the woman as an accessible nurturer and a person in need of male protection. Later, several studies have elaborated on gender differences in the adoption of both voice and other mobile services (e. g. Ling 2001). As the adoption process has continued, the device has been redefined as a social network device and thus within the domain of women. For example, Skog (2002) observed that girls valued social functionality of the mobile phone higher than boys, who on the other hand stressed technical functionality. She explained this finding with general role theory suggesting that text messaging is more functional in maintaining female roles, than male roles. This is also observed in the content differences in text messages of girls and boys. Kaseniemi and Rautiainen (2002) observed that girls more often used all 160 characters of an SMS and filled it with references and social gossip, while boys often wrote messages of 40-50 characters with " plain language". Ling and Yttri (2002) describe a joint examination, interpretation and sharing of messages among female users (particularly

teens) that may be explained by attributes of the social networks of female versus male users. The channel richness, interactivity (asynchronous) and format of text messaging services may be particularly well suited for maintaining female users' social networks. Expressive use of mobile phones seems to be common to both sexes, but is conducted in different ways by male and female users. Male users express their identity with technical attributes, such as brand name and model, while female users express their individuality and confirm their group identity by sending, receiving, filtering and sharing text messages. These differences have been explained using rather ge neral theory of group identity formation (Skog 2002). The teenage user segment has been described in several domestication studies, both qualitative and quantitative. Among the most penetrating studies are a set of qualitative studies done on Scandinavia n adolescents and teenagers (e. g. Kaseniemi and Rautiainen 2002, Weilenmann and Larsson 2000, Ling and Yttri 2002). They show that the use of mobile services is very well integrated in the daily lives of teenagers. However, the impression that services are adopted for symbolic and social status reasons only (e. g. Skog 2002), is contradicted by many of the descriptive studies. A variety of explanations have been suggested of the widespread adoption of mobile services among young users. Ling and Yttri (2002) indicated three interpretations of fashion and style, and suggested the use of text messaging may be understood as both a way of communication and as a means of social integration that plays a role as style marker when the mobile phone itself has lost its significance as an object of style display. This is closely related to Skog's (2002) interpretation of the mobile phone as symbolic capital. Symbolic elements of

mobile phone use have also been confirmed in studies of mobile phone use in organizational contexts (Manning 1996). However, Manning (1996) found that the mobile phone was statusenhancing at some levels in the organization while it was status-reducing at other levels. There is also a relationship between symbolic capital and social capital when the object of symbolic value is a communication medium. In that case, there is a relationship between style as a way of communication and style as an indication of group membership (Weilenmann and Larsson 2000). This gives rise to the idea of text message sending, receiving, filtering and sharing as an expressive communication activity used to display style and social capital. The explanation of mobile service usage as " ritual gift giving " applies particularly to the explanation of text messaging service use (Taylor and Harper 2001). For example, Kaseniemi and Rautiainen (2002) observed three additional uses of text messaging besides regular peer-to-peer messaging; message collection, chain messaging and collective reading. Most other studies of teenage text messaging use have reported similar behaviors (Ling and Yttri 2002). Taylor and Harper (2001) gives references to alternative explanations of gift-giving behavior that fits the observed use of text messaging, such as ritual explanations rooted in primitive elements of our culture, but also sociological, social psychological and economic explanations of gift- giving have been suggested. Ling and Yttri (2002) suggested that text message adoption among teens may be explained by a theory of social learning and development (and emancipation) because text messaging are particularly well suited for exchanging ideas on issues focused in teenagers social learning (e. g. exploration of sexuality, social

interaction). For example, many of the chain messages identified by Kaseniemi and Rautiainen (2002) were of sexual content used to explore the limits of appropriate content in messages. Another suggestion is that the asynchronous form of messaging is particularly well suited for initiating and exploring new relationships (Ling and Yttri 2002, p. 160). Ling and Yttri (2002) mention several situations in which text messaging is preferred to voice because it is used as an awareness or initiating service similar to what Nardi et al. (2000) report for instant messaging services. Thus, a social network explanation is introduced in which the difference between teenagers and other users is explained by the social networks of teenagers being more dynamic. In addition to these social explanations of messaging service adoption and use among young users, there have also been some domestication studies focusing utilitarian or instrumental gratifications of text messaging. Grinter and Eldridge (2001) studied the adoption of text messaging among teenagers, and found that text messaging were preferred to other media because it was considered quicker, cheaper, easier and more convenient to use. 2. 1 Model Three models have been among the most widely applied to explain general ICT-adoption; the technology acceptance model (TAM) originally proposed by Davis (1989), the theory of reasoned action (TRA) originally proposed by Fishbein and Ajzen (1975), and the extension of TRA into a theory of planned behavior (TPB) originally proposed by Ajzen (1991). The technology acceptance model (Davis 1989, Davis et al. 1989) focuses on the attitudinal explanations of intention to use a specific technology or service. In many ways, TAM corresponds to rational or utilitarian theories of media choice and use. When applied to the explanation

of use or adoption behavior, TRA includes four general concepts - behavioral attitudes, subjective norm, intention to use and actual use. The inclusion of subjective norm in TRA represents an important addition when compared to TAM. With the subjective norm concept, TRA includes elements of social influence found in social explanations of media use. The theory of planned behavior (TPB) was proposed as an extension of the theory of reasoned action to account for conditions where individuals do not have complete control over the ir behavior (Ajzen 1991). The inclusion of perceived behavioral control in TPB reflects the internal and external constraints on behavior, and is directly related to both behavioral intention to use and actual use. Based upon the findings indicated above, we suggest re-specifying and extending the theory of planned behavior when explaining the adoption of text messaging services among young users. In figure 1, our suggested model is illustrated. The model contains 13 interrelated concepts. In the following, the applied concepts and relationships are presented, and propositions are made on the relevance of these concepts and their particular relationships. Insert figure 1 here. Two issues are of relevance with respect to ease of use in the model; the higher competence of younger users and their more exploratory and advanced use of service functionality. Several studies report that young users acquire " digital capital" (Skog 2002) from their use of mobile services. For example, it is not uncommon to see citations in qualitative studies of mobile service use that indicate that the younger users of the family have taught their parents how to use their phones, PC's, or services on these platforms. Younger users may be more skilled and experienced technology users and thus, ease of use may not be

as important for these users as for other users. However, studies also report a more playful use of mobile phones among younger users and that they are more focused on exploring the functionality of a service. For example, the practice of personalizing the phone or service is typical among young users. This also indicates that younger users may perceive ease of use differently. For example, if personalization, filtering and adjustment of initial settings are not offered by an application or service, user friendliness may be perceived as low. Studies have also indicated a relationship between digital capital and symbolic capital suggesting that services designed for young users should not be too easy to use, because then, no status would stem from being able to handle the device, application or service (Taylor and Harper 2001). These findings indicate that even though ease of use in general is believed to be of little importance to mobile services, it may be even less important to young users. Perceived usefulness was originally seen as a fairly simple concept including components such as efficiency and effectiveness that are mainly related to extrinsic motivation in work contexts. Later, elements of intrinsic motivation have been included in the definition of both ease of use and usefulness (e. g. Thompson et al. 1999). However, intrinsic motivation has been mainly associated with ease of use and extrinsic motivations with usefulness. As seen from uses and gratifications studies, the extrinsic motivations of mobile services are not limited to effectiveness and efficiency. Motivations of accessibility, flexibility, sociability and security have all been mentioned in these studies. Accessibility and flexibility are typical, but not unique, to mobile services and sociability and security are typical of communication (as opposed to information) services. In addition, motivations

of enjoyment, fashion and status and expressiveness have been mentioned. Some of these motivations are intrinsic, but other may perhaps best be described as derived. For example, intrinsic motivations of enjoyment lead to skills which provide the user with digital capital, which in some social networks gives access to both symbolic and social capital. Thus, the traditional usefulness concept should be modified and extended when explaining the adoption of mobile services among young users. Extrinsic motivations of efficiency and effectiveness may be less important to young users, but extrinsic motivations found in uses and gratifications studies should be included in the usefulness concept. Thus, effectiveness and efficiency should be related to availability, flexibility and security to cover all conceptions of usefulness in mobile services. We find that by re-specifying usefulness, these conceptions of usefulness may be included. Thus, we find no need to replace the usefulness concept with more specific instrumental components to cover the differences in extrinsic motivations of mobile and traditional services. However, we suggest that the usefulness concept should be extended and supplemented to cover the issues of intrinsic and derived motivations discussed above. For example, enjoyment and entertainment go beyond ease of use and is perceived as instrumental of services primarily designed for entertainment (mobile games, mobile video and audio streaming, chat and flirt services) (Leung and Wei 1998, 2000). The instrumentality of these services is enjoyment and entertainment in itself, not the efficiency or effectiveness of being able to access mobile entertainment services ubiquitously. In addition, the instrumentality related to enjoyment goes beyond influencing ease of use, and the playfulness

concept sometimes applied in studies of traditional ICT-adoption (Venkatesh 2000) is replaced by a broader concept of enjoyment here. To get access to symbolic and social capital by using a service, a requirement is that it has some element of expressiveness. It should be possible to express style using the service. In addition, text messaging services are communication services used to communicate at several levels, to demonstrate participation in social networks maintaining different roles, and to share and collect prior communication sessions. These are all expressive elements of communication that originate in the derived motivations discussed above. In CMC-research, expressiveness is compared to instrumentality as two styles of communication (Boneva, et al. 2001). Expressiveness is used of communication in relationships of emotional intimacy and sharing, while instrumentality is used of communication in relationships based on common activities. For example, Boneva et al. (2001) propose female communication to be more expressive, while male communication is proposed to be more instrumental. Based on these suggestions, services that communicate expressiveness in this form are more likely to be appreciated by female users. Thus, expressiveness is an instrumental attribute of a communication service partly influencing usefulness and partly influencing attitudes directly. The term expressiveness has also been used in other traditions, such as personality research and consumer psychology. We briefly discuss some of conceptions of expressiveness in these traditions in section 3. Attitudes are generally believed to be the results of personal and social influences. However, in TAM, attitudes towards use are determined by instrumental determinants only. When including subjective norm in the model, it is

possible to create a relationship between norms and attitudes that may be particularly relevant to young users' adoption of mobile services. However, it is also important to conceptually discriminate norms and attitudes in adoption models. Thus, we suggest accepting an influence of subjective norm on attitudes, but rejects including influences of external and interpersonal influence on attitudes directly. We also suggest extending the determinants of attitudes towards use from purely instrumental determinants to more derived determinants such as enjoyment and expressiveness. However, the attitude formation process is believed to be similar for usefulness, ease of use, enjoyment and expressiveness in that the users perceive a service as instrumental in fulfilling intrinsic, extrins ic and derived gratifications, and consequently develop a positive attitude towards using it. Above we have discussed one of the two facets of external influence; that of symbolic capital derived from style in all its conceptions, and that of external influence on the development of subjective norms. While the first of these facets is included in expressiveness in our model, the external influence in determining subjective norms is believed to be particularly important to young users (Leung and Wei 2000). Young users may be more affected by external influence because their subjective norms are developing and changing, they may be more exposed to the sources of external influence, such as general mass media, and they are more directly approached by advertising of a persuasive approach by terminal vendors and operators. Interpersonal influence has been suggested important to explaining the adoption of communication technologies in CMC-studies and to explaining adoption of mobile and messaging services in domestication

research. However, there are issues of instrumentality that must be separated from issues of social influence in communication services adoption. Interpersonal influence is the influence of others in developing norms that the use of a particular service is expected. In principle, it is unrelated to instrumentality. Almost all explanations in domestication research introduced above include elements of interpersonal influence. For example, the suggestion that young users are more subject to social influence because they are at a stage of social development and learning (Ling and Yttri 2002), the suggestion that young users' social networks are more dynamic and thus exposed to influence than other users (Oksman and Raitiainen 2001), or the interaction between symbolic and social capital that makes instrumental motivations and social influence interrelated for communication services. Consequently, interpersonal influence is assumed to be more important when explaining the adoption of messaging services and the adoption of services by young users in general. Subjective norms are the norms developed through external and interpersonal influence. In general, Webster and Trevino (1995) suggest social influences, and thus, subjective norms to be more influential in explaining the adoption and use of new media. The question, however, is whether text messaging should be considered new media among young users. As indicated above, almost all teenagers in Norway have adopted text messaging, and many of the users no w have considerable experience in using it. Even though social motivations for adoption may be particularly important to young users, these motivations may by now be more instrumental than norm based, and may be identified through the instrumental determinants of attitude toward use

rather than through subjective norms. To give an example, young users may find text messaging instrumental in social coordination because all other members of their social network uses it, but still feel little social pressure towards using text messaging services as a norm. In our context, self efficacy is the individual's confidence in that adoption of a service will lead to the desired behavior (Bandura 1982). The determinants of self-efficacy are typically found in attributes of the individual adopter, such as experience, skills and education. Even though it is considerable variance in young users' skills and experience in using mobile services (Kaseniemi and Rautiainen 2002, Grinter and Eldridge 2001), these users are generally believed to be among the more experienced and skillful users of these services (Ling 2001, Skog 2002). For example, Kaseniemi and Rautiainen (2002) found that adolescents found mobile phones to be a more controllable technology than PC's. Thus, one may expect that self efficacy in general will be higher among young users than among other users in general, and thus, of less importance as a determinant of adoption. A variety of conditions may facilitate or inhibit the use of mobile services. In general, lack of facilitation is believed to reduce the perceived behavioral control of using a service or technology. Examples of such conditions are price, service and terminal availability, support, roaming and interconnect, security issues and service compatibility. In general, these conditions are controlled by the facilitators (operators, service providers) and individual users (through their resources). Recent developments of services particularly for the young segment, and the widespread use of prepaid service plans particularly designed for young users suggest that facilitating conditions controlled by facilitators are

perceived as good. In addition, the social networks of young users function as support networks through the interaction mechanisms of digital, symbolic and social capital discussed above. On the other hand, young users in general have limited financial resources. Grinter and Eldridge (2001) showed that when compared to voice services, text messaging services were believed to be cost efficient services, indicating that price facilitation is of importance to young users. Carroll et al. (2002) suggested hidden costs that appear after users' appropriation is a particularly important determinant of what they call disappropriation - that the users stop using a service after an initial adoption. The inclusion of behavioral control in TPB has been an important contributor to its explanatory power. In general, we have argued that the determinants of behavioral control are believed to be less important to young users than other users because of their experience and skill in using text messaging services and the facilitation of services supporting regular text messaging use offered by operators and service providers to the young user segment. Financial resources and pricing, however, is indirectly believed to be an important determinant of behavioral control due to limited resources among young users. Implicit in our presentation of the model and its concepts and relationships, we have made several propositions. To summarize, adoption models may provide a valuable basis for explaining the adoption of messaging services among young users, but the models need re-specifications and extensions. First, the attitudinal part of the TPB should be extended with new concepts capturing the motivations related to mobile service use. These concepts are believed to be important determinants in the perception of usefulness, the development of attitudes towards use and

in directly determining intention to use a service. Attitudes towards use are influenced by both individual and social determinants. Norms should be clearly separated from instrumental motivations to use mobile services for maintaining social relationships, but are still believed to be particularly important to young users. The skills and support networks of young users and the facilitation of services particularly for young users makes us suggest that behavioral control is of less importance to these users. In particular, text messaging services are believed to be cost efficient and thus, this element of facilitation conditions is less influential. 3. Methodology A simple one- group posttest design was applied in which respondents were recruited from three upper secondary schools in the Agder region of Norway. The survey was administered by school contacts (typically the principal's secretary) and distributed by teachers during a social scienceoriented class. The students answered the survey questionnaire individually and returned their answers using briefcases put up in school traffic areas. Only mobile phone users were allowed to participate. A general response rate of 62. 3% (N= 658) indicates that there are few systematic differences between respondent and non-respondent mobile phone users in the survey. The majority of the subjects were between the age of 16 and 19, and 44. 3% of the subjects were male. Because we do not have population data on age and gender at the three schools, we can not tell whether there are systematic differences in age and gender distribution between sample and population. However, when compared to general age and gender statistics at similar upper secondary schools in general, the sample seems representative of upper secondary school students. In the questionnaire, subjects were first asked about their

use and intentions to use specific services. Then, the " stimulus material" was introduced with the following text: " We now want you to focus on text messaging services that in different ways are used to keep or get in contact with others. Examples of such services are sending text messages to friends and family, chat services and flirt services. Using SMS to receive logos and ring tones is not relevant here". This statement represents the stimulus used to introduce the service context to the subjects. Thus, the interpretation of all measures should be made within this context. For all concepts, multiple measures, typically in the form of agreement with a set of statements using a seven-point scale ranging from " strongly disagree" to " strongly agree", were applied. A list of all statements, measures and reliabilities coefficients is shown in Appendix A. Ease of use, usefulness and attitude towards use were measured using items developed from adapting the original items of Davis (1989). Similar items were used by Davis et al. (1989), Taylor and Todd (1995) and Battacherjee (2000). Enjoyment includes a group of gratifications identified in studies of the Internet as " enjoyment" (Pappacharissi and Rubin 2000), of ICQ as " entertainment" (Leung 2001), of mobile phones as " relaxation" (Leung and Wei 2000), of pagers as " fun-seeking" (Leung and Wei 1998), and of text messaging as " nutz-spaz" (HÃ¶fflich and RÃ¶ssler 2001). To cover these elements of enjoyment, a four item scale was developed collecting and adapting items used in uses and gratification measurement scales. The choice of a particular concept - " expressiveness" - as a perceived attribute of a service or technology is new. The term has been used in social psychology of individuals' general ability to express their emotions or identity (Cassidy et al. 1992). In research on

identity formation and personality, it has been used as a measure of the relationship between what a person believes about herself (see Schwartz et al. 2000, p. 507), and how she express herself applying the concept of " personality expressiveness" (Waterman 1993). In consumer research, the expressiveness concept has been extended from individuals to products indicating how well a product expresses values beyond instrumental utility (Mittal 1994), and some of our items were adapted from scales used in this tradition. In addition, a status item was adapted from uses and gratifications research. Studies of text messaging use have shown how one of the most important ways of expressing service use is to discuss the service with others and to share it with others (Grinter and Eldridge 2001; Kaseniemi and Rautiainen 2002). Thus, items referring to this particular form of expressiveness were included. The measure of external influence was based on three sources of influence - media, society and profession (school). Thus it includes, integrates and extends the measures used by Battacherjee (2000) and Taylor and Todd (1995). The measures of interpersonal influence and subjective norm were based on Battacherjee's (2000) extension of the measures used by Taylor and Todd (1995) and Mathieson (1991), and adapted to our setting. The measures of self-efficacy, facilitating conditions and behavioral control were based on the items used by Battacherjee (2000) and Taylor and Todd (1995), but adapted to our context. Our measure of facilitating conditions also includes specific items related to the infrastructure of mobile services. Intention to use was measured with a three item scale adapted from Battacherjee (2000) and Mathieson (1991). This measure had a reliability of ? = 0. 79. Actual use was measured with a

psychometric measure of three items and had a reliability of ? = 0. 91. In addition, actual use was measured as the number of text messages sent pr. day and the amount of money spent on voice and text messaging services pr. month. The correlation between the psychometric measure and the measure of the number of text messages sent was r= 0. 62. All our traditional measures were based upon previously validated measures (Venkatesh and Morris 2000), and their reliabilities were considered acceptable. There were two measures with ? below the recommended 0. 7 level - external influence at 0. 63 and behavioral control at 0. 66. Thus, particular attention to reliability of these items was given in a confirmatory analysis of our measurement model. This analysis showed good fit (? 2 /df= 2. 975, RMSEA= 0. 055) and significant relationships between items and unobserved concepts (p