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A Co-Located Interface for Narration to Support Reconciliation in a Conflict: Initial Results from Jewish and Palestinian Youth

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ABSTRACT
So called intractable conflicts may benefit from more modest and socially oriented approaches than those based on classical conflict resolution techniques. This paper is inspired by theories on small group intervention in a conflict. The general claim is that participants may achieve a greater understanding of and appreciation for the other's viewpoint under conditions that support partaking in a tangible joint task and creating a shared narration. Our goal was to design a methodology wherein the extent to which technology contributes to conflict negotiation and resolution could be assessed. Specifically, a co-located interface for producing a joint narration as a tool for favouring reconciliation is presented and discussed. The results of an initial set of studies where the interface was used by Arab and Jewish youth in Israel provided insight into the usability of the various components of the technology and of the paradigm.

Author Keywords
Face-to-face collaboration, tabletop interaction, narration.

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g. HCI): Miscellaneous.

INTRODUCTION
This paper is concerned with the design of technology that aims at providing progress toward reconciliation of a conflict. It explores the role of technology for fostering a shift of attitudes of participants via a narration task. The general claim is that participants may achieve a greater understanding of and appreciation for the other's viewpoint under conditions that support partaking in creating a shared narration. The work is based on two cultural elements: social psychology approaches to conflict resolution that emphasize the role of narration in small group interventions and the design of a collaborative tabletop interface aimed specifically for the task. The two main research questions are:

- Does a face-to-face collaboration-enforcing interface for negotiating narration facilitate a change of attitudes and contribute to reconciliation?
- Can this interface be an alternative to a typical face-to-face moderated discussion?

In this paper we first give the theoretical motivation and background for an approach based on narration and explain the specific characteristics of our own contribution from the point of view of conflict reconciliation intervention. We next discuss some technological background of co-located interfaces for narration. We then describe the design and implementation of our Narration Negotiation and Reconciliation Table (NNR-Table). The results of an extended set of pilot studies with Jewish and Arab youth in Israel using the table are reported in the following section. A "lessons learned" section and some final considerations conclude the paper.

NARRATION AS A CONFLICT RECONCILIATION TOOL
Many conflicts are considered intractable: all efforts aimed at trying to solve them have proved futile. Classical techniques of conflict resolution, in particular those aimed at finding the essential needs of the conflicting parties, and providing negotiation strategies and contextual support, address the key aspect of the problem. The shortcoming is that they overlook the underlying social aspect of the conflict and the subjective perception of individuals in the conflicting camps. Traditional education (in the case where a positive effort is undertaken) has also a limited impact. It is based on a clear power-play relation in society which is especially strong if there is a minority living in the same organized society (e.g., a state) as the majority. A more modest approach that has been proposed for intervening "at

the basic social level" is based on storytelling, i.e., working through intractable conflicts via inter-group activities [see 4]. The approach does not have the ambition of solving the causes of the conflict and it is only remotely reminiscent of the Freudian approach that was later adopted also in several studies of social trauma [see 4]; the idea is to engage in small group interventions with participants of the conflicting parties.

Theoretical background can be found in the constructionist approach [e.g. 17], a view that describes intergroup dialogue as a crucial transformative process, in which participants deal with disagreements through self expression and listening to others. *The other* is included within the realm of moral responsibility and there is greater understanding, acceptance and connection to the other's experiences and positions.

Altogether, following Bar-On and Kassem [4] we can consider three main approaches:

1. The human relations approach [e.g. 19], based on the idea of creating personal relations among participants and thereby changing stereotypical perceptions and attitudes. The shortcomings are that it tends not to consider historical roots of the conflict, and the external context with its power relations among groups.
2. The confrontational model, focusing on collective identities and the asymmetric power relations that exist between the parties. In a sense members of the minority are at an advantage as they tend to have a better representation of their identity than do members of the majority group, who do not really need it. The shortcomings are that it does not build an atmosphere of trust nor does it promote a more complex perspective of self and of others.
3. Intergroup encounters focusing on family stories that intertwine emotional and personal narratives of the collective history of the conflict with the perspective of each side. This method originated in work by Bar-On with children of Holocaust survivors and children of Nazi perpetrators.

We are particularly interested in the conflict between Palestinians and Jews, one of the most dramatic examples of intractable conflicts in modern times. The conflict over the same territory has gone on for over a century in various forms. Since 1948, after the founding of the State of Israel, there has been a fragile and tenuous relationship between the Jewish majority and Arab-Palestinian minority within the state, in addition to the ongoing open conflict with Palestinians (and other Arab peoples) outside of Israel's borders. Following the Oslo agreements in 1993 an autonomous Palestinian Authority was established in part of the West Bank and in Gaza. As we know, the conflict between Israel and forces in the Palestinian Authority has led to extreme violence, especially since 2001, and the civil population on both sides has been directly affected. In general we can say that the situation within Israel and the situation between Israelis and Palestinians are two different problems even if both are traceable to the same ethnic conflict. Language and socio-cultural aspects are important and distinctive elements: Arab-Palestinians living in the state of Israel are a minority, they normally attend school in Arabic but are fluent in Hebrew and they share most aspects of life in Israeli society, while encountering many of the typical problems of a majority-minority relationship. Those living in the territories of the Palestinian Authority usually do not speak Hebrew (especially the young, who in most cases have never been in Israel), attend school curricula prescribed by the Palestinian Authority and live under harsher conditions.

Several concrete initiatives have used narration as a methodology for improving the recognition of the other. For example, the Coexistence Workshop is a course in the teacher education program of the University of Haifa's Faculty of Education [15]. Bar-On and Adwan [3] have engaged a group of teachers in a process of producing a joint textbook that includes two narratives with Palestinian and Jewish teachers. Maoz et al. [16] describe the use of narration in a mixed group of teenagers in Israel.

Our own work started from the recognition of narration as a key element for an educational initiative targeted at Jewish and Palestinian youth co-existence. The main difference with the initiatives mentioned above is the use of a specifically designed co-located shared interface that supports two teenagers in the production of a joint narrative. In particular, key features of our approach are:

- To provide a setting for face-to-face multimedia narration with contributions from both sides and a joint, mutually acceptable outcome. We designed the process to be bottom-up, starting from contribution segments rather than with a complete story, in order to focus attention on elementary contributions of the other.
- To emphasize explicitly specific points of disagreement, rather than leaving them to be perceived as vague feelings of conflict and detachment, and to provide a means for acting jointly toward achieving a narration acceptable to both viewpoints. The process had to implicitly include classical steps in conflict resolution approaches, such as escalation and de-escalation [11].
- To require physically acting together in the process of revising and completing the narration, in the belief that tangible joint actions are an important component of the intervention for achieving common goals.

Some additional factors are fundamental:

Participants must understand that they achieve either a joint result or none; and they must know that the result will be

possibly viewed by their own group (for instance it will be broadcast on TV) so they cannot betray their own "side" in order to achieve an immediate success.

Language should not be to the advantage of either group. In addition to causing possible limits to natural expression, language is a means of imposing the dominant culture and of making people too aware of the power imbalance. So for each participant we aimed at expression in his native language, even if the minority members know the language of the majority. Each contribution must then be translated into a neutral language (English). Participants must therefore at least passively master the neutral language. As we shall see later, this constraint was relaxed for practical reasons after an initial set of pilot studies, but we intend to adopt it in the full study.

An initial set of visual stimuli relevant to the conflict are provided and the first narrated story segment is provided by the system to initiate the story telling process.

These characteristics position our system across the three points of Bar-On and Kassem [4] in a dynamic paradigm (different aspects prevail throughout the unfolding of the experience) with the aim of producing in the participants a general and perceivable positive shift in attitudes.

The Narration Mediation method [25] emphasises the narration aspect as well. The main difference is that in our approach the mediator is less involved in a direct dialogue with the participants: in the Narration Mediation method, the main moderator task is to carry out a dialogue with the participant, often in separate sessions, trying to identify a common basis for the joint story. In our approach, the interface itself supports and encourages the dialogue between the participants while the moderator acts primarily to facilitate their use of the table's functionality.

Another approach to mediation somewhat similar to ours is Transformative Mediation [5] which emphasizes empowerment and recognition as primary goals, as opposed to aiming directly at the settlement of the dispute. In our case, though, empowerment and recognition are realized by allowing the participants to have equal opportunities to contribute to the joint narration (or to alter it); we do not focus on a specific issue, rather on the general recognition of the other's point of view. In this respect, there is some evidence (see for example [23]) that these types of interventions actually do serve to prevent deterioration of the relationship between Israeli and Palestinian youth.

SUPPORTING NARRATION WITH TECHNOLOGY

There has been some exploration of technologies that allow children to reflect after performing activities outside the classroom. One example is Ambient Wood [21], where children first explored a digitally augmented woodland to find out about plant life in different habitats, and then, back in the classroom, used an interactive screen display to share their information with one another.

Similarly, the Savannah project is a collaborative, location-based game in which groups of children role-play the part of lions on a hunt in a virtual savannah; an interface for replaying a system-recording of each completed level is then provided in the classroom so children can reflect on how they performed [6].

The use of tangible tools has also been explored to support storytelling in systems such as MIT's KidsRoom [7], StoryRooms [1] and StoryMat [22]. Storytent, a system developed at Nottingham University, is a projected display shaped like a tent which allows children to immerse themselves in a virtual world [12]. The TellTale interface [2] explores the idea of providing ways of making the pieces of a story "tangible". TellTale is a caterpillar-like toy with five modular, colored body pieces on which children can record their own voices; once linked together, the audio snippets are played back in sequence.

Some research has focused on having the system behave as a companion to a child. Sam, a tool developed at Media Lab [22; 9], consists of a 3D, animated virtual peer that can pass physical toys back and forth to real children and can cooperate with children in constructing stories.

The use of a tabletop device to facilitate conversation and storytelling has been explored by [24] among others. Their paper describes a system in which a group of users explore digital archives of shared materials such as photographs, video, and text documents on a tabletop interface.

It is worth mentioning a totally different approach, not based on narration, but interestingly dealing with conflict resolution in the Middle East, developed as a role playing videogame by Burak and colleagues [8].

THE NARRATION NEGOTIATION AND RECONCILIATION TABLE

In order to meet the key requirement of providing a setting for face-to-face multimedia narration we decided to implement the system as a tabletop interface. To take full advantage of multi-user gestures, the MERL DiamondTouch has been used—a multi-touch input technology that supports multiple, simultaneous users. DiamondTouch can distinguish who is touching and where it has been touched [10].

The participants sit facing each other at opposite sides of the table and a graphical interface is top projected onto the DiamondTouch device. With this configuration, the participants have different points of view of the interface. Although this may create problems for the visualization of the elements [see for example 14], we thought that a shoulder to shoulder positioning on the same side of the table would not be appropriate for this paradigm. In order to provide a fair access to the elements of the application, each

object on the table can be moved and rotated by simply dragging[1] it.

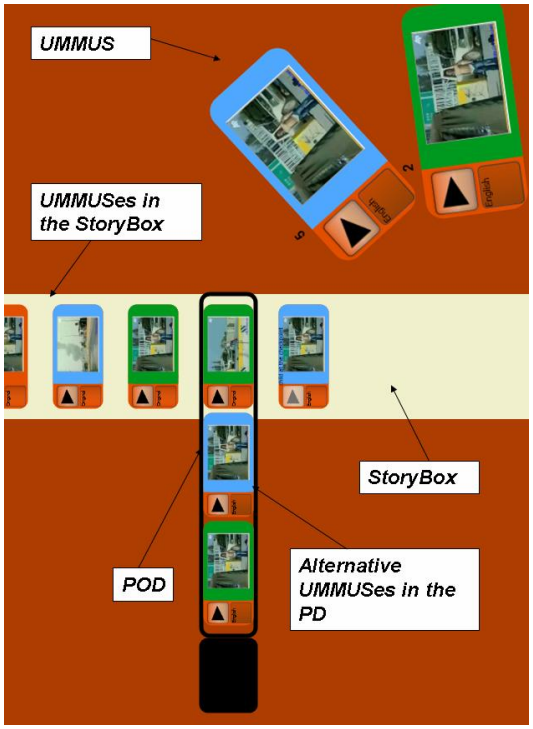

Figure 1. A detail of a screen shot of the NNR Table with the main components.

The benefit of multi-user access for tabletop interaction has widely been discussed in the literature. In particular, Morris and colleagues [18] discussed the notion of *cooperative gestures* where the system interprets the gestures of more than one user as contributing to a single, combined command. They discuss and evaluate different purposes of these types of gestures. Of specific interest in our case are the two usages aimed at increasing participation/collaboration (when interactions that require explicit coordination between two or more users can lead to an increased sense of partner cohesion and teamwork) and implicit control (when sensitive actions are defined so as to require a cooperative gesture). The work on StoryTable, a multi-user storytelling interface for children, provided evidence that cooperative actions on the interface may foster collaboration and influence task performance [20].

The basic element of the interface is the UMMUS (Unit of MultiMedia User Story) which also sounds similar to a typical middle-eastern food much liked by both populations in Israel. An UMMUS can be loaded with a picture and 20 seconds of voice can be recorded. An UMMUS can be recorded with audio in the participant's own language as well as its English translation. Each UMMUS has a color that represents the participant who created it (colors that have national meaning for each side - green for the Arab Palestinian participant and blue for Jewish participant).

The audio recorder and a picture repository are always present on the table and they can be accessed by both participants. Due to an obvious technical limitation, only one participant at a time can record the audio on a UMMUS. Selection of pictures, generation of UMMUSes and arrangement of the objects on the table surface are all actions that can be done in parallel by the two participants.

A sequence of UMMUSes creates the story. In order to add an UMMUS into the sequence, a participant just drags and drops it into a container (called the StoryBox) positioned in the center of the interface. In contrast, removal of an UMMUS from the story requires cooperative gestures: the two participants need to drag it out together. An initial pre-defined UMMUS is automatically positioned as the first element of the story in order to give the participants an initial narrated segment. The StoryBox is a place where the participants can negotiate the process of "sequencing" some of the UMMUSes produced in order to create a coherent shared narration.

The order of this negotiation on the StoryBox is not constrained by the system; the participants can decide when and where in the sequence to put a new UMMUS. The whole story obtained by concatenating the multimedia snippets of the UMMUSes in the StoryBox may be played at any moment by the participants.

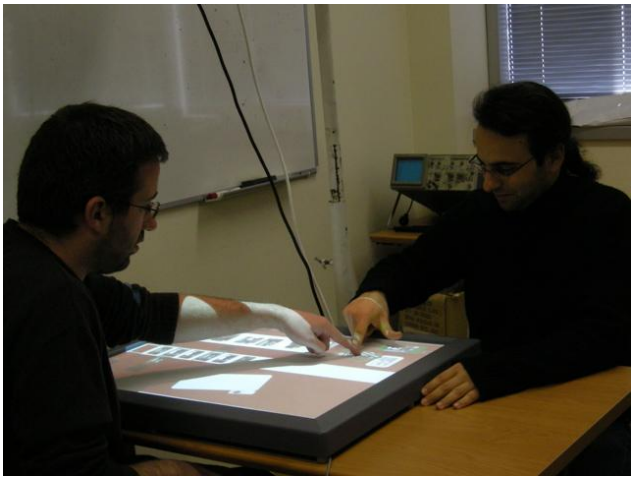

Figure 2. Interaction with the NNR-Table

Regarding cooperative actions, the basic rule of the system is that any constructive action (e.g., creating an UMMUS or placing it in the StoryBox) may be performed by each participant independently while any removal action (e.g., removing an UMMUS from the StoryBox or deleting an UMMUS) has to be done through a joint action.

[1] A version of the Rotate and Translate algorithm first proposed in [13] has been implemented.

Conflict reconciliation goals	Elements for conflict Escalation-De-escalation	Elements on the NNR Table
Individual Actions • reinforce individuality • empower personal and national narrative • enhances equality and ability to state and argue one's point of view	Creation of segments of a narrative that support the individuals personal and national perspective Use of one's own language provides legitimacy and equalizes sides	Construct new Unit of MultiMedia Story (UMMUS)
	Compilation of these segments to create a narrative	Insert new UMMUS into StoryBox
	Express one's point of view in non-aggressive manner	Create a Point of Disagreement (POD) box
	Encourage creation of alternate points of view in non-threatening ways	Insert an alternative UMMUS in POD
Joint Actions • learn importance of collaboration & cooperation • acknowledge and place value on the multiple sides to the narrative, that there is no one correct story	Realization of the power of give-and-take in joint task	Move UMMUS from its original position in StoryBox
	Admit possibility of alternate approaches to one's own narrative	Remove an UMMUS
	Realization that compromise leads to progress	Remove a POD
	Translation to other language and to English promotes symmetry	Listen to narration
	Realization that task can be completed only with cooperation on both sides	Approve the narration

Table 1. Critical elements for conflict escalation and de-escalation (middle column) with the corresponding elements from the Narration Negotiation & Reconciliation Table that implement them (third column). The conflict reconciliation goals aimed for by the individual and joint actions are shown in the first column.

When the participants have completed the story to their satisfaction, they have to jointly press together (again a cooperative gesture) the "Done" button.

A crucial element of the interface is the possibility of expressing and negotiating disagreement, at any moment and in a tangible way. This is aimed at implementing the concepts of escalation and de-escalation [26;19]. Tangibility is realized through the idea of a *Point of Disagreement (POD)*. A POD is a frame that can be positioned around an UMMUS in the StoryBox and has the effect of "labelling" that contribution as an object of disagreement. Once a POD has been positioned, the participants cannot conclude the story (the "Done" button is automatically disabled). In this sense, PODs induce "lose-lose" situations. At the same time PODs are tools for proposing alternatives: one or more additional UMMUSes representing alternative formulations out of the *impasse* are dragged into the frame.

A POD can be removed when the two participants agree upon which UMMUS they want to keep as an acceptable formulation. They do so by jointly pressing the POD removal button. Again, a cooperative gesture is used to mark their awareness of an important event (in this case, the positive result of a negotiation). Additional UMMUSes and PODs may be added in an iterative manner but the story will remain incomplete until all PODs have been resolved.

Table 1 summarizes how the main design elements of the NNR Table (namely the UMMUS and the POD) may serve to achieve the conflict reconciliation goals by exploiting the elements of the conflict escalation/de-escalation.

PILOT INTERVENTIONS

The target population included Jewish-Arab pairs of youth aged 18-24 years who act as storytelling partners. Our pilot studies involved the testing of pairs of Israeli and Arab youth who live within Israel. These initial studies were designed to provide usability data as well as opportunities to test different elements of the methodology (e.g., language of intervention, selection of picture stimuli, ability to use single and joint functions). In the planned full study, we will apply it to even more contentious populations, where it will be used with pairs of Israeli Jewish and Palestinian Arab youth.

Initial studies

Initially, 4 pilot sessions were conducted with a *Pen'n'Paper* mockup of the NNR-Table (see figure 3): a large cardboard surface replaced the DiamondTouch table, printed images were available; narrative segments were transcribed by the moderator on slips of paper and affixed to the relevant image.

Each pair was instructed to work in tandem to create and record a joint narrative. At the end of each session the moderator interviewed the participants about their attitudes towards the task, its conceptual design and the intervention paradigm.

During the first two sessions, the pre-narration stimulus consisted of a short video clip showing Israeli soldiers at a border crossing responding to an Arab child who was wearing an explosive belt. Selected frames from the video were made available as pictures for storytelling. This set of stimuli was very harsh and participants either felt obliged to tell a "severe" story or declined to continue the intervention. Furthermore, using a video clip seemed to

constrain too much the storytelling activities inducing the participants to narrate the actual story of the video.

For the other two sessions, a set of photos that represent a range of both positive and negative situations in the life of young Israelis was used. Among other things, these photos depicted an Arab family having dinner together, Jewish and Arab youngsters on a beach as well as negative situations like a Jew mother crying at a funeral and Israeli soldiers searching a Palestinian house. The photos were selected by a preliminary study in which youth of the same age as our target population scored the "emotional" impact on a wider set of photos.

Another issue that arose from these pilot studies is related to the translation of the narration. At the beginning we decided to let the participants speak their own language and have each segment of the story translated into English as a neutral language for both participants. The presence of a translator was definitely felt to be intrusive in the sense of distancing the participants from each other and making the narration less fluid and more awkward. Moreover, the Arabic speaking participants knew Hebrew and did not need the translation (and often this led to arguments about the translation of the counterpart's contribution).

Figure 3. Interaction with *the Pen'n'Paper* mockup

Regarding the interface design, the *Pen'n'Paper* mockup demonstrated the intelligibility of the concept and it allowed us to identify potentially problematic usability issues before implementing the actual prototype.

Formative Evaluation of the NNR-Table

Subsequently, 9 pilot interventions were conducted with the NNR-Table prototype described above. All of them involved two Israeli males, a Jew and an Arab, aged 17-18. Each intervention included a joint narration task using the NNR-Table (carried out in Hebrew) and two interviews (one pre-task and one post-task) carried out respectively in Hebrew and in Arabic for the two participants.

Again, the pairs were instructed to develop a joint narrative. The material used as a stimulus included the set photos discussed before that focused on two young men, Mohammed and Moshe. A trained moderator (social worker) was present during all the sessions. The role of the moderator was mainly aimed at keeping the subjects focused on the narration task and encouraging them to use the NNR-Table functions, especially those that were novel to the users (e.g. the PODs). Differently from the Narration Mediation approach [25], we aimed at minimizing the role of the mediator during the task in order to focus on the more prominent role of the NNR-Table in making tangible its contributions to the joint narration and disagreements.

The purpose of the pre-task interview was to document attitudes towards the conflict in the region and toward the other participant as a member who is stereotypically considered to be the enemy. The purpose of the post-task interview was twofold: (1) to document a possible change in attitude towards the conflict and toward the other participant and (2) to evaluate the intervention including the role of the technology, in all its functions, in enhancing a possible change in attitude towards the conflict and towards the other participant. The pre- and post interviews were tape recorded, transcribed into the original language, Hebrew or Arabic, and then translated into English. The narrative intervention was videotaped and its contents were transcribed and translated to English. What follows is a qualitative analysis of the material collected.

A Jewish participant, Z, had a "centrist" political attitude and a tendency to avoid extremist positions while his Arab counterpart, A, expressed a pessimistic view on the Middle East conflict and a negative position toward Israeli Jews (*"[…] perhaps, I'm even more racist and biased toward Jews […]*"). During the task, A. added a very extreme contribution to the joint narration (*"Mohammed decided to try and kill his friend because of racism"*) and Z, using a POD, proposed a very conciliatory alternative which was immediately accepted by A. In the post-task interview, A insisted that he would have liked to turn the story in a more negative (and in his opinion realistic) direction but he also judged the joint story as being satisfactory for him. Yet, Z complained, in the post-task interview, about the notion of the POD which, in his opinion, is too strong to signal disagreement. If his partner's contribution is not exactly what he would like but he still could live with it, then he preferred not to use a POD but to continue the narration in order to avoid creating any unnecessary conflict.

Indeed, several participants expressed the concern that the PODs provide signals that are too invasive. O, another Jew participant, viewed the PODs as an insult to the opponent, as a form of disrespect toward the other's opinion. Yet, he also recognized that the system may effectively support the task because it helps make tangible the different contributions to the joint story ("*[…] this program is the means to materialize the story, the means to reach the goal. […]*"). He also noted the benefit of the co-located setting "*[…] it is really suitable for youngsters, its great fun to drag with the finger and I think the message is it creates a*

relaxed feeling beyond the technology. One begins to play and it is really fun, Ok, I'll bring this and you give me that. It creates a need for cooperation, one responds immediately; I put a picture and then he puts up a picture. It requires cooperation."

This view about the benefit of the cooperation on the interface is shared by several participants (O1: *"[…] each of us can freely express their opinion and it is possible to disagree or debate via the story, which is a good thing […]"*) even if, of course, there were a few who regarded the narration task as useful but without recognizing a significant support from the technology (*"However, the interactive meeting between those people does not have to be accompanied by the program. It can be done without the program."*). One participant complained that narration is a too simplistic task ("*I am referring to more complex matters other than creating a story and agreeing on points of argument.*")

For another pair, Z2, the Jewish participant presented himself as a very left wing person; he had participated in programs to enhance peace with Arabs and Palestinians and was very pro-Arab. The Arab participant, O2, perceived most Jews to have right wing political ideas and described the conflict in terms of a "Holy War" for both sides. However, he believed that peace is essential but saw it in terms of necessity rather than mutual understanding. As a result, the task performed by these two participants went on quite smoothly. When the moderator pushed them to try to express the feelings of the two characters rather than just describing the situation, Z1 introduced the Israeli side while O2 continued to present the Arab side. However, before the conflict between the two started to escalate, O2's acceptance of Z1's Israeli-oriented point of view made Z1 further de-escalate toward a statement of peace and co-existence. As expected they did not use any PODs and the single mild disagreement, O2's *"The Palestinian also want peace with the Israeli […]"*, was changed into the more neutral *"Both parties believe that there is a possibility of peace and co-existence"* just by replacing the old UMMUS with the new one.

In the post-task interview, O2 expressed satisfaction for their ability to resolve disagreements. He reported that he had a positive experience which came to him somewhat as a surprise. He was aware of the uniqueness of the outcome, that is, he did not expect it since achieving agreement between Arabs and Jews was not the common situation in his opinion. In contrast, Z1 was less surprised by the outcome but he recognized the fact that he had mildly escalated (following the moderator's suggestion), and pushed O2 to accept a less strong Arab point of view (*"[…] Mainly since I tried to create a story that I did not genuinely believe as I mentioned it didn't embody my true thoughts. I tried to invent a story. […]"*). Regarding the use of the system, Z1 did not like the idea of the PODs and he suggested the possibility of allowing parallel stories in case of disagreement ("*[…] I then continue with my story and he can continue with his story. […]*")

O3 (Jew) and M (Arab) narration referred to actual issues such as security checks of Arabs and terror actions. They used PODs twice during the interaction and negotiated with each other quite nicely to resolve them. Their story had a positive ending. In the post-intervention interview, O3 gave a nice interpretation of the PODs and said that it encouraged a cultural discussion because if one disagrees he does not have to interrupt the other, but he can present his view later and everything is kept in the software.

In other cases, the participants did not use PODs because they were able to avoid escalation of conflict. For example, H (Jew) and P's (Arab) narration referred to actual issues such as security checks of Arabs and terror events but they both focused on the good personal relations between Moshe and Mohammed. It is interesting that both of the participants referred to feelings such as fear and sadness.

One of the aspects that were identified across all interviews for Arab and Jewish participants was the importance of the pictures in the narration task. One reason is that they helped generate ideas for the story (*"The pictures are an important aspect, if the program had only been phrases we could not have imagined the reality, it allows one to use their imagination."*) Some participants complained about the number of pictures available (*"There it is not a sufficient spectrum to choose from and neither is it satisfactory. "*) and that those did not directly help in building the story (*"It was quite difficult to connect some of the pictures to the story.*")

LESSONS LEARNED

There are at least two levels on which an intervention using the NNR-Table might be considered successful. The first level consists of negotiating a shared narration; for example in the case described above of Z1 and O2 who agreed on a shared story: although Z1 admitted he was "forced" by the system, he had a choice of not accepting a shared narration. In this sense, the system was successful in helping the two users reach a compromise.

Of course, there is also a second level of evaluation, i.e. how much the users are induced to shift their attitude toward the other group. As noted above, there is already evidence [23] that developing a common narration supports the peace process. We are currently running a controlled study in which this level will be explicitly evaluated.

The pilot studies presented in this paper provided several important lessons that are currently being implemented. First, although we have not yet observed a clear-cut change in participant attitudes, all have expressed a general satisfaction (and sometimes even a surprise) with learning more about the partner's viewpoints. In some cases, the participants were made explicitly aware that their stereotyped opinions of the "other" side were incorrect. This appears to be related to the exchange of story ideas

that was facilitated by the audio-visual media and turn-taking paradigm.

One aspect that was made clear is that it is crucial to select and pair the subjects in such a way as to have an escalation of conflict. It is more difficult to obtain results if participants are politically too extremist or too moderate. We knew the language issue was essential and we devoted lengthy discussions to its design. For practical reasons though, we relaxed the constraint and after the mockup we temporarily decided to run the intervention in Hebrew only. This is clearly not a long-term solution but rather driven by the availability of Hebrew speaking Arab participants in the location in which the pilot study was carried out. In order to offset this bias and to show the importance of the "other" side, the moderator is an Arab. The current study is taking place in a location accessible to Palestinian Arabs from the Palestinian Authority who typically do not speak Hebrew. (Even for Israeli Arabs, who are fluent in Hebrew, it still represents the language of the majority in power.) Our interface has been designed to cope with multilingual recordings and the full study is being run with simultaneous translation.

The study with the mock-up clarified the importance of the pictures used as stimuli for the narration. These should not be too harsh since some of the participants felt overwhelmed by the conflict. Moreover, they should not be related to a specific story (e.g., the video used in the first mockups). Although this particular aspect had been corrected for the prototype study, minor issues emerged. For example, the initial UMMUS automatically positioned by the system should not be too positive since there then appears to be little room for conflict. The relatively small number of picture (12) was seen as restrictive by some participants although a larger number may pose problems in visualization and selection with just direct manipulation. Nevertheless, the availability of pictures as key elements in the creation of the story was reported to be effective by almost all participants. Further testing of the visual stimuli is required to resolve these dilemmas.

The central aspect of the design, the POD proved useful to encourage creation of alternate points of view in non-threatening ways. Yet for some participants, the PODs appeared to be a somewhat strong tool for signaling disagreement. On the other hand, they were useful to escalate the conflict (see the first Z example) and this is a basic aspect of our approach. Since the POD is one of the most novel features of the interface, and a function that is completely unfamiliar to the participants, we suggest that additional explanation and an opportunity to view a POD-in-action (via a pre-recorded story in a different domain) may be warranted.

CONCLUSIONS

The novel cooperative and co-located setting and the availability of multimedia elements appear to be interesting and motivating for the participants. Participants commented positively on the uniqueness of engaging in an activity-based interaction – "doing" - and not just talking. The extent to which these key features contribute to a change in attitudes will form the substance of the data analysis from the full study. Once the above mentioned limitations are resolved (language, picture stimuli, participant selection, training in novel NNR-table features) it will be possible to actually test the effectiveness of this tangible co-located interface.

The preliminary results presented in this paper have demonstrated the feasibility of both the paradigm and the analysis procedures described above. The full study will implement the lessons learned during the pilot studies. Furthermore, the full study is endeavoring to cope with the difficult logistics associated with dealing with the use three languages (Arabic, Hebrew and English) as well as accommodating two different contexts: Jewish Israelis with Arab Israelis and Jewish Israelis with Palestinians of the territories of the Palestinian Authority.

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