

# Young children and the use of video chat: implications for QoE research

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**Abstract**—Young children represent an important, yet under-explored user segment in QoE research. This is partly due to the limitations associated with traditional QoE assessment methods. As a first step towards addressing this non-traditional user segment, this paper shares selected findings from a mixed-method study on the use of video chat and potential influence of technical influence factors on children’s QoE. An exploratory survey with parents (N=87) was combined with home observations (N=7) and focus groups with children (N=21). The results provide further insights into how and why video chat is used with young children, and initial insights into how children react to technical impairments, e.g., by displaying emotional or behavioral indications of poor QoE. Further, we reflect on a number of methodological challenges that need to be addressed in future QoE-studies with children.

**Keywords**—Videochat; young children; Quality of Experience; influence factors

## I. MOTIVATION AND BACKGROUND

Over the last years, the need to embrace user diversity and to gain better insights into both stable and more dynamic human influence factors in/on Quality of Experience (QoE) research [1] have received growing attention. This is e.g., reflected in how results are reported, but also in how studies are/can be designed and conducted in order to strive for a more heterogeneous composition of test panels (see e.g., [2]). However, due to practical-economical constraints, recruitment is typically still focusing on test populations that are relatively easy to reach (e.g., university students, colleagues, etc.). Moreover, lab studies using standard quality assessment scales are still common practice. While such studies clearly have important merits, their suitability for investigating QoE with less traditional user segments, such as young children, is limited. As a result, the focus in QoE studies is still almost exclusively on adult user groups (i.e., of 18 or older).

However, the reality is that many children in all age groups grow up in what in [3] are called *media-rich* digital homes and with a wide range of digital applications, such as online video, gaming and video chat [3], for which QoE is a key concept. Furthermore, while digital media exposure and the use of digital media among older children and teenagers have comparably received a lot of research attention (see e.g., [4] on how and why teenagers use video chat), the same cannot be said for younger children. A large-scale qualitative study from 2015 [3] indicated a *substantial increase in use of digital technology by very young children* but also showed that

research focusing on the youngest user groups is not following the same trend.

Currently, it is thus unclear what QoE means when considering (young) children as user population, whether (and how) QoE can be evaluated in this respect, and what the implications are in terms of existing evaluation methods and measures. Hence, it is important that this growing, yet challenging and under-explored user segment receives more attention, also from the QoE point of view. One exception worth noting is the interesting study presented in [5], in which groups of children and young adults between 9 and 17 years old participated in a video quality evaluation study. It was concluded that students are suitable as viewers in subjective experiments. However, it was not further investigated to which extent the used grading scale was actually properly understood (and whether other, more child-friendly scales may be more suitable) and whether the test set-up in general may have influenced the obtained results. Furthermore, the segment of children below 9 was not included. In our own research, we therefore focus more specifically on the age group of 6 months to 8 years old and we use video chat as a specific case.

Recent studies indicate that the use of video chat with young children is not a marginal phenomenon. [6] conducted a survey study among parents with children between 6 and 24 months old and found that 85% of the respondents had already used video chat and used it relatively frequent, in many cases to develop and maintain a bond with relatives that live far away [6]–[8]. However, despite the growing number of studies focusing on video chat and young children’s visual attention [9], and socio-cognitive and language development (e.g., recent study in [10] found that children from the age of 2 years old can actually learn new words through video chat), issues related to QoE (and factors influencing it), have received very little attention so far. Our research therefore aims to further explore (1) how video chat services are used by young children (i.e., 6 months up to 8 years old), (2) the potential influence of technical impairments and other factor on children’s QoE and (3) methodological implications and challenges. We present selected findings from three studies, namely an exploratory survey (N=87), a home observation study (N=7) and a focus group study (N=21).

## II. METHODOLOGY

In the exploratory *online survey* study, parents acted as a proxy for their child(ren) in the target age group (6 months up to 8 years). The survey was distributed through different channels (e.g., kindergartens, social networks) and included a range of topics, such as socio-demographical info, screen

media habits of the child, use of video chat applications (e.g., applications, devices, frequency, context(s)/settings of calls, conversation partners, attitudes, etc.). The last part focused more explicitly on experience with technical quality-related issues during video chats and their potential impact. 87 participants completed the whole survey (233 incomplete entries were disregarded). 82,8% of the respondents were women, 17,2% were men (age range from 20 to 43 years old). 49.4% has a master degree or higher.

The survey was followed up by two qualitative studies. The first study used the *naturalistic observation method*. Home observations of parent(s) and child(ren) during a video chat session were conducted. Even though a lab study would offer more advanced possibilities for observation and manipulation of the call conditions, we opted for this more naturalistic approach as children in these age groups are sensitive to changes in their environment. Having the observations take place in the home environment thus allowed to minimize the risk for unnatural behavior or for children being too overwhelmed to participate. Observations were guided by an observation scheme and mainly focused on how children participate in/react during a call, and to potential technical impairments (if occurring). Six families with in total 7 children (between 14 months and 5 years old; two girls and five boys) participated. In all cases, the conversation partner was a remotely living relative. All calls took between 10-20 minutes. The second qualitative study used the *focus group method*. Five 15-20 minutes long focus group interviews with in total 21 children (7-8 years old, nearly equal gender distribution) were organized at a local school. The main focus was on the children's overall use of video chat and on factors contributing to a positive / negative experience with video chat. Groups were composed with the help of the teacher, taking into account the main recommendations from the literature (indicating that aspects such as personality, familiarity and friendship patterns, gender, group size should be considered) [11].

### III. SELECTED RESULTS

The children represented by their parents in the *survey study* covered the whole age range from 0 to 8, with 3 years old being the largest group (32.9%). One third had used a Smartphone, tablet or computer (either alone or with someone else present) at least several times a week up during the preceding two weeks (reference period). Smartphone, tablet and/or computer are used for various purposes by the youngest children: most popular were watching movies and videos on YouTube (or similar platforms), listening to music (e.g., on Spotify), watching family pictures and videos, playing games and video chatting with family. In line with [6], 89,7% of the respondents answered that their youngest child had already participated in a video chat. Moreover, the medium was used at least 1-2 times per week by the majority of children represented. Typically, conversations do not take too long: slightly over 50% reported that calls are usually not longer than 10 minutes. Different applications, such as Facetime (50%), Skype (43.7%), Messenger (28.7%) are used and the same goes for devices used for video chatting: The Smartphone is most popular (79.3%), but also tablet (33.3%) and laptop (32.2%) are commonly used for video chatting with young children.

In terms of the physical and social context, the results

indicate that video chat conversations typically take place at home (90%) and are most often initiated spontaneously. A clear majority (9 out of 10) indicated that there is always an adult together with the child during a call and in terms of conversation partner, grandparents are the clear winners (83.9%). Parents confirmed that especially the fact that video chat allows for visual interaction makes it much more attractive to use with young children than audio-only interaction. A few respondents also explicitly mention that video chat supports children's language development. Generally, almost 9 out of 10 parents agree that their children try to actively participate in the conversation (e.g., through play), yet that keeping focus during a video chat is challenging for many children: they easily get distracted by things happening in the physical world (nearly 8 out of 10 agree).

Respondents were also asked which quality-related issues they had already experienced during video chats in which their youngest child participated. As Fig. 1 indicates, video and audio problems (respectively 37% and 25%) are most common, but also issues with synchronization between audio and video (10%) and problems when one or more other parties try to join a call (6%). When asked whether and how the child reacted to such quality issues, answers vary. Some parents replied that their child does not seem to notice or pay attention to it, and just kept playing. However, a larger part reported that the child did react in some way and thus did seem to be aware of quality issues: *"He loses interest. Sometimes he even got upset because he was told we will talk to grandma, but then it doesn't work and he doesn't understand why"*. Another parent explicitly mentioned that the child got frustrated *"because he is expecting to see the grandparents on the moment and without any interruptions"*. Another respondent noticed a clear age difference: *"my 2 month old doesn't realize it, but the 2 yr old asks where they went"*.

The *home observations* (illustrated in Fig. 2) confirmed most of these findings. Overall, the observed children easily lost interest or were distracted by their toys. However, their understanding of the situation and their behavior seemed to vary greatly depending on their age. Especially the children older than two participated more actively in the conversation. For instance, they answered questions and tried to involve the conversation partner(s) in their own play, despite the mediated setting (e.g., showing a toy and trying to play with the grandparent(s)). In some cases, the child also tried to share more general aspects of their daily life with the other party (e.g., showing the flowers in the living room, showing new skills with the bike). Parents commonly tried to adapt the video chat session to the child's behavior: they tried to involve the child(ren) as much as possible and followed them wherever they would go with the camera, even outside. All of the observed children also touched the screen.

During five of the observations, no noticeable technical problems occurred. Only during one observation, the picture froze for some seconds. The child (5 years old) commented on this, but the problem was quickly fixed. After the conversations, the parents answered questions about the behavior of the child during the observation. None of the parents reported unnatural behavior during the call. They were also asked how their child(ren) typically react when a technical problem occurs. Some of the reactions mentioned above were confirmed.

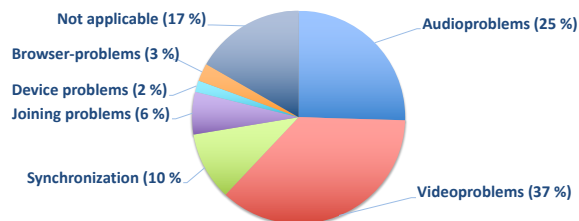


Fig. 1. Technical quality-related issues influencing video chats

One of the parents mentioned: "When technical problems appear, my daughter gets angry at the iPad, but it depends on how busy she is at the moment". Another parent had observed that the child got scared because of the distorted image. However, it was also mentioned that the children sometimes do not notice, or notice but do not seem to care.

The *focus group* sessions were, as mentioned, organized with children who were already able to express themselves better verbally. In terms of the general use behavior, most prior findings were confirmed: e.g., children often move around when video chatting, use it in combination with playing. However, it became clear that children in this age group are much more conscious users. For instance, they consider the content of a call and the conversation partner as factors that strongly influence their experience (fun or boring). Moreover, they are much more aware of the occurrence of technical issues. All children in the focus groups had already experienced technical problems during a call (e.g., freezing video) and quickly starting talking about the fact that this is annoying. A number of children explicitly mentioned that they get angry. One child answered: "I am not getting angry, just disappointed". Interesting to observe was also that many have an idea about what may be the cause of the problem and even try to fix it by e.g., moving inside the house to find a spot with a better connection, turning the device on and off. Further, the study confirmed that an age-appropriate moderating style and careful group composition are extremely important.

#### IV. DISCUSSION

In this paper, we shared selected findings from a mixed-method study focusing on the use of video chat with young children. We argued that children represent a user segment deserving more attention in QoE studies and that better insights into young children's use of and QoE with digital technology can help to ensure that digital, interactive services and applications are developed and refined in such a way that they enable positive and valuable experiences, tailored to the needs and abilities of this particular user segment.



Fig. 2. Observations of video chat session with children

While the studies are exploratory and results cannot be generalized to children using video chat, the findings provide further insights into how children react to technical impairments, e.g., emotionally or behaviorally providing indications of bad QoE. The studies illustrated that play and playful interaction are very often an essential part of video chat sessions involving children in the investigated age group and that preserving the attention and interest of the child tends to be challenging. In most cases, there is an adult together with the children when video chatting and remotely living family members are the main conversation partners. Further, video chat with young children often has a mobile character (following the child) and calls typically start spontaneously. Given this characterisation of typical use sessions, the importance of ecologically-valid research environments and a playful approach to investigate children's QoE becomes evident. However, we also reported that no technical impairments occurred during most home observations. As a result, there is a need to further explore approaches that allow to investigate the impact of technical impairments on children's QoE, in their natural environment. Finally, the studies also showed that age is a crucial influence factor that needs to be carefully considered in follow-up studies. It is possible to gathering QoE-relevant information with young children as user segment. However, the study design and measures need to be carefully tailored to the specific age group and children's means of expression.

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