“Accept” or “Decline”: Alternative Options for Video Telephony Tools for Inter-Generational Family Communication

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This study contributes to the discussion on video telephony for inter-generational family communication. We present an evaluation of 11 alternative interaction options next to the standard options “accept” or “decline” for video telephony in 10 family scenarios with 20 grandchildren and 20 grandparents. Results highlight a differentiated view of the two generations on family situations for inter-generational video communication. Grandparents are more likely to use video telephony in different situations than grandchildren. Further, family scenarios provoked different interactions by the two generations. Overall, we suggest alternative interaction options for inter-generational family communication enabling users to immediately react to incoming video calls to the current situation, goal, activity, context and self-disclosure needs.

video telephony, inter-generational family communication, information disclosure, interaction design

1. INTRODUCTION

Recent literature discusses video telephony as suitable for family awareness and communication – together with a discussion of the complexity of family and inter-generational communication (Judge et al 2010b, Saslis-Lagoudakis et al 2006, Lindley et al 2008). However, families do not only benefit from modern systems but also run the risk of causing conflicts and tensions between single members due to varying opinions, activities or goals (Little et al 2009). Moreover, when designing for communication social relations and the context of use have to be considered too (Khalil & Connelly 2006). Further, systems supporting family communication need to be sensitive to individual information disclosure aspects (Little et al 2009, Floridi 2005).

In specific, studies on video telephony highlight these issues showing that video telephony is not as immerse and “impromptu” as initially reckoned (O’Hara et al 2007, Judge & Neustaedter 2010a). Video calls are often initiated by media such as phone calls, voice or text chats. An explanation may be the intrusiveness of video telephony needing initiatory actions to check the availability and willingness of the callee for video conferencing (Judge & Neustaedter 2010a).

The present study builds on feedback gathered in separate focus groups with grandparents and grandchildren during which a value tension (Miller et al 2007) - a conflict between perceived benefits and harms - between the two generations could be identified: Grandparents with no video telephony experience absolutely recommended this possibility for inter-family communication whilst experienced grandchildren appreciated this option for communicating with their grandparents less. The reasons for this negative attitude refer to the presumption that once grandparents have access to video telephony an extensive use will follow ignoring the current situation, goal or information disclosure needs of the callee (e.g.: having dark circles around the eyes because of staying out long, being naked, interference with current activity). Grandchildren are willing to use video telephony for inter-generational family communication but suppose problems that might arise when providing such tools to grandparents.

These findings highlight the current weakness of video telephony tools which is mainly caused by a lack of integrated solutions giving the callee a chance to balance incoming calls to individual goals, activities, context and self-disclosure needs.

In the following study we first adapted family scenarios for incoming video calls with 9 grandchildren and 9 grandparents in focus groups (see Table 1). Secondly, 11 alternative interaction options (see Table 3) next to "accept" and "decline" were evaluated for 10 selected scenarios talking to 20 grandparents and 20 grandchildren. Further, participants rated the perceived adequacy of the presented family scenarios for inter-generational video communication (to double check validity of scenarios).

The differently perceived adequacy of video communication in particular scenarios implies the need of alternative interaction options for video telephony. Further, potential interaction alternatives for video conferencing tools could be identified that may balance tensions occurring in inter-generational family communication.

2. RELATED WORK

Discussing modern communication technologies Poole et al. argue that the majority of systems rather focus on functionality and *neglect non-functional facets* e.g. human values (Poole et al 2008). This is in line with Floridi (2005) who sees a need to be sensitive and responsive to the kind of information the user does or does not want to disclose since *information disclosure* (deliberate or unintended) can have a profound influence on relationships and trust.

Especially studies on video telephony have shown particular mundane practices. Studying mobile video telephony O'Hara et al. differs between *social and emotional calls* (mainly used to maintaining relationships), *show and talk calls* (in which video gives visual information pieces) and *functional calls* (for arranging or organizing) (O'Hara et al 2007). However, according to O'Hara et al (2007) "important" topics were usually not discussed over video telephone due to context issues. Looking at video conferencing in the home, Judge and Neustaedter (2010a) reveal two usage strategies. The primary one is *conversation "support"* (watching gestures and body languages) and the secondary one is the use of this medium in order to be "*part of activities*". The Authors report that SMS or phone calls are used prior to video calls assuring the availability and willingness of the callee, reporting that video chats are not impromptu at all.

Inter-family communication brings further complexity to the design space. Little et al. (2009) point out that technology designed to maintain family relations must take some form of *self-disclosure* into account since different opinions and goals may lead to *tensions* between single family members. Lindley et al. (2008) explored the "*complexity of*

relationships" in later life and report that communication technology does not always consider all aspects of *family relations*. For example, older users in many cases are happy to watch their younger relatives but in contrast do not have the need (or are even not delighted) to be watched. Similarly, studying video telephony Kirk et al. refer to *natural tensions* between generations. Parents want to observe their children while kids only grant visibe access to parents and other close people, but not to all communication partners (Kirk et al 2010).

Recent studies indicate that in video media spaces privacy issues seem to decline when intimate people (e.g. family members) and media-space-like systems come into play (Judge et al 2010b, Saslis-Lagoudakis et al 2006). However, as argued by Floridi (2005) and Little et al. (2009), *tensions* between single family members still emerge referring to *information disclosure, goal diversity, context, social relation* or the *current activity*. Responding to these aspects diverse approaches for reacting on video calls have been discussed (e.g. obscuring, filtering, camera disabling (Roussel 1999, Boyle et al 2000)). Such *fine-grained* and *lightweight controls* in interfaces inherit different trade-offs, such as assuring privacy but to the cost of less communication, as an example (Boyle & Greenberg 2005).

To summarize, little work could be found dealing with intrusion, self-disclosure or goal diversity within inter-generational family video communication. Our study shows how extended interaction options can decrease such issues of video telephony for family communication beyond the standard options "accept" and "decline".

3. STUDY

This study investigated alternative interaction options for video telephony tools for inter-generational family communication. The focus was on alternatives that go beyond "accept" or "decline" and to be used to react to calls in diverse situations.

Two hypotheses have been investigated. H1: Grandparents and grandchildren differ in their perceived adequacy of family scenarios for video telephony. H2: Reactions on family scenarios differ between grandparents and grandchildren.

3.1 Study Setup

The study was split into two parts. A) Development of family scenarios in workshops with grandparents and grandchildren. B) Evaluation of alternative interaction options for incoming video calls in scenarios developed in A). Further, family scenarios developed in A) were evaluated by participants rating the perceived adequacy for video conferencing.

3.2 Sample

For both parts of the study grandchildren (Part A: 9 participants, [Age: $M= 25.33$; $SD= 2.06$]; Part B: 20 participants [Age: $M= 24.95$; $SD= 2.19$]) and grandparents (Part A: 9 participants [Age: $M= 69.56$; $SD= 5.9$]; Part B: 20 participants [Age: $M= 67.45$; $SD= 4.46$]) were invited. In each group the sex ratio was balanced. Selection criteria for both groups were: not living together with grandparents or grandchildren, own a mobile phone, use the internet. Since not all participants did have video conferencing experience a demo was held in study A) and B) using Skype. None of the persons participated in both parts of the study.

3.3. Part A - Family Scenario Development Workshop

The aim of the two workshops was to create comparable realistic family scenarios for grandparents and grandchildren describing the circumstances in which a video call comes in. Both groups were given 12 pre-defined base scenarios. These scenarios were initially defined by us, 6 of them indicating a possible tension between caller and callee and 6 of them not. The reason for providing pre-defined situations was to guarantee that in part B) of the study both generations work with scenarios that can be compared and only distinguish in the role of the actor (grandparent, grandchild). All scenarios indicated situations that may occur repeatedly during daily life and did not refer to exceptional circumstances.

3.3.1 Procedure

The *first* task of the participants was to classify the scenarios into "inappropriate" or "appropriate" for video telephony. Participants were asked to group the scenarios and rate them on a 6 point Likert scale ranging from highly appropriate (6) to highly inappropriate (1). The *second* task was to adjust the content of the classified scenarios so that in the end of the session 6 of them could be classified as highly ($N=2$), medium ($N=2$), lowly ($N=2$) inappropriate and 6 of them as highly ($N=2$), medium ($N=2$), low ($N=2$) appropriate for video communication. The *third* task was to adapt the content of the scenarios to the family role (grandparent, grandchild) including filling words to enhance the realism.

3.3.2 Results

The result of this procedure was a balanced set of comparable realistic family scenarios, 12 for grandparents and 12 for grandchildren. Six of the scenarios were classified as highly, medium, lowly inappropriate and 6 of them as highly, medium, lowly appropriate for video communication.

Scenarios classified as inappropriate for video communication included diverse types and levels of

tensions leading to non-responded video calls (e.g. interrupting activity, undesired self-disclosure, diversity of goals, inadequate context). Scenarios classified as appropriate for video conferencing did not include any type of tension.

Due to the adaptations of the scenarios during the workshops 2 scenarios had to be excluded since their comparability for grandparents and grandchildren was not given any more. Table 1 lists the key elements of the remaining 10 family scenarios inappropriate (1-6) and appropriate (7-10) for video communication (for both groups).

A limitation of the inappropriate family scenarios can be seen in the unbalanced types and levels of included tensions. This fact should however not affect part B) of the study since an independent re-evaluation of the perceived adequacy of the scenarios for video telephony was done by participants of part B.

Table 1: Key elements of inappropriate (1-6) and appropriate (7-10) family scenarios ($N=10$) for grandchildren and grandparents

Nr	Family Scenarios
1	You have a lump on your head that may cause a conflict
2	You have a swollen cheek, can hardly talk and do not want to show yourself to others
3	You are naked
4	You are in a hurry (job completion needed urgently for next morning)
5	It is late evening, you are tired and want to go to bed
6	You do not want to be disturbed (planned to have a quiet and extensive birthday breakfast)
7	You have a lump on your head and have no reason to hide it from others
8	You know that grandparents/grandchildren are very busy and often tired
9	You know that grandparents/grandchildren are excited because of first time situation (getting a stair lift / first zoo visit)
10	You did not have contact to grandparents / grandchildren during the last three weeks because of limited access to communication channels

3.4. Part B: Evaluating family scenarios and video telephony interaction options

The *primary* goal during part B was to evaluate alternative interaction options for both, grandchildren and grandparents to respond to incoming video calls given the family scenarios derived in part A). The set of options included the two standard options "accept" and "decline" and 11 interaction alternatives showing different types of *content* and *access control* [0] (see Table 3). A *secondary* aim was to evaluate the family scenarios from A).

3.4.1 Alternative interaction options

The proposed 11 interaction alternatives offered callees possibilities to immediately react on incoming video calls beyond "accept" or "decline" – and by doing so avoiding the need of initiatory actions. Alternative options included already existing solutions such as "blur video", "show my profile photo only", "audio channel only", "open text chat" or "show avatar" but also new solutions such as "decline and send 'I'll call back' message", "silence", "hide my video on my screen", "freeze video", "show predefined video" and "transfer to mobile phone". One difference of our used prototype compared to current video tools was that it did not show of the callee. Therefor the fluency of the communication process was simplified by transferring the chosen option directly into communication. Silencing video calls constitute an exception since no communication is started.

3.4.2 Procedure

Prior to the evaluation all interaction options were explained to each participant using a click dummy. The main screen of the dummy displayed an incoming video call. By selecting an option the main screen transferred into a split screen showing the consequence of each "accept"-option for both communication partners and how it would appear on the screen. (e.g. "accept, but blur video": caller sees blurred video of callee and callee sees unblurred video of the caller).

Participants were instructed to imagine having a video telephony solution at home which is – similar to landline phones – always callable. The 10 scenarios from A) were presented to each participant in random order. Grandparents and grandchildren were asked to select one of the two offered standard ("accept" and "decline") and 11 alternative interaction options to respond to the call. After they had chosen an option participants were asked what motivated their decision. This procedure was repeated for all scenarios developed in part A) of this study. In the end participants were asked to rate the adequacy of each of the 10 scenarios for video communication on a 6 point Likert scale (1= highly inappropriate; 6= highly appropriate).

3.4.3 Results: Adequacy of family scenarios for video communication

A T-test for independent samples was chosen for comparing the mean ratings of the perceived adequacy of the family scenarios for video telephony between grandparents (GP) and grandchildren (GC). Results indicate a significant difference in the perceived adequacy of the 10 scenarios for video communication between the target groups with $t_{(38)} = -3.09$, $p = 0.004$. Overall, grandparents rated family scenarios less inappropriate for video con-

ferencing ($M = 4.28$; $SD = 0.87$) than grandchildren ($M = 3.61$; $SD = 0.44$).

Further, grandchildren classified more family scenarios ($N = 5$) as inappropriate for video communication whereas grandparents allocated only 2 scenarios to this category (see Table 2). For 3 of the 10 family scenarios results show a converse view of the two target groups: grandparents perceived the scenarios as appropriate whereas grandchildren perceived them as inappropriate. For the remaining 7 scenarios both target groups had the same opinion rating 5 as appropriate and 2 as inappropriate.

Table 2 shows the mean ratings of the perceived adequacy for video communication for each family scenario and target group. The right columns picture the scenario classification to the categories "inappropriate" or "appropriate". Classifications of the scenarios to converse categories are bold.

Results highlight that a) grandparents are more open for using video telephony in diverse family situations than grandchildren and b) scenarios exist where both generations show a converse view on the adequacy of the situation for video conferencing that might lead to conflicts.

Table 2: Mean ratings (1= inappropriate; 6= appropriate) and classification (inappropriate= -; appropriate= +) of adequacy of scenarios for video communication per scenario (1-10) and target group (grandparents= GP; grandchildren= GC)

Nr	GP Mean rating (SD)	GC Mean rating (SD)	GP Class.	GC Class.
1	2.95 (1.82)	1.65 (0.81)	-	-
2	3.40 (1.50)	2.26 (1.19)	-	-
3	3.74 (1.66)	2.45 (1.23)	+	-
4	3.95 (1.67)	2.50 (1.43)	+	-
5	4.30 (1.26)	3.30 (1.03)	+	-
6	4.45 (1.54)	4.95 (0.94)	+	+
7	4.55 (1.36)	3.35 (1.14)	+	+
8	5.05 (1.09)	4.15 (1.27)	+	+
9	5.35 (0.67)	4.55 (1.39)	+	+
10	5.75 (0.71)	5.53 (0.61)	+	+

3.4.4 Results: Selected interaction options

Frequencies from descriptive statistics show that overall grandparents (GP) accepted incoming video calls ($N = 200$) in the given family scenarios with 52% whereas grandchildren (GC) only with 40.5%

(see Table 3). The "decline" option was chosen in only 2.5% (GP) and 1.5% (GC) of the cases. *Grandchildren* "silenced" incoming video calls (17%), selected the option "decline, but send "I'll call back" message" (14%), "accept, but show profile photo only" (8%) or "decline, but enter a text chat" (7%). *Grandparents* selected the "decline, but send message "I'll call back"" option (15%), "accept, but show profile photo only" or "decline, but enter a text chat" each with 6.5% or "accept, but only with audio" (6%). *Both groups* selected the "accept, but transfer to mobile phone" option in 5.5% of the given situations. The other interaction alternatives can be disregarded since their percentages are low between 0-2% for GC and 0%-2.5% for GP.

3.4.5 Options for both generations

For both target groups (GP= 15%; GC= 14%) "decline, but send "I'll Call back" message" proved to be one of the most suitable option instead of standard "decline" incoming video calls. This option was mainly selected when the current scenario did not permit to accept the call (e.g. being naked [scenario 3] or urgent job completion [scenario 4]). "Accept, but show profile photo only" (GP= 6.5%; GC= 8%) turned out to be a potential interaction option in situations where visual information could cause a conflict (scenario 1) or in case the callee does not want to disclose personal visual information (scenario 2). "Decline, but open text chat" (GP= 6.5%; GC= 7%) can be seen on a similar level mainly used in situations where speech is restricted and callees do not want to deliver video information (scenario 2). The option "Accept, but transfer to mobile phone" was chosen by both generations in 5.5% of the scenarios, especially when the locally fixed video conferencing tool prevents users from carrying on other activities (scenario 5).

Table 3: List of interaction options (N=13) and frequency of reactions (N_{GP}=200; N_{GC}=200) in percentage to family scenarios for grandparents (GP) and grandchildren (GC)

Nr	Interaction option	Selection GP	Selection GC
1	Accept call	52%	40.5%
2	Decline call	2.5%	1.5%
3	Silence call	2%	17%
4	Decline, but send "I'll call back" message	15%	14%
5	Accept, but blur own video	0%	1.5%
6	Accept, but hide MY video on MY screen	0%	1%
7	Accept, but show MY profile photo only	6.5%	8%
8	Accept, but freeze MY video	0.5%	0%
9	Accept, but show predefined video	1%	1.5%

10	Accept, but show avatar	2.5%	0.5%
11	Accept, but audio only	6%	2%
12	Decline, but open text chat	6.5%	7.0%
13	Accept, but transfer to mobile phone	5.5%	5.5%

3.4.6 Grandchildren "silence", grandparents "manipulate"

The "silence" option was frequently used by *grandchildren* (17%) to react on video calls but was rarely selected by *grandparents* (2%). In contrast, *grandparents* preferred to choose alternative options that manipulate the video or audio channel ("accept, but show my profile photo only" [6.5%], "decline, but open text chat" [6.5%], "accept, but only with audio" [6%]). These results highlight that in general grandparents are more likely to start a bidirectional communication with grandchildren whereas grandchildren tend to hide by silencing video calls.

To sum up, findings imply that alternative interaction options for video telephony tools are needed for inter-generational family communication. Whereas grandchildren tended to silence incoming video calls, grandparents rather manipulated the audio and/or video channel. Moreover, results suggest integrating the alternative "decline, but send "I'll call back" message" next to the standard option "decline".

4. DISCUSSION AND CONCLUSION

Overall this study contributes to a more selective design of future video conferencing tools for inter-generational family communication. *First*, and this could be seen in both parts of this study, grandparents are more open to video conferencing in different situations while grandchildren perceive situations more often as inappropriate. *Second*, our findings highlight that alternative interaction options beyond "decline" and "accept" are needed not only for inter-generational family communication but also within the generations to help balance emerging tensions.

For both generations, we suggest integrating the "decline, but send "I'll call back" message" as alternative interaction option. Moreover, a transfer of incoming video calls to mobile phones shows a high potential to support the communication between grandparents and grandchildren. This applies mainly in situations where callees are willing to communicate but other activities interfere with the location dependency of current video telephony tools. In addition, the difference in the interaction behaviors between the two generations indicate

that grandchildren are more likely to hide behind the "silence" option whereas grandparents rather start bidirectional communication by manipulating incoming video calls.

With this study we were able to show the value of different video telephony functionalities to balance tensions in inter-generation communication. Our findings contribute to the investigation of interaction alternatives for video telephony for both, inter- and within-generational family communication. Follow up studies have to be aware of the type and level of possible tensions and their impact on individual reactions to video calls. In the present study this issue can be disregarded since the aim was not to show interaction options adequate for different kind of tensions but to show, in general, that there is the need of alternatives beyond "accept" and "decline" for inter- and within-generational video communication.

A still open question is if the proposed alternative interaction options may foster social interaction between and within generations. Although we think that this approach may have a high potential this hypothesis must be studied in field trials under realistic conditions. In addition – the other way around – interaction options for starting video communication may be interesting as well.

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