

When Coactivity Enhances Video Communication Experience

The Shomi prototype: from the users needs to the evaluation of

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Abstract — The current socio-economical context tends to isolate people and limit face to face contacts. Communication services are crucial to maintain social and affective links but present services don't meet users' expectations. In this perspective, we designed Shomi, a video communication application, providing an enriched experience of copresence based on coactivity. Shomi results from a user centric conception process. The main steps of this process are described in this paper.

Keywords — *video communication; copresence; sharing; coactivity*

I. INTRODUCTION

The current socio-economical context tends to isolate people and limit face to face contacts: one in two French people feels far away from his family and 30% of the population over 60 often feels alone.

Communication services are crucial to maintain social and affective links and more especially video communication to experience copresence feeling.

However, current services are unsatisfying in terms of users expectations.

In this perspective, we designed Shomi, a video communication application, providing an enriched experience of copresence based on coactivity allowing users to hear, see, interact and be aware of their correspondents' activity.

Shomi is the result of a user centric conception process.

In this paper we present a synthesis of preliminary studies which helped us to identify the expectations and frustrations of video communication users in order to define a new user experience. We highlight the notions of copresence and coactivity which are the new essential of Shomi.

Developed according to the user centric agile method [1] requirements, several user tests have been held for each iteration of development to strengthen usability.

A set of results coming from these evaluations and iterations will be hereby presented.

II. VIDEO COMMUNICATION: EXPECTATIONS AND FRUSTRATIONS

Capitalization on internal studies directed by Orange on this topic and the results of a set of face to face interviews on a panel of users and non-users of video communication (12 people from 20 to 55 years old), led us to a set of conclusions. Thus, by choosing a video communication users need to go further than a simple audio communication and further than simply exchanging news. Users need to see their correspondent and his environment, be in empathy with him, feel his presence, share his context, share a moment, an event, an activity, show objects... It is also an opportunity for a group communication in opposition with mainly dyadic phone communications.

If each medium has its own utility (concerning relationship with relatives), it seems there is a usage continuum of these different media going from practical (SMS) to face to face. In other words, going from being practical to looking for a feeling of presence (cf. figure 1 & 2)

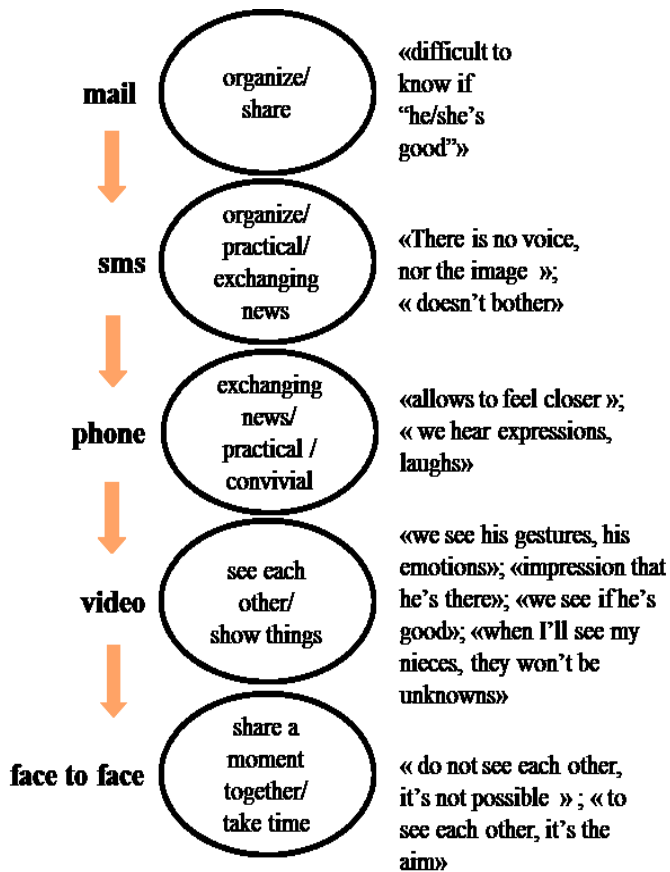


Figure 1 : usage continuum of communication media

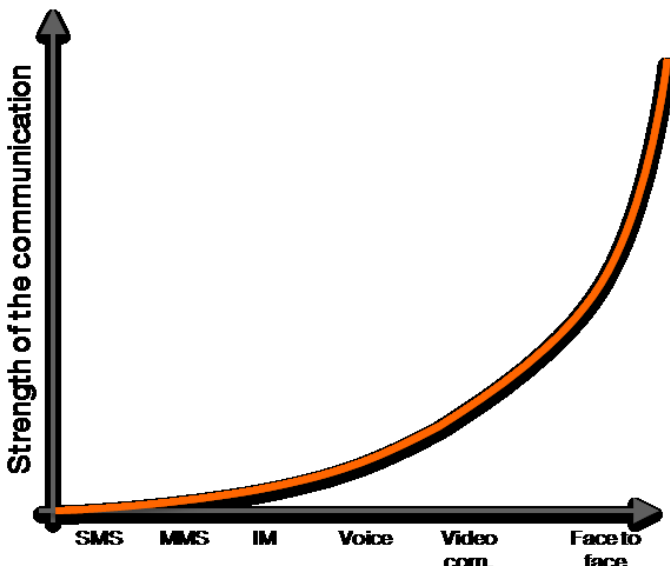


Figure 2 : illustrative diagram (i.e not based on data)

Considering these needs, the studies mentioned above also highlight a set of recurrent problems in the using of video communication services: the unreliability of the audio and

video quality, the ergonomics problems, the lack of interoperability, the unavailability of the service on every communication devices, the network requirements. In addition, the current format of video communication provides discomfort and trouble:

- Discomfort: “during an interpersonal communication, protagonists build a common contextual framework that makes sense for them and serves as a support for action and for interaction” [2]. But, during a video communication, this common framework is challenged due to the disjunction of physical spaces and the limitation of the frame determined by the camera that makes difficult gesture, gaze and speech synchronization. Difficulties, which when they are repeated, bring discomfort and incomprehension. On the other hand, the obligation to maintain the link, to look almost continually at an interlocutor, is not really natural and contributes to discomfort.
- Trouble: the sharing of activity or the multi-activities (to do something else while being in communication), recurrent during our interpersonal communication, is limited during a video communication notably due to the static frame (even if this is less significant on tablets and smartphones) and to the reduced frame limiting the possibilities to share content. Some solutions on the market, suggest share screen (like Skype) but it's limited in terms of interactivity. Some other platforms suggest share spaces but with limited types of activities (like Google Docs) or in a “master-slave” mode.

These studies show us that users of video communications are looking for a feeling of presence and sharing more but the current applications generate, beyond recurrent technical and ergonomics problems, discomfort and trouble, limiting their expectations.

Eventually, the objective of Shomi comes to enrich video communication with coactivity, expecting the decrease of discomforts and troubles and the increase of copresence feeling.

III. COPRESENCE AND COACTIVITY

Before describing the Shomi concept, we need to enlighten two main notions of our argumentation: copresence and coactivity

In the literature, concerning the connection of people through telecommunication systems, the notion of copresence is, generally linked to the notion of “social presence”. We could define it through « the feeling of being together » [3] as well as “the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships” (Short, Williams and Christie, 1976) or “when one person

feels another person is ‘there’ (Bull 1983); two quotations mentioned by [4].

Bonadera and his collaborators [3] compiled different factors which seem to contribute to the copresence feeling or “that might make the experience of remote location immersive (create telepresence for the participants)” during a video conference. We will note, about our topic, that one of these deciding factors is « shared working space ». Likewise, in studies focusing on copresence feeling factors in virtual environments, we find the role of visual shared space [5] and collaboration [6].

With this first dive into literature, we can highlight a correlation between copresence, coactivity and shared working space, thus reinforcing Shomi hypotheses.

As a tool allowing coactivity, it seems interesting to look also into literature for the decisive factors concerning distant collaborative work in order to position Shomi.

The Ellis clover [7] characterizes cooperative activity with three spaces allowing, respectively, to coproduce, to coordinate and to communicate (cf. figure 3).

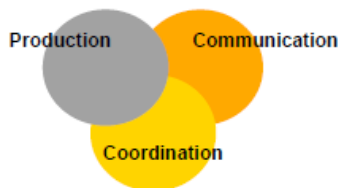


Figure 3 : Ellis clover

By and large, cooperative applications should integrate:

- features allowing a common activity,
- coordination features to link these activities,
- communication features to allow information exchange.

For Dourish and Bellotti [8], collaborative activity needs a «group awareness», meaning “the understanding of the activities of the others, which gives a context to one’s own activity”. This group awareness is achieved when copresence and building of common cognitive space are met.

Talbot & Pernelle [9] refer to a participation model which describes a cooperative application like “a regulated space”, meaning “shared and socialized”:

- it is shared because it allows to share a variable number of objects according to the application (documents, pictures, sounds, ...).
- it is socialized because it reflects (i.e. takes into account and shows) the organization and the sharing rules of this space (who manages what, when, how, who must do what, when, how, can we question the organization of things and how,...).

It is interesting to note with Bukkart [10] that “according to the task and the step, users prefer to see the objects on which they are working moreover than their interlocutor (Gaver, 1993). In special cases, the view of other participants may even disrupt and make the activity and collaboration less efficient. Coaction, coordination and synchronization among users constitute then other dimensions of activity as important as the communication dimension”.

Considering these different elements on distant collaboration, it seems, as described in the next chapter, that Shomi meets these different criteria for sharing, coordinating and communicating.

IV. SHOMI: AN INTERACTIVE VIDEO COMMUNICATION

A. The concept

Basically, Shomi offers a new experience of communication enhanced by:

- content sharing and coactivity,
- in a shared space open to free collaboration
- where video becomes an activity like any other.

Shomi tends to propose a virtual lounge table giving the users the possibility to share digital content as tangible ones in real life.

For Shomi, increasing capabilities of coactivity during a video communication will stop the difficulties currently encountered in order to get close to a natural situation which will increase the copresence feeling.

The fact of sharing a common space will allow the different protagonists to see what the other do and to see the same things. We think this synchronous sharing space will decrease the disjunction feeling dependent on physical spaces; increasing the feeling of copresence and facilitating the collaboration. Moreover, the fact of loosening the collaboration rules (cf. next chapter), i.e. having the collaboration rules set on the user’s initiative, allows the correspondents to resume their relationship habits, and thereby a more authentic communication, reinforcing the link and the copresence.

Finally this interactivity and the resulting copresence will maintain a link with one’s correspondent without feeling the constraint to watch him continuously. Video will be used more flexibly. This possibility will contribute to cope with the feeling of discomfort expressed in our studies.

B. The application

Shomi is issued as an application available on tablets and mass market oriented. But this concept can be extended to business market as well.

It is a synchronous shared space. Correspondents meet there like around a table and share freely different activities in form of stickers: pictures, games, browsers...Each stickers can be

moved by any of them and each of them can see what is moved, removed or added. Video is managed as an activity as any other. Each user access to a private space which allows him to select the contents and the activities he wants to share (cf. figure 4).



Figure 4. Shomi screen copy: synchronous shared space

With the tablet release, extensions to other devices have been imagined and implemented (cf. figure 5); always with the idea overtake the constraint frame of present video communication services and to tend to a physical copresence situation:

- allow another device (for instance another tablet) to join the communication in order to facilitate the participation of other household people,
- display shared contents (including video) on TV for a best context sharing experience,
- access to the camera of other devices (smartphone, robot...) to offer to one's correspondent different points of view.

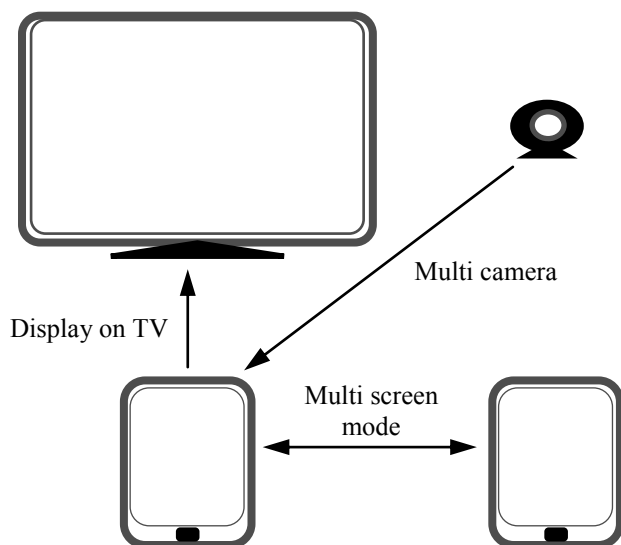


Figure 5 multi-terminals configuration

The choice to develop Shomi on tablets contributes to the goal of facilitating the capability to do something or to show something during the communication.

The Shomi application is developed on Android and based on WebRTC to manage the synchronization of different activities and contents and for video communication.

V. FIRST RESULTS

A dozen of user tests, according to the agile user centric method [1], have been done on Shomi application. Unlike other method, several tests at the end of every development sprint were held to integrate the results of evaluation in the current prototype development backlog as soon as possible. This avoids the trap of conducting only one user test (a dozen people) passed at the end of the development. Each set of test included 3 tests with 3 duos (knowing each other), recruited according to the following targets: a duo friend/friend, a duo child/parent and a duo grandparent/grandchild. That way, we met almost seventy people during these tests.

These test goals were targeting: the usage facility, the perceived usefulness and the overall satisfaction. Each test was divided in three parts: answering a pre-test interview about the communication habits of the participants, achievement of realistic scenarios of application usage and completing a post-test interview. At the end, the participants completed the Attrakdiff questionnaire that positions the application on two axes: "hedonic quality" and "pragmatic quality" (<http://attrakdiff.de/index-en.html>).

These results must be put into perspective, since the people testing the application only spent 1h30 in the test room.

We hereby introduce the tests results rather on the angle of interest raised by the participants considering our main hypotheses. Results about usability will not be presented here.

Globally, results are very positive on the interest for the service. Shomi is better perceived than the existing services because it allows to:

- "do something together" whereas today, the other is blindly guided on an application or on Internet, we receive pictures by email or we share someone's screen. *"Today on social network, we can show pictures but not so easily", "it is easier when we have something to show", "we are more together", "it is less impersonal"*.
- reinforce the "feeling of togetherness". For the majority of the interviewed users, the possibility of sharing activities and contents contributes to this "feeling of togetherness". Likewise for the possibility to be together in a common space and to see what the other does. *"The relationship is stronger", "the feeling of sharing is immense", "as it is easier to share, give an impression of presence of the other one as if he was nearby", "we see the movements of the other one", "as if we had the person nearby and could see him manipulating"*.

Opinions are mixed, concerning the possibility to manipulate the video stickers like any other activity, allowing to see it or not during the communication. For some, it is more the fact of not having to watch his correspondent due to collaborative activity that is important. But this flexibility remains appreciated.

About improvement points, we can notice:

- for coordination, the difficulty to anticipate actions of one's correspondent: a user can see the sticker manipulated by his correspondent or the new web page changing but he cannot anticipate, like in real presence, this action.
- for the socialized dimension of the space [9], it seems that the Shomi explanations on organization and sharing rules of this space are not clear enough, especially for what is not shared: like private space, full screen.

Shomi is perceived as simple, innovative and fun (cf. figure 6).



Figure 6 : Attrakdiff test last results, 2015 January

VI. CONCLUSION

Our ambition was to revisit the video communication. People interviewed expressed the desire of further sharing and copresence. The literature, referenced in this paper, reinforce our conviction about a link between coactivity and copresence. Finally, the evaluation of the prototype Shomi strengthens our conviction.

Next steps in progress: these hypotheses, validated during user tests in lab, must be now confirmed with tests in real life situation and the copresence feeling evaluated more precisely by using objective and subjective questionnaires (cf. [11] for a short list of these questionnaires).

Beyond Shomi, the next step is the design of new prototypes going further on the copresence feeling. After enriching communication with coactivity, we think we could reinforce this feeling of copresence by stimulating all of our senses during the communication (beyond hearing and seeing). Nonverbal communication is largely commented in the literature: Albert Mehrabian [12], with his “rule of 7%-38%-55%” about part of verbal, paraverbal and nonverbal in the communication of our emotions, or J. Candau [13]: “with its sensorial productions or receptions, it [the body] is, daily, an intersubjective information medium”.

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