Replicating a Study of Collaborative Use of Mobile Phones for Photo Sharing in a Different Cultural Context

Carolina Sandoval[1], Camila Montero[2], Tero Jokela[3], Andrés Lucero[4]

[1]Universidad de Chile, Santiago, Chile
[2]NIC Chile Research Labs, Santiago, Chile
[3]Nokia Research Center, Tampere, Finland
[4] University of Southern Denmark, Kolding, Denmark

{carolina.sandoval, camilamonterosalazar}@gmail.com, tero.jokela@nokia.com, lucero@acm.org

ABSTRACT

In this paper, we replicate a study of collaborative mobile phone use to share personal photos in groups of collocated people. The replication study was conducted in a different cultural context to check the generalizability of the findings from the original study in terms of the proposed interaction techniques, current photo sharing practices, and privacy. Our results confirm and expand the original findings. We report our main findings by comparing them to the key findings of the original study. Finally, we discuss possible reasons for some variance in the results.

Categories and Subject Descriptors

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, Experimentation, Human Factors.

Keywords

Replication; RepliCHI; Mobile Collocated Interaction.

1. INTRODUCTION

Replication studies aim to confirm, expand or generalize the findings from an earlier study [5]. Although research in Human-Computer Interaction (HCI) shows few examples of replications [1], initiatives such as RepliCHI [11,12] are promoting validation and refutation studies to be conducted in an attempt to consolidate what the HCI field knows. Moreover, the CHI 2014 conference included for the first time "Validation and Refutation" studies as one of its eight main contribution types. In this context, we conducted a replication of Lucero *et al.*'s evaluation of *pass-them-around* [7], a phone-based prototype that allows a small group of collocated people to share photos using the metaphor of passing paper photos around.

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The main reason to replicate this study was to check the generalizability of the main findings from the original study regarding the proposed interaction techniques, photo sharing practices, and privacy. Based on Hendrick's types of replication [4], we conducted a *partial replication* of the original study where we used the same format, tools and experimental protocol, but where we deliberately changed the cultural context of the original study from Finland to Chile. Testing the prototype in a different setting would thus allow us to consolidate, invalidate or reduce the scope of the original study's findings [5].

2. CHANGING CONTEXT FROM FINLAND TO CHILE

There are clear cultural differences between Nordic and Latin American countries. People in Nordic countries are characterized by moderately strong practices of uncertainty avoidance, future orientation and institutional collectivism, as well as gender egalitarism. It also has weaker practices of in-group collectivism, and performance orientation, assertiveness, and power distance [2]. Furthermore, Smiley notes that Nordic people tend to be modest, punctual, honest, and high-minded [10]. On the other hand, Latin America is characterized by the practices of high power distance, and low performance orientation, uncertainty avoidance, future orientation and institutional collectivism. In other words, Latin American societies tend to enact life as it comes, taking its unpredictability as a fact of life, and not overly worrying about results [2].

Despite these societal differences, Chile and Finland share many characteristics in common. Both countries are relatively small in terms of population (i.e., six and 15 million respectively), and they are located in remote areas of the world and in the periphery of their respective continents (i.e., South America and Europe). But perhaps the two most salient similarities with regards to this replication study relate to technology use and photo sharing practices.

Similar to Finland, Chile's use of Internet and communication technologies is unique compared to their neighboring countries. In Chile, 41% of the population has access to mobile Internet connections[1] and 61.4% of the population are Internet users, surpassing the rest of the countries in Latin America[2].

[1] Subtel. www.subtel.gob.cl/

[2] World Bank. http://data.worldbank.org/topic/infrastructure

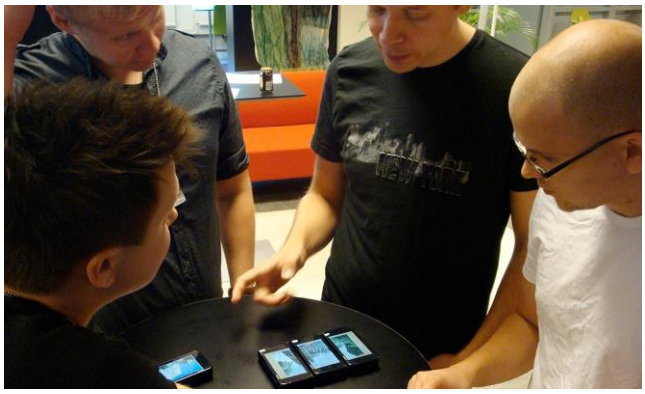

Figure 1. Evaluation setup of the original Finnish study. Four participants sharing photos using devices on a round table.

Moreover, while online photo sharing websites such as Flickr, and more recently Facebook, are popular in Finland [7], Chile has found their own solution in Fotolog[3]. Since 2002, well before Flickr or Facebook were adopted for online photo sharing, Chileans found a way to share their photos online. Fotolog is a social network where people express themselves through online photographic diaries. Over 5 million out of 30 million active accounts correspond to Chilean users.

This combination of factors (i.e., technology use and photography culture) made Chile an interesting setting to run a replication study of *pass-them-around* [7].

3. ORIGINAL STUDY

Lucero *et al.* [7] took conventional sharing practices with paper photos as a starting point to see how technology could better support those practices. *Pass-them-around*[4] is a phone-based prototype that allows a small group of collocated people to share photos using the metaphor of passing around paper photos. The prototype encourages people to share their devices and use them interchangeably while discussing photos face-to-face. We will now describe the main aspects of the photo sharing experience provided by the *pass-them-around* prototype.

3.1 Interaction Techniques

There are several ways to browse and share photos. First, people can browse through personal photos by *tilting* their devices horizontally with a quick up and down movement on either side of the device. Second, people can share a photo by performing a long press and *throwing* the photo in any direction across the table by flicking it. Third, the owner of a photo collection (or photographer) can share their personal photos as a group by first tilting their device vertically towards the center of the table and then passing them on *sequentially* one by one to the next person by tilting their device horizontally. Fourth, while sharing photos as a group, an audience member can activate *photo pointing* and inquire specific aspects of a given picture by performing a long press on that photo. Fifth, *huddling* allows people to closely discuss photos in sub-groups by combining two, three or four devices together (into two tiles of two, or by *tiling* all four) that display a composite larger version of a photo [8]. To disconnect a device from the shared view people must simply pick their device up from the table. To stop sharing a collection as a group, the photographer must tilt their device vertically towards themselves. Further details on the design rationale and interaction techniques can be found on the original *pass-them-around* paper [7].

3.2 Evaluation

In the original study, 20 participants (i.e., five groups of four friends) were invited to share their personal photos using the prototype. The participants varied in gender (16 male, 4 female), age (between 21 and 40), and background (14 technical, 6 non-technical). A total of 15 personal photos from each participant were used during the evaluation so people would have a real motivation to talk about and share those photos. Quantitative data was collected by means of the AttrakDiff[5] [3] questionnaire after a photo-sharing task. Qualitative data was collected both during the photo-sharing sessions (i.e., observations of use) and later during semi-structured interviews. Affinity diagramming [6] was used to analyze the qualitative data.

4. REPLICATION

As was mentioned earlier, our goal was to check if the original study's main findings (i.e., interaction techniques, photo sharing practices, and privacy) would still hold if the prototype was to be evaluated in a different cultural context.

4.1 Evaluation

In preparation for the replication, the first author of the original study (i.e., the last author of this paper) traveled to Chile, brought the prototype with him, and explained the evaluation procedure to the first two authors of this paper in detail. He also provided the semi-structured interview questions, which were jointly translated into Spanish with the first author of this paper. Both the first author of the replicated study and the first two authors of the current study were native Spanish speakers. The authors of the original study (i.e., the last two authors of this paper) were otherwise not involved further in the current study.

The same format, tools and experimental protocol of the original study were used. Twenty new participants closely matching the aforementioned friendship, gender, age, and background distribution criteria were recruited. The same Nokia N900 mobile devices running *pass-them-around* from the original study were also used. The main difference between the original study and the replication lies in the slightly larger (i.e., 90 cm vs. 60 cm diameter) and shorter (i.e., 85 cm vs. 130 cm tall) round table that was used. As a result, participants in the replication were sitting rather than standing around the table, as was the case in the original study (Figure 1).

5. RESULTS

Our results confirm and expand the original findings. We will now compare the main findings of our study to the key findings of the original *pass-them-around* study.

[3] Fotolog. www.fotolog.com

[4] Pass-them-around. http://youtube.com/watch?v=Omx50UD_J0o

[5] AttrakDiff. http://attrakdiff.de/index-en.html

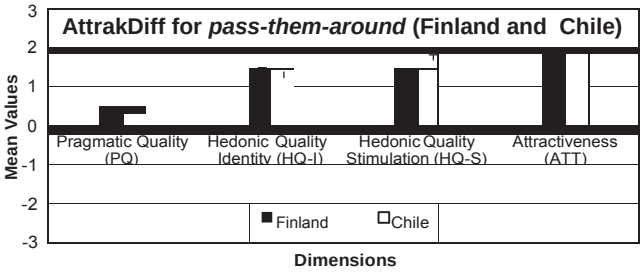

Figure 2. Mean values and standard errors along the four AttrakDiff dimensions.

5.1 Interaction Techniques

Similar to the original study, all participants (20/20) were able to share their personal photo collections. Most participants did not seem to see the benefit of sharing pictures sequentially (compared to half of them in the original study): *"The pictures seem to be somewhat delayed."* (P6) Similar to the original study, participants found a way to display the same photo that the photographer was explaining at a given time: photo pointing was spontaneously (or in agreement with the photographer) used by all participants (20/20) to browse and discuss photos as a group. This emerging way of photo sharing was called *mirrored view* in the original study.

Group *huddles* were created in all sessions. Although *huddling* was described as novel and as *"this is magic!"* (P9), most participants initially had trouble pinching the devices together to display a larger tiled image. A few of them (3/20) even took the device's stylus out to check whether the (low) sensitivity of its resistive screen had anything to do with this. Back in 2010 when the original study was conducted, resistive touchscreens that required a hard touch for interaction were popular. Today, people are more familiar with the lighter touch of capacitive screens, especially to browse photos by performing a swipe gesture. On the AttrakDiff questionnaire (Figure 2), there are no significant differences on any of the four dimensions. However, on the pragmatic quality (PQ) dimension, the prototype was rated slightly lower in the replication than in the original study. These problems to interact with the touch screen may have impacted the ratings on this dimension. Nevertheless, participants were able to create larger device tiles using pinch. In line with the original study, participants complained about bezels and how *"they cut faces."* (P11)

Half of the participants (10/20) took the device in their hands to browse photos in a more comfortable way: *"The natural thing to do is not to keep it on the table."* (P1) In the original study, participants made a similar request whereby it should also be possible to browse photos while comfortably seated on a couch.

5.2 Current Photo Sharing Practices

Most participants (17/20) reported using social networks (e.g., Facebook, Instagram, Flickr) and instant messaging (e.g., WhatsApp) to share pictures. When the original study was conducted in 2010, WhatsApp[6] had not yet gained the level of popularity it currently has in Chile. Although a few participants mentioned sharing photos via MMS in the original study (4/20), instant messaging was not mentioned at all back then, confirming the trend that applications such as WhatsApp are negatively impacting the amount of SMSs and MMSs that people send to each other. Similar to the original study, we found that people share photos using a laptop (7/20), a mobile phone (3/20), or by sending photos as email attachments (3/20). Other ways to share photos that were new to this study include Dropbox[7] (4/20) and browsing physical photo albums (4/20): *"With my family, we still get together and browse physical albums."* (P16)

5.3 Privacy Concerns

When discussing about sharing photos (or other media content) in a public environment, most participants (18/20) raised their concerns on privacy and the safety of their personal information: *"People keep personal things in their phone,"* (P12) *"I'm not comfortable with my photos being more public than I want them to be."* (P17) In the original study, half of the participants (10/20) wanted the photos to be permanently transferred to all members of the photo sharing session, slightly fewer people than what we found in our study (12/20): *"If someone has already shared a photo with me, I should be able to keep it."* (P7)

6. DISCUSSION

6.1 Cultural Differences

Despite the cultural differences, the original Finnish results were mostly confirmed by our replication study in Chile, where the prototype was received equally positively. In a study of replications in HCI, Hornbæk *et al.* [5] found that replications mainly confirm earlier findings and often make simple comparisons to earlier studies.

Regarding their use of technology, the Chilean participants were accustomed to having ubiquitous devices readily available for use in their daily activities (e.g., they all spoke about their mobile device as though they had it on them by default). The ubiquitous use of photo sharing applications to tell others on the spot what they are doing was also a recurring topic: *"Yes, because when I'm window shopping for shoes, I will take a picture and send it to a friend to see if they like it. The same goes for any delicious meal we have, you send a photo to tease the other party."* (P10) This is similar to how Finns use their mobile devices [9].

However, we did notice a potential cultural difference regarding the slightly careless attitude towards sharing photos in the semi-public evaluation setting. While the content for most pictures was related to travel, there were photographs where participants exposed themselves more openly than what was observed in Finland especially when there are strangers (i.e., the researchers) around (e.g., a group of four friends with their pants down showing their boxer shorts). Based on what they saw in the pictures, these participants joked around and had a natural and relaxed conversation. They had no concerns about sending those pictures to the researchers a few days before. These participants seem to reflect some of the more open and careless behavior of exposing themselves through photos in public that was observed in the early days of Fotolog.

[6] WhatsApp. www.whatsapp.com

[7] Dropbox. www.dropbox.com

Figure 3. Evaluation setup of the replication in Chile. Four participants sharing photos using devices on a round table.

6.2 Setup Differences

The main difference between the original and replication studies was the larger and shorter round table that was used (Figure 3). For this reason, during the replication we carefully observed the participants' interaction, both when interacting with each other, and while using their phones.

We observed that participants at different times tended to sit, kneel or stand, and that each of these behaviors would support the interaction performed at that time. For example, they used to sit when they needed to rest or when they were sharing photos with participants located at either side of them. They sometimes kneeled when they wanted to focus on their own phone, and on other occasions they remained standing when talking to more than one person at a time.

Despite these variations in body position, in all sessions, participants took each other's mobile phones for a moment, sometimes to look at the picture the other person was watching, or to tile devices together, or just to test what would happen when changing the order of the phones around the table. While in theory a larger table could potentially make it more difficult to reach out and take the mobile phone of the person sitting across the table, in practice we did not observe such limitations.

6.3 Procedural Differences

Upon discussing our findings with the first author of *pass-them-around*, we realize there may have been slight differences in how the functionality and the interaction techniques were explained in both studies.

As the main interaction design lead for *pass-them-around*, the first author of that paper had a better understanding both about the intentions for the conceptual design (i.e., sharing practices with paper photos) and the limitations of the technology (i.e., the resistive touch screens of the device). In the original study the prototype was introduced as a research prototype that was created to try to bring back some of the richness behind conventional photo sharing social practices. In the replication, we introduced the prototype without explicitly explaining why sequential photo browsing worked the way it did. Participants were clearly expecting photo sharing to incorporate functions from the digital world (i.e., duplicating images, automatic slideshow mode, etc.). Along the same lines, participants in the original study were told to use their fingernails to activate the resistive touchscreen. In the replication study, that piece of information was not mentioned, which resulted in participants trying to use the device's stylus to operate it. While we believe the use of the stylus did not have a large effect on the overall results, these slight differences in how the instructions were given to participants can help explain some of the variance in the results.

7. CONCLUSION

A study of collaborative mobile phone use to share personal photos in groups of collocated people was replicated in a different cultural context. We compared the main findings of our study conducted in Chile to the key findings of the original study in Finland, which were confirmed and expanded by our study. Possible reasons for some variance found in the results were also discussed. We hope that the field of Human-Computer Interaction will embrace the need that we have as a community to conduct more (and better) replication studies to consolidate what the field knows.

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