

# USER-GENERATED CONTENT IN MOBILE MULTIMEDIA: EMPIRICAL EVIDENCE FROM USER STUDIES

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## ABSTRACT

This paper presents evidence from two studies on the use of mobile multimedia. *Mobile Image* has more than 1000 multimedia messages collected from a pilot in 1999-2001. *Radiolinja* has more than 4000 messages from a multimedia messaging (MMS) pilot in summer 2002. In *Radiolinja*, it was found that 32% of messages were a part of an interaction chain such as question-answer pairs, greetings, or stories. Thus, approximately 50% of traffic in the network arose from interactional needs rather than from individual, unattached messages. After the practice phase, fluctuations in use are largely explained by interactional reasons. This paper suggests that user-generated content is a key element in the success of mobile multimedia.

## 1. EVIDENCE FROM PRODUCT ANALOGIES

This article takes a look at the first evidence of how ordinary users create content for mobile multimedia, and what drives its use. The data is from several studies conducted mostly in Helsinki, Finland.

Social scientists' studies of analogical products (mostly, WWW) suggest three visions for mobile multimedia [13]. (1) According to the *instrumental vision*, mobile multimedia is used to transmit information to other people, to check timetables, negotiate routes, and so forth [6]. (2) The *expressive vision* has three subtypes: the artistic vision claims that multimedia enhances creativity. People will dramatize their lives to each other with stories, drama, and songs [1,15]. The games and spectacles vision links multimedia to virtual world, games, B-movies, music videos, and advertising [3]. In the identity play vision, people can and do play with their identities, sexual and other in multimedia [19,24]. (3) According to the *mundane vision*, mobile multimedia mobile multimedia is used for various purposes such as gossiping and keeping in

touch with friends and family [13]. It supports mundane activities.

If we discount polls, there are few reliable studies on short text messaging (SMS, that is, text messaging using mobile phones). Text messaging is above all versatile: it supports many types of ordinary human activities, not just work [18]. It provides content for boring moments and transforms them into meaningful, sociable situations [10]. It has also created a new platform for a playful culture that consisted of playful hoax messages, chain letters, and humor, among other things [8,9,10]. Some messages are also collected into notebooks and treated as treasured possessions [9].

When we contrast this picture with evidence from mobile services, it is increasingly evident that text messaging became a hit because people use it to create and send content to other people, and to respond to that content. Thus, in a sample of 613 users biased towards higher income groups in the Helsinki area, only about 1/3 had used mobile services (29% of women, 44% of men) [5]. E-mail and banking services were the most used services, but only 2% of those respondents who had tried to use mobile services used them daily. Only 8% were weekly users of banking services, and 11% used search services weekly. That is, less than 3% of all respondents used these services weekly. If this is the case, text messaging owes its success to user-generated content and wireless application protocol (WAP) its failure partly to not supporting such content [2].

The second possible source for cues for mobile multimedia is literature on mobile photographing. In 1997-8, in an EU-funded project "Maypole," a group of researchers built a functioning prototype for taking and sending mobile images [17]. They learned that:

- Photos were used for joking, emotional communication, and artistic activities (enhancing images, building stories from images).
- Photos were not primarily supporters of memory, but communicated things as they happened, and communicated emotions.

- Users wanted to and did edit images.
- In factual communication, photos were not useful: visual communication is not accurate enough for exact communication. The busy lifestyle of adults calls for powerful means for exchanging information. The best media for such messaging is talk, not images.

Based on these studies, we can draw an initial hypothesis. As used today, mobile technology is Janus-faced: it supports both expressive and instrumental activities, as well as ordinary interactions. If mobile multimedia follows SMS, its use stems from mundane interaction. If it seeks its clues from photography and WWW, its use will be based on the expressive potential of this technology.

## 2. MOBILE MULTIMEDIA AS A SITUATED PHENOMENON

To study on which vision people base their uses of mobile multimedia, we conducted two user studies. The first study, called *Mobile Image*, with a mobile phone capable of sending images in 1999-2000. The second study, called *Radiolinja*, was a study of MMS messaging conducted with Radiolinja, a Finnish mobile phone operator in summer 2002, just before the launch of the actual service. MMS refers to multimedia messaging service: an MMS capable phone is able to send not only text messages, but also digital photographs (typically, in JPEG format) and sound files (typically, in AMR format).

We created what we called the situated framework, which is based on ethnomethodology [23]. The focus is on what people will *do* with new technologies, rather than what they say about their use, or what information can be traced from logs alone. We studied how users compose multimedia messages and how they respond to messages: users' responses are the best source of evidence of how they understood these messages in the first place [11,12].

## 3. DATA AND METHODS

In *Mobile Image* we gave a Nokia 9110 and a Casio digital camera, connected with an infrared link, to four groups of five people (pilot, male, female, and control groups, the pilot and the control being mixed-gender) for approximately 2-3 months each. Photographing became even more mundane and *ad hoc* than in Maypole. People shot images of their meals, dirty plates in the sink, their home street, and so forth. The University offered access to a computer system for all participants. Messages were collected as e-mail attachments. For ethical reasons, we did not automatize this procedure, but asked participants to send or forward all their messages to the researcher responsible for the project. Groups were selected to saturate technical expertise, access to technology, and

gender. Radiolinja provided a free phone service (based on GSM technology) [11].

In *Radiolinja*, we selected three user groups from a Radiolinja technology and service pilot. The pilot took place in summer 2002, and lasted about 5 weeks. Each user was given a MMS phone (either Nokia 7650 with an integrated camera or SonyEricsson T68i with a plugin camera). Three mixed-gender groups with 7, 11, and 7 members were studied. Out of the Radiolinja pilot, we selected groups to take into account gender difference, terminal types, and the city-countryside axis. Exact numbers are confidential, but the following figures point the scale of messaging in the pilot. In all, users sent over 4000 messages during the pilot. Over 2000 were unique (the rest being duplicates in group messages, or recycled messages). These data were produced through the Radiolinja system automatically. As in *Mobile Image*, the service was free of charge.

Although these data are complete, participants knew that they were studied, and were informed about the ethical procedures we used. In particular, we told them how our data was produced, promised not to publish pictures without their consent, and promised to change details of images so that it would not be possible to identify them from our publications. In addition, we have followed standard academic and legal practice and have changed all names and details that could identify people or places.

## 4. THE IMPORTANCE OF INTERACTION

To see what kinds of interactional objects multimedia messages are, we have to take a look at what recipients do with images. In the male group in *Mobile Image*, 22% of messages were constructed as responses to previous messages, only 6% of the female group responded to messages through forms typical to face-to-face interaction. The figure for the whole group was 18% [12]. In contrast, the female group constructed joint album-like themes that were less typical to the male group (68%). For instance, women shared pictures of their boyfriends and "childhood" (images of parents, siblings, previous homes, and hometowns). References to these themes were sometimes explicit, but more often, just implied, as in women's photos of their boyfriends. These themes were "compulsory" in one sense: once such theme was established, all members were expected to send messages that belonged to that category. Men attached their messages less to such themes (21%)[12].

Because the *Radiolinja* data is massive, we studied a random sample of 100 messages to test the importance of interaction. This analysis showed that 32% of MMS messages referred explicitly to a previous message, which represents a significant increase to that of *Mobile Image*. The important point here is that if all messages were self-

standing information announcements meant only to be received and processed, not responded to, traffic in the network would be considerably smaller. If 32% of messages call forth responses in terms of adjacency pairs (such as questions that call forth answers), this means 32% increase in messaging. Were these three-part sequences (such as teases), the increase in traffic would be 64%. In *Radiolinja*, the true figure is between these two estimates, and is around 48%. It is difficult to give exact figures because not even adjacency pairs elicit responses at all times, while sometimes they lead to MMS exchanges by several people. In this, MMS messaging is much like conversation, in which most turns open participation possibilities for several listeners, not just one [22].

## 5. INTERACTION AND THE TRAJECTORY OF USE

Figure 1 reports weekly messaging frequencies for *Mobile Image* and *Radiolinja* data. It shows that in both data sets, the trajectory of use follows a logarithmic pattern. In *Radiolinja*, routine use settled to 2-3 messages/day/phone for each participant after five weeks. The difference between these two data sets is mainly due to the ease of technology use. While taking a picture and sending it easily took two minutes with the *Mobile Image* equipment, the process quickened to less than 30 seconds in *Radiolinja*.

However, this analysis hides variations due to brief periods of intense interaction – that is, some message prompts several responses that are seen in statistics as peaks of activity. For instance, when Tom from group 2 in *Radiolinja* sent news of his engagement to “all,” that is, to the six people in the group. As proof of his newly gained status, he sent a picture of rings in his and his fiancée’s hands. In response, he first got a series of congratulations from other members. Typically, these messages consisted of a text message, or an MMS message with smiling face in a photograph, and a congratulation in the text field. However, one response was untypical: Jani, the bachelor of the group, teased him of “being caught,” added a picture of his hand with no ring, and noted that “only Miss Universe can catch me in the text.” Tom replied to that message by countering Jani with an indirect remark of the main problem of a bachelor’s sex life, masturbation. He sent a new ring picture, added that he has had more mornings with his “woman” than Jani with his hands, and closed his message with a series of laughter tokens in text (“Ha ha he he”). No response followed.

The key point is that this exchange consisted of 13 messages within two days. This episode explains 14% of the group’s messaging activity in those two days when it took place (N=91 messages). Tom’s announcement was not a self-standing message, but situated in social action; messaging does not result solely from independent acts of

expression, but from sequences in which preceding and subsequent actions relate meaningfully to each other.

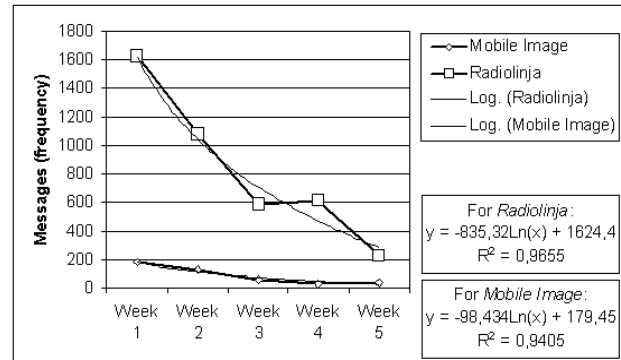


Figure 1. The Trajectory of Use in *Mobile Image* and *Radiolinja* (first 5 weeks)

A preliminary hypothesis, then, is that during routine use, variations in activity can largely be explained by such spurts of interaction: MMS messaging is not a random process; its roots are in ordinary interaction. However, statistical analysis of this result is still pending.

## 6. CONCLUSIONS AND DISCUSSION

Since the first studies of mobile devices are ambiguous in their verdict on how people are going to use this new technology, this paper explicated a situated framework for studying mobile multimedia [11,16,17]. This perspective suggests that mobile multimedia mainly supports mundane interaction. So far, we have found only one aspect in our data that supports the more extreme vision, namely the pilot group’s image manipulation culture in *Mobile Image*. However, this culture was but a small portion of messaging in that group (6%). The mundane interaction vision describes data better than the expressive vision. A quantitative analysis of the trajectory of use confirms the importance of interaction for the success of this technology.

Few “design drivers” can be listed for future development. First, as text messaging, mobile multimedia is easy to use for various purposes. As long as it supports interaction, people will find ways to use it. They entertain each other. Secondly, to make this technology more successful, new features ought to support mundane expression and responding as smoothly as possible. Third, playful modes of expression ought to be supported, not just rational uses. Sound in *Radiolinja* was primarily an expressive feature [3,7]. As this paper has argued, a good deal of activity in the network owes to co-experience: doing things together [3].

In both studies, messaging was free for participants. We do not have access to data that would allow

comparison with paid services. However, we believe that the trajectory of use still has a logarithmic shape, as people will have to practice technology, and explore its possibilities. When this phase is over, usage levels down to a stable, routine level. The main difference to a paid service is probably the level of initial active phase. Lower starting levels ought to be expected, if users have to pay for messages.

Finally, we need a naturalistic research agenda for studying mobile multimedia. Polls and focus groups tell us little about what and how people do things together. Importantly, such empirical analysis makes research more realistic even though predicting the future, of course, still remains a risky business in the quickly evolving field of mobile multimedia.

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