Give Peace a Chance: A Call to Design Technologies for Peace

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Abstract

Peace is an extremely important value for humankind, yet it has been largely ignored by the computing and human-computer interaction community. This paper seeks to begin a discussion within the human-computer interaction community on how we can design technologies that have peace as an explicit goal. To begin this discussion, I review empirical studies on the factors that contribute to conflict and those that make conflict less likely. Based on this, I identify areas where human-computer interaction research has already contributed to prevent conflict and promote peace, and open areas where our community can make a positive difference.

Keywords

Peace, causes of conflict, software, technology, empirical studies, discussion.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. K.3.1. Computer uses in education. K.4.1. Public policy issues.

Introduction

Peace is an extremely important value for humankind, yet it has been largely ignored by the computing and

human-computer interaction community. This paper seeks to begin a discussion within the human-computer interaction community on how we can design technologies that have peace as an explicit goal.

Peace is universally recognized as a positive value. Examples can be found in religious texts such as the Bhagavad Gita "And how can there be any happiness without peace? " (2:66), the Torah "Turn from evil and do good; seek peace and pursue it" (Psalm 34:14), the New Testament "Blessed are the peacemakers, for they will be called sons of God" (Matthew 5:9) and the Koran "And if they incline to peace, do thou incline to it; and put thy trust in God" (al-Anfal 8:61). The Russell-Einstein Manifesto of 1955 is an example of a humanist text appealing for peace "There lies before us, if we choose, continual progress in happiness, knowledge, and wisdom. Shall we, instead, choose death, because we cannot forget our quarrels?" [35]. Even those in charge of conducting wars appreciate the value of promoting peace and preventing conflict. The 2008 National Defense Strategy, prepared by the US Department of Defense states that "military efforts to capture or kill terrorists are likely to be subordinate to measures to promote local participation in government and economic programs to spur development, as well as efforts to understand and address the grievances that often lie at the heart of insurgencies" [11].

This last statement makes it clear that peace is not just a goal for idealists but also for pragmatists. Nobel Prize Winner Joseph Stiglitz, for example, has estimated that the Iraq war is costing every household in the United States 138 USD a month, and that by 2017 the United States will have paid 1 trillion USD in interest for the money borrowed to pursue this war [16]. In addition, war is a major cause of poverty in developing regions. Most of the poorest countries in the world are involved or have recently been involved in violent conflicts [39].

Notwithstanding the economic costs of war, the most horrible costs are in terms of human lives. The most atrocious example in recent history is the civil war in Rwanda that cost the lives of about 500,000 people and is still having negative consequences in neighboring Congo [13].

While intrapersonal, interpersonal and inter-group conflicts do not have the dire consequences of civil or international wars, they can certainly have a negative effect on our everyday lives leading to anger, stress, distrust and violence [41]. Technologies may actually be contributing to these problems as a recent survey found that information technology is the most common cause of stress for people in the UK, and dealing with new technology was considered more stressful than commuting or retiring [15].

In spite of the important role of peace in our beliefs and traditions and its impact on the wellbeing of humankind, the computing community has dedicated little time and effort toward developing technologies with the explicit goal of preventing conflict and promoting peace. In fact, a search of the ACM Digital Library reveals that most computing research papers that mention "peace" are related to military projects (e.g., [2][37]). Ben Shneiderman has perhaps been the only consistent voice calling for the use of information technologies to promote world peace, arguing that peace should be part of a social impact statement in every human-computer interaction project [38]. There is also a course taught by Fogg based on conducting

surveys and getting many ideas on how to invent and evaluate technologies to promote peace [20].

Outside the human-computer interaction research community, the *ICT for peace foundation* is dedicated to supporting the international community in managing crises through the use of information and communications technology [26]. This foundation has strong links to international organizations such as the United Nations.

The most comprehensive proposal for conducting computing research on peace actually came from one of the parents of computer science as an academic discipline. Just a few months after the Cuban Missile Crisis, Louis Fein wrote a paper titled *Computer-Oriented Peace Research,* which proposed the creation of the *Peace on Earth Research Center* (PERC). His vision was for PERC to construct computer models to provide a better understanding of the problems that cause armed conflict and through this understanding develop solutions that could prevent future conflicts [17].

Even though the computing research community appears for the most part to have ignored Fein's call, the past 10-15 years have seen a large number of publications that have addressed Fein's first challenge by conducting statistical analyses of empirical data on conflict to better understand the risk factors associated with conflict. This research, together with the increasingly ubiquitous nature of computing technologies provide a unique opportunity for human-computer interaction researchers to make a difference in designing technologies that prevent conflict and promote peace.

To begin a discussion on how the human-computer interaction community can contribute to peace, I review empirical studies on the factors that contribute to conflict and those that make conflict less likely. Based on this, I identify areas where human-computer interaction research has already contributed to prevent conflict and promote peace, and open areas where our community can make a positive difference.

Causes of conflict

Conflict can occur at many levels with five being commonly cited: intrapersonal, interpersonal, inter-group, inter-organizational and international [14]. In this paper, I concentrate on reviewing the causes of conflict for civil and international wars, as well as, interpersonal and inter-group conflict. I do so based on articles that use statistical analyses of conflicts to find the factors that affect the likelihood that conflicts will occur.

Civil and international wars
FACTORS THAT INCREASE THE LIKELIHOOD OF CONFLICT
Stewart provides an overview of findings on the causes of armed conflict in developing countries, which have been the costliest in human lives in the past 50 years [39]. A cause he and others highlight is private motivation (e.g., economic benefits of joining armed groups, looting, and illicit trade). The main proponent of this idea is Collier, who found that economic opportunities are more likely to drive civil wars than grievances. His point is that civil wars will not occur if rebel organizations cannot be financially viable. Collier found that countries that heavily depend on primary commodity exports are much more likely to experience civil wars because it is difficult to ascertain the origin of these commodities and they can be more easily

commercialized [7][8][9]. Private motivation is not limited to causing wars in developing countries though. One of the main advocates for the Iraq war, United States Vice President Dick Cheney, was previously CEO of Halliburton, which obtained almost 20 billion USD in single source contracts for work in Iraq during the first two years of the war [16].

A second type of cause cited by Stewart is a failure of the social contract (e.g., low incomes, short life expectancy). Collier, for example, found that rapid economic decline increases the risk for conflict by increasing the financial incentive for participating in an armed conflict [7][8][9]. DeRouen Jr. and Goldfinch also cite social unrest as a cause of violent conflict [12].

A third cause for conflict cited by Stewart is environmental stress (e.g., lack of resources). Homer-Dixon studied how environmental scarcities can contribute to violent conflicts citing examples in Senegal, Mauritania, Israel and the West Bank, Nicaragua and other countries [23].

A fourth factor Stewart mentions and that often comes first to mind is inequality (e.g., political access, economic, social). While inequality is often part of the grievances brought up to justify violent conflicts, it does not appear to be a good predictor for conflicts [7][8][9]. Cramer provides the example of many countries with high levels of inequality (e.g., Panama, Brazil) that have not recently experienced civil war [10].

An interesting dimension of armed conflicts is ethnicity and other kinds of identities. DeRouen Jr. and Goldfinch found that inter and intrastate conflicts are more likely to become violent if there is an ethnic dimension to the crisis [12]. Sambonis argues that there is a difference between ethnic/religious (identity) wars and those that are not. Through a statistical analysis of civil wars, he concludes that identity wars are mostly caused by political grievances and are unlikely to occur in democratic countries [36]. Surprisingly, Collier found that ethnic and religious fractionalization reduced the risk for conflict. However, having the largest ethnic group constitute 45-90 percent of the population increased the risk of civil war. Collier speculates that ethnic groups constituting such a fraction of the population have the means and the incentive to exploit other ethnic groups [7][8][9].

Collier cites other risk factors for civil wars including having a high proportion of young men in the population and partially democratic governments [7][8][9]. DeRouen Jr. and Goldfinch add other risk factors including contiguity to an adversary, a violent trigger to the crisis, and a crisis that has been happening for a long time [12]. Demonstrating the complexity behind the sources of conflict, Kenyon-Lischer provides evidence of how humanitarian aid can sometimes contribute to conflict if it is, for example, provided to refugee camps that are used as military bases by armed groups [29].

The language used by warring parties also plays a role in fanning conflicts. Ivie, for example, discusses the use of language in justifications of war by the United States, with the presentation of Americans as victims and enemies as savages driven by irrational desires [27]. Chambers reviews the use of euphemism and tautology in the language of war. Examples include

"coalition of the willing" and "selective targeting" (tautologies), and "collateral damage" and "regime change" (euphemisms) [6].

FACTORS THAT REDUCE LIKELIHOOD OF CONFLICT
The most consistent finding in the literature is that fully democratic countries are less likely to have civil wars and participate in armed conflicts with other countries [7][8][9][12][33][36]. On the flipside, Collier found that severely repressive regimes are less likely to suffer from civil wars than partially democratic countries [7][8][9].

A better educated population reduces the risk of armed conflict. Collier found that each year of education reduces the risk of civil war by about 20 percent. He also found that economic growth and high incomes reduce the risk for civil war [7][8][9].

Ackermann discusses the history and current practices of international conflict prevention, from the Congress of Vienna in 1815, to the Marshall Plan and the various roles the United Nations has played. Ackermann distinguishes between two types of conflict prevention practices. Operational prevention is aimed at imminent crises and includes actions such as fact-finding and monitoring missions, negotiation, mediation, facilitating dialogue between the parts and confidence building measures. A recent example is what was done to prevent an escalation of the conflict between Georgia and Russia in 2008. Structural prevention aims to prevent conflicts in the long term through actions such as facilitating governance, increasing the respect for human rights, improving educational systems and economic opportunities, and promoting democracy [1].

Interpersonal and inter-group conflicts
Interpersonal and inter-group conflicts have been studied primarily in how they affect workplaces, such as those in information system development groups [3]. Factors that cause interpersonal and inter-group conflict include individual characteristics (e.g., stress, frustration, goals), perception (e.g., distortion, misunderstanding, perceiving other's behavior or intentions to be unfair), communications (e.g., hostility, insults), behavior (e.g., low interaction, blocking other's goals), structure (e.g., power imbalances, interdependence, preferential treatments, closeness) and previous interactions (e.g., past history of conflict) [41].

There is empirical evidence that how people deal with conflict has a direct effect on how often they run into conflict. Friedman et al. found that people who use an integrative approach towards addressing conflicts (i.e. they take into account the interests of all parties) experience less conflict and stress than those who attempt to dominate in conflict situations or avoid these situations altogether [21]. Graziano et al. found that low-agreeable people are more likely to favor power-assertion tactics during interpersonal conflicts when compared to high-agreeable people. They also found that the type of relationship affects the preferred tactic (e.g., power assertion more likely to be preferred when dealing with siblings) [22].

Factors that can cause a conflict to de-escalate include anticipated common enemies, stalemates, fatigue, shifts in goals, a step to cool an opponent's anger, a step to cool tension, and a signal that de-escalation is wanted [41]. Interventions designed to mitigate conflicts involve identifying stakeholders and their

interests, analyzing conflicts, and developing conflict mitigation methods that can be integrated with a larger goal (e.g., business goals) [5].

The role of human-computer interaction

In this section I discuss the role human-computer interaction can play in promoting peace and preventing conflict. I do so by going through the factors that increase or decrease the likelihood of conflict and discussing how previous projects have already made positive contributions and where there are opportunities for research. This does not intend to be a comprehensive collection of what has been done and what could be done, but rather provides a starting point for a discussion on human-computer interaction research for peace.

Preventing armed conflict
According to the empirical studies reviewed in this paper, promoting full democracy with free and fair elections, freedom of assembly, press and religion, and respect for human rights is one of the surest ways of preventing conflict. Getting there may not be so simple, but one could argue that greater exposure through the Internet to how successful countries' governments work may contribute towards democracy. Technologies can also help implement democratic reforms more quickly through the use, for example, of well-implemented voting systems that can easily be audited and provide transparency.

A prime example of helping improve educational levels in developing regions is the work of the *One Laptop Per Child* (OLPC) Foundation [32]. The laptops can motivate children to stay in school and their parents to send them to school. They also provide children the

advantage of having an enormous increase in their access to content, and encourage them to produce their own. This makes it more likely that they will acquire 21st century skills to better understand, analyze and use online information and produce digital content of their own [25]. Other examples of work on educational technologies for developing regions include the work of Kam et al. on e-learning games, and Moraveji et al. on single display groupware learning applications [28][30].

Private motivation to go to war could be exposed through information visualization techniques. Last year, students in one of my classes designed information visualization software to track the path of campaign contributions for the United States Presidential primaries. It enabled users to see, for example, where the campaign contributions came from and where the politicians were spending money. Similar efforts could be used to untangle the financial interests behind wars.

Failures of the social contract that cause extreme poverty and low life expectancy can be addressed through a variety technologies. Initiatives like OLPC can help by providing future generations with the skills to better participate in the global economy and thus help reduce poverty. Likewise, mobile technologies can help provide information to prevent disease, promote healthy habits, and help people in developing regions get more out of what they have by, for example, being informed of market prices and weather forecasts. In work with colleagues in Uruguay, I learned about parents in rural areas whose children received laptops made by OLPC and were using them to check weather forecasts to better operate their farms.

Technologies can help alleviate environmental stress in many ways. Blevis' recommendations on sustainable interaction design can help in preventing technologies from having a negative impact on the environment [4]. Satellite imaging delivered in a user friendly manner can be used to better understand how to manage natural resources and predict where crises may occur. Simulations and modeling can help evaluate different scenarios in the use or resources while information visualization can help the public better understand how the products they consume affect the environment.

Inequality could be addressed first by making people aware of its prevalence and severity. Information visualization could be used for this purpose. The more difficult task is actually reducing inequality. Again the work of the OLPC Foundation comes to mind. By providing *every* child in a given country with a laptop, OLPC could actually help reduce inequality by providing a wider set of the population with 21st century skills. Technologies to facilitate peer-to-peer micro-financing can also provide more people with opportunities to become economically self-sufficient.

Technologies can also help reduce tensions due to identity issues such as ethnicity or religion. This can be accomplished by highlighting the humanity of the other set of people. Examples of work in this area include that of Stock et al. who presented a tool for joint narration to promote conflict negotiation and resolution, with some results from an experience between Arab and Jewish youth [40]. A few years earlier, Rosen described something similar through *KidCast for Peace*, which proposed connecting children in various parts of the world so they could share their creations and obtain feedback [34]. The *International*

Children's Digital Library provides access to children's books in dozens of languages, enabling children to read books written by people from other ethnic and religious groups [24]. Other possibilities for research include tools that automatically "translate" euphemisms and dehumanizing language in news stories as well as tools that will bring up the same news story from several points of view.

In addition, computer technology could be used to better understand how populations are convinced to go to war. For example, an analysis of media stories could trace how pro-war messages and language are distributed and who originates them. This idea could be extended to examine how online social networks are used to promote war and peace.

Technologies can also be of help in operational prevention tasks such as monitoring missions and confidence building measures. For example, streaming video of sensitive areas could be made available over the Internet. This could be used to ensure that cease fires are respected by providing an easy way for all parties to monitor sensitive areas.

Preventing interpersonal and inter-group conflicts
Much of the research in human-computer interaction could be contributing towards reducing interpersonal and inter-group conflicts by providing users with less stressful technologies that are efficient, effective and satisfying to use. Other research in our field is directly aimed at intrapersonal peace, such as Mynatt's work on providing peace of mind through technologies that help connect families with elderly relatives [31].

There are many other ways in which technology could help. For example, users could get warnings if they are about to send an email with hostile language. Software could also be used to help facilitate conflict resolution by walking users through the process of taking into account the interests of all parties and reaching settlements that consider contextual goals (e.g., those of a household or a business).

Designing for values
Flanagan et al. discussed value based design and the methods that can be used to incorporate values into the design process. The value sensitive design methodology includes the incorporation of values into research questions. They also discuss the incorporation of designer, user and stakeholder values [19]. Further work resulted in the Values at Play methodology, which was used for developing games with social-activist themes [18]. The methodology involved discovering the relevant values, translating them into the design of a system, and verifying whether the translation was successful. This process could also be used to incorporate peace values into technologies.

Discussion
My hope is that this paper begins a serious discussion within the human-computer interaction community on how we can design technologies to promote peace and prevent conflict. It identifies many areas where research can be conducted and where technologies can have a positive impact. In particular, I believe that we should concentrate our research on affecting factors that have been identified by empirical studies to increase or decrease the likelihood of conflict.

There are many challenges ahead. Evaluating technologies for peace can be difficult. In particular, if we want to reduce armed conflicts, the efforts may need to be large (such as OLPC) and it may be difficult to evaluate their impact. While it may be possible to measure shorter term gains in areas such as education, it may take years for any of these projects to have positive measurable effects in terms of peace, and even then, it may be difficult to attribute successes to specific projects. In the case of tools to help reduce interpersonal and inter-group conflicts, it may be easier to conduct the type of studies that could one day be published at the CHI conference.

From an academic's perspective, it is also difficult to pursue this avenue of research due to the lack of funding opportunities, with funding increasingly being at least as important as publications in the job evaluations of faculty in technical fields at research institutions. This problem could be turned into a positive by making all the research in this area completely open, sharing research results, and making any software open source. This could encourage a larger community of volunteers to participate and would increase the chances of any project to succeed.

Future steps should include opportunities for all those interested to join in discussions and arrange for suitable ways of communicating. It would be useful to host a SIG or a workshop at the next CHI conference.

Conclusion
In this paper, I have presented a review of empirical studies on the causes of conflict and discussed how these findings can provide a starting point for the human-computer interaction community to conduct

research on promoting peace and preventing conflict. I have identified many opportunities for research and expect that this paper will inspire others to think of many more.

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