Peacemaking Affordances of Shareable Interfaces: A Provocative Essay on Using Technology for Social Change

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Abstract. This article is a provocative essay on the topic of educational applications of shareable interfaces, with a focus on the use of multitouch interactive tabletops in peacemaking school initiatives. Based on the already researched affordances of tabletops in education, as well as promising empirical results from the limited application of this technology in peacemaking contexts, the authors of this manuscript would argue for the integration and further investigation of interactive tabletops in peacemaking school initiatives, pushing the boundaries of the technology to positively influence our societies.

Keywords: Peacemaking · Peacebuilding · Peace education · Technology enhanced learning · Peace and technology · Multitouch tabletops · Shareable interfaces

1 Introduction

The potential of using technology for peace has received considerable attention in the recent days. The role of technology in peacemaking, peacebuilding, and peace education, in terms of initiatives and ideas as well as technology infrastructures for peace, is recently being discussed in prestigious academic conferences and journals [11, 14, 24, 25]. Overall however, promoting peace or educating for peace through the means of technology is a topic we rarely see addressed in school contexts. There are a few established models for conflict management in schools, which mainly involve conflict resolution education (i.e., conflict management skills training) infused into the daily school curriculum; yet, very little work is done in this area that takes advantage of current technologies and innovations. This provocative essay aims to start the dialog and encourage research that unpacks the largely unexplored potential of shareable interfaces – that is, technologies designed to support collocated collaboration – in technology-enhanced peacemaking, peacebuilding and peace education initiatives. The essay focuses on multitouch interactive tabletops, as a form of shareable interfaces, pointing to relevant literature and calling for research that expands their potential application in this area.

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2 Background Work

2.1 Peace and Technology

As Hourcade and Bullock-Rest [12] explained, there are many opportunities for research in the area of human-computer interaction and peace including "the design of technologies to enable connections between opposing camps, tools to present news stories from several points of view, and technologies to support international monitoring missions to prevent the escalation of conflicts", yet the same authors acknowledge that empirical work is very limited and sporadic (p. 443). In educational contexts and initiatives, some technologies have been used to promote peace and peace-related outcomes, although the focus of these efforts mainly revolve around the use of Internet technologies mediating long-distance collaboration in particular, (i) *virtual learning environments* to host learning activities related to peace, (ii) *Web 2.0 and communication technologies* including blogs, wikis, social networking sites, video sharing sites, email and video conferencing to promote communication and collaboration among people of diverse backgrounds, and (iii) *serious games or MMORPGs* to promote exposure to diverse populations and social interaction, such as the PeaceMaker game which simulates the Israeli-Palestinian conflict and engages dyads in negotiating peace [4], or *simulations* used to teach about conflict management [2]. A review of these previous efforts is found in Veletsianos and Eliadou [25].

The benefits emerging from the use of communication and collaboration technologies are numerous, especially when those are employed in cases where participants' physical co-presence is obstructed by insurmountable barriers, such as physical distance, high costs in time and money, fear and suspicion, or external events like war, conflicts and attacks. Without overlooking the advantages of using technologies to support remote interaction in peace-related initiatives, the authors of this work would argue that sharing an experience in a common physical space, e.g., via shareable interfaces, affords yet more powerful peacemaking opportunities.

It is acknowledged that peace education takes different shapes in practice, as for instance, human rights education, development education, conflict resolution education, international education and environmental education [8]. According to Harris [8], this results out of the controversy surrounding the concept of 'peace' in combination to educators' attempts to address different forms of violence in different cultures and in different social contexts. Despite the different approaches, practices that aim to promote peace-related outcomes have several features in common, as they are mainly oriented towards fostering collaboration, communication and understanding of the 'other' – parameters which function as prerequisites for peace [25]. We support that these factors can be enhanced by the means of shareable interfaces, when the technology is used by learners to carry out meaningful tasks and to share structured experiences that involve or even require their physical co-existence and collaboration in collocated settings.

Sharing mutually meaningful experiences in a common physical space is a way of enhancing social connections [19], which in turn can enable the aforementioned prerequisites for peace. We, therefore, argue that technology-infused practices which require collocation, e.g., learning tasks mediated by shareable interfaces, have the potential to provide shared experiences that can activate social bonding and the other above-mentioned peace

factors. Moreover, physicality and collocation can be essential in peacemaking efforts in the rather typical case in which language barriers exist between those in conflict (e.g., Israeli-Palestinian conflict, Greek-Turkish Cypriots conflict). Overall, however, technology-enhanced peacemaking research in collocated settings is almost non-existent to date. Even opportunities for such research were lacking until a few years ago, when tabletops became commercially available, affordable and compelling for small-group, collocated work [6, 9]. The rest of this essay focuses on multitouch interactive tabletops, as a form of shareable interfaces which presents an opportunity to nourish peacemaking efforts in collocated educational settings.

2.2 Interactive Tabletops

Tabletops are large horizontal displays that enable interaction by multiple concurrent users. They have been commercially available since 2009 with the introduction of MS Surface [6]. In terms of hardware, commercial tabletops can typically respond to more than 40 simultaneous inputs, therefore can easily support groups of four to six students. In terms of software, today commercial operating systems, such as Windows 8 (or above) and Android, support native touch input and offer a repository of thousands of touch applications that can be easily downloaded from the Web and used on a commercial tabletop. Also, if funds, time and expertise permit, custom-built tabletop applications can be designed and developed.

There is already substantial work on their use to support various types of communication collaboration and learning. A summary of work on the pedagogical considerations of tabletops is found in Higgins et al. [9]. Also, a summary of work on the technological considerations of tabletops is found in Dillenbourg and Evans [5]. Briefly, studies on tabletops have shown that "being able to see another's physical actions on the shared display can enhance awareness, which in turn can support fluid interaction and coordination" (p. 167) [10]. Also, the horizontal orientation of a tabletop display allows users to hover their hands easily over the surface, and as a result, gesture-based communication can supplement or even replace verbal communication around tabletops [22]. This might be particularly useful in cases where language barriers may inhibit participation and interaction among the collaborators.

Moreover tabletops have been found to enhance the sense of teamwork [18], 'invite' interaction and willingness to participate in groups tasks [23], increase equity in physical interaction compared to other devices [7, 15, 17], promote joint attention on the task [5, 7], encourage playfulness in interaction [16, 20], improve the (learning) experience and motivation to engage in the task [3], enable collaborators to negotiate conflict [7, 14, 21], and help engage users in 'creative conflict', that is, arguing and disagreeing directed at ideas rather than people [1]. One might consider all of the above as 'peacemaking affordances' of the technology, although none of these studies have perceived it as such, setting tabletops pertinent to work on peacemaking, peacebuilding and peace education.

2.3 Tabletops for Peace

A couple of previous studies have endorsed the idea of collocated, technology enhanced peacemaking exploring the potential of tabletops in this context. In particular, Stock et al. [24]

designed a collocated tabletop interface, the NNR-Table, as a tool for reconciliation. NNR-Table allowed multimedia narrations to be contributed from two opposing sides; participants worked together to achieve a narration acceptable to both viewpoints (i.e., by revising and completing the narration together). NNR-Table interventions were found successful in helping Jewish-Arab pairs of youth reach a compromise and learn more about each-other's viewpoints [24, 26]. Moreover, Ioannou et al. [14] designed a collocated brainstorming tabletop activity to facilitate dialog and consensus decision-making in groups of college-students discussing sensitive and controversial topics, including peace-building in a country in long-term ethnic conflict. The authors found that discussion around the tabletop was fluent with no evidence of tension, anxiety or strong disagreement among the participant.

Furthermore, Ioannou and Antoniou [13] used tabletops to promote playful collaboration and learning among students in conflict (verbal and physical bullying) in an elementary school, leading to positive changes in their attitudes and behaviours from pre to post intervention testing. In particular, a SUR40 tabletop was used with freely available applications and designed game-like learning activities which required students, in conflict-laden groups, to collaborate around the tabletop (see Fig. 1.). Once such activity for instance, required students to learn about animals (top image of Fig. 1) or to categorize the various types of musical instruments (bottom image of Fig. 1) by sorting images on the tabletop [13]. In a follow-up study in the spirit of technology-enhanced peacemaking, the same authors conducted an intervention study with 44 young children (aged 9–10 years old) of multiple ethnicities in an elementary school with a large number of migrants. In this work (see Fig. 2), tabletop technology and associated learning activities aimed at promoting communication and collaboration, perspective taking and feeling of acceptance (authors' reference under review).

The aforementioned studies showed that tabletop technology can function as mediator for peace, through two different approaches. On the one hand, Ioannou et al. [14], Stock et al. [24] and Zancanaro et al. [26] provided evidence supporting that peacemaking can be fostered when students are given opportunities to deal explicitly with sensitive issues directly linked to the existing conflicts of the students' micro or macro environment. In these cases, tabletops appear to facilitate perspective-taking processes, in a tensed-free way. On the other hand, findings provided by Ioannou and Antoniou [13] indicated that it is not always necessary to talk about peace issues in order to achieve peace-related outcomes. In fact, the particular study was diversified from the previous and was innovative in that technology was used by students in conflict-laden groups for game-like tasks which were not directly or explicitly related to the experienced conflict per se. In this way, students' attention was intentionally shifted from the existing conflict amongst them and was placed to the gamified learning tasks that students had to jointly carry out. The tabletop activity, as an attractive and challenging force, shaded the stated ongoing conflict between the group members, who simply aimed to successfully complete the game-task. Despite the fact that the students had barely discussed about their conflict as such, or about peace-related issues, the emerged findings revealed students' positive behavioral and attitudinal shifts, highlighting tabletops' potential as 'peace-enforcing' technology. This was achieved by providing a shared common physical space of equal access and of distributed power, where students could collaborate over structured, game-like activities through which they could engage in a mutual goal.

Fig. 1. Tabletop collaboration in conflict-laden groups (Ioannou and Antoniou 2016)

Fig. 2. Tabletop collaboration promoting feeling of acceptance (under review)

In other words, the focus of the particular study was not solely on what students communicated about, but on creating an attractive technology-infused social environment in which they could communicate and work together [13].

In accordance to Nardi and Whittaker [19], given that "social bonding is affected through two linked processes, namely engagement of the human body in social interaction and informal conversation" (p. 86), current research findings document that

tabletops can respond to both of these processes, thereby promoting communication, collaboration and interaction, the so-called, by Veletsianos and Eliadou [25], 'antecedents to peace'. Either by directly targeting peace topics or by deliberately going around them, the use of multitouch interactive tabletops appear to have the potential to mediate peace-related outcomes, regardless the adopted approach.

Overall, considering the encouraging but limited research work on tabletop-enhanced peacemaking, as well as their already researched affordances for communication and collocated collaboration, one could argue that tabletops are well suited technologies for integration in peace education initiatives and interventions. We would argue that tabletops and other shareable interfaces, such as for example integrative walls and floors [6], can be 'peace-enforcing' technologies which can enable a shared workspace for collaboration and interaction among people in conflict, allowing 'power' to be shared and distributed and, in this way, 'forcing' the participants to take into account the interests of the 'other'.

3 Discussion

The potential of shareable interfaces, including multitouch interactive tabletops, in peacemaking and peace education is largely unexplored. This provocative essay calls for research that expands the potential application of such technology in peacemaking school initiatives. Based on the already researched affordances of tabletops in educational settings, as well as promising empirical results from its limited application in peacemaking contexts, the authors argue that tabletops, but also other forms of shareable interfaces, can have a stimulating effect in education if their peacemaking affordances are perceived more widely.

Shareable interfaces, such as interactive tabletops and interactive walls and floors [6], are now commercially available whilst becoming more robust and affordable every year. In terms of software, interactive tabletops have an advantage compared to other shareable interfaces: commercial operating systems, such as Windows 8 (or above) and Android, support native touch input and offer a repository of thousands of touch applications that can be easily downloaded from the Web and used on. For example, a beginner's attempt to integrate the technology, might involve the use of off-the-shelf applications from the Windows Store in the categories of Education and Entertainment. There is a number of freely-available applications in the Windows Store, such as iMath, English Club, Puzzletouch, and Kids Play & Learning (see application descriptions in the Windows Store) around which school teachers can design learning activities linked to aspects of the everyday curriculum. These apps come with levels of difficulty and other various settings which can be customized and personalized according to the grade-level and knowledge of the participating groups, as in Ioannou and Antoniou [13]. Also, the technology can either be integrated in the curriculum or can be used for extracurricular activities, with similar peacemaking goals in mind.

All in all, the authors present a position that tabletops, and other shareable interfaces, can be 'peace-enforcing' technologies allowing 'power' to be shared and distributed and giving the chance for people in conflict to share a common space. Future research should

benefit from further empirical investigations in this area, potentially leading to the formation of some theoretical or methodological account of:

(i) how shareable interfaces might promote peacemaking by eliciting and supporting various types of interactions amongst collocated learners, and
(ii) how learning design, mediated by such technology, can be tailored to changing perceptions, improving relationships and breaking down social barriers.

Closing, tabletops in particular, and shareable interfaces in general, are a new generation of educational technologies that offer new possibilities for engaging students in communication and collaboration. In the future, new forms of collaborative practice will be supported by this technology, especially as it gets more advanced and equipped with relevant software. What is also important, this kind of technology is attractive for young people who can stay engaged and enjoy the experience [3, 14]. Tailoring this technology to enhance peace education efforts is a great area for research and development while serving an important purpose.

The authors of this work believe that tabletops, and other shareable interfaces such as interactive walls and floors, can provide a revolutionary approach to peacemaking school initiatives, pushing the boundaries of the technology to positively influence our societies and giving educators the opportunity to deal with social issues perhaps in ways they have not had the chance to do before. This provocative essay aims to start the dialog and encourage research that unpacks the largely unexplored potential of shareable interfaces in the unique areas of peacemaking, peace-building, and peace education.

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