Taking a More Balanced Approach to Adolescent Mobile Safety

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Abstract

Adolescent online safety is becoming more challenging as teens are prolifically using mobile smart phones. Parental control applications ("apps") are available, but, the adoption rates of such apps are remarkably low and may not adequately address the problem at hand. To examine this further, we propose three studies 1) a structured analysis of existing adolescent online safety apps, 2) a survey-based study to confirm our hypotheses that the values embedded in the features of these existing apps are sub-optimal, and 3) building a prototype of a new online safety app with features that better meet the needs of parents *and* teens.

Author Keywords

Parental control; teen self-regulation; adolescent online safety; value sensitive design;

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Motivation and Background

According to a Pew Research report, approximately three quarters of teens have access to a smart phone [6], and 91% of teens access the internet using their mobile devices [1]. Using smart phones, it is now possible to interact with people from all over the world.
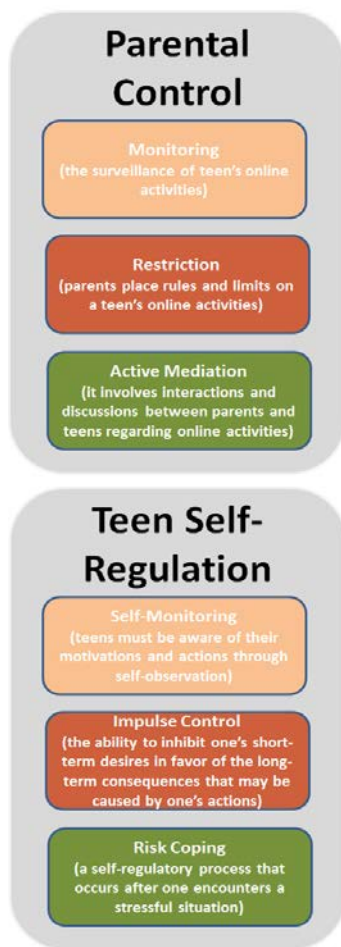
Parental Control

Monitoring
(the surveillance of teen's online activities)

Restriction
(parents place rules and limits on a teen's online activities)

Active Mediation
(it involves interactions and discussions between parents and teens regarding online activities)

Teen Self-Regulation

Self-Monitoring
(teens must be aware of their motivations and actions through self-observation)

Impulse Control
(the ability to inhibit one's short-term desires in favor of the long-term consequences that may be caused by one's actions)

Risk Coping
(a self-regulatory process that occurs after one encounters a stressful situation)

Figure 1: Teen Online Safety Strategies (TOSS) Theoretical Framework (*Similar colors are used for parental strategies and analogous teen strategies*)

Statistics show that teens are far ahead in terms of interacting with people online. For instance, 37% of teens use social messaging software; and 47% of teens are users of video chatting applications **[1]**; 71% teens have access to more than one social networking sites **[6]**. Despite offering such world changing opportunities to connect, the internet also presents a multitude of new risks to teens, including cyberbullying, exposure to unwanted explicit materials, harassment, and sexual solicitations [8].

To protect teens from such risks, parental control applications have been created **[13]**; however, only 16% of parents report using such apps on teens' smart devices [9]. Researchers have conducted almost no research on the existing adolescent online safety mobile apps to understand adoption problems or how they protect teens from online risks.

Some initial work has been done in the HCI community to create new prototypes: "We-Choose" and "FamiLync" promote collaboration between parents and teens **[4,5]**. Such approaches have resulted in more positive outcomes, such as helping reduce addictive smart phone usage and foster positive relationships between parents and teens **[5]**. However, these apps are not currently available for parent and teen to use. Therefore, my initial research goal includes the analysis of existing teen online safety apps, exploring reasons for low adoptions of such apps, through using a value sensitive design approach, which will emphasize the values embedded within these systems

Research Questions
Technical mediation for mobile devices is relatively new and, thus, an area that lacks a wealth of research. The main goal of my thesis work is to fill this gap by

answering the following questions: 1) Why current solutions for promoting adolescent online safety have low adoption rates? 2) What are the various strategies available (in theory and practice) for promoting adolescent online safety on mobile platforms? 3) Is it possible to design better solutions for promoting teen mobile safety which embed more positive family values and, subsequently, increase adoption rates?

Theoretical Frameworks
Value sensitive design (VSD) is "a theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout the design process" **[3]**. My initial goal is to better explain how technical mediation influences current apps by reverse engineering the values embedded in the design of existing apps. With my advisor's help, we also built a framework of Teen Online Safety Strategies (TOSS) that uses both parental control and teen-self regulation, shown in **Figure 1**. In the process of building the TOSS framework, the following assumptions are made: 1) parents have some control over teens' online activities [7]; and 2) teen also have an influence on their online safety **[2]**.

Proposed Methods
To address the aforementioned research questions, I will conduct three studies (**Figure 2**) related to adolescent online safety within mobile platforms.

For my **first study**, I have already conducted a structured analysis **[12]** of Android teen online safety apps **[11]**. I analyzed apps on the Android platform as Android has 83% market share of cell phones **[14]**. I found 75 relevant apps and applied grounded approach **[10]** to the data set to make a list of 42 features (e.g.,
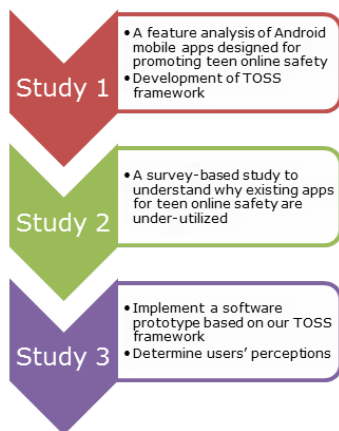
application *log*, *call log*, *browser log*) related to adolescent online safety available in those apps. I found that **89%** of the features supported promote **parental control** over teen self-regulation (11%), which clearly indicates that there is an opportunity to design new teen online safety apps, which are more targeted toward teens.

For my **second study**, I will use a web-based survey to confirm some of our initial hypotheses as to why current adolescent online safety apps are under-utilized. There will be two separate surveys for parents and teens. After gathering adequate data from both parents and teens, a logistic regression will be used to find out the factors that influence the adoption or non-adoption of mobile online safety apps. My initial hypotheses include: 1) Authoritarian parents will be more likely to use parental control apps; 2) tech-savvy parents who are concerned for their teens' personal privacy will be less likely to use such apps; and 3) parents whose teens have experienced risks will be more likely to use.

My **final study** will include creating a better adolescent online safety app, which will promote healthy adolescent development. I will design and develop a functioning mobile app prototype embedding different online safety strategies related to parental active mediation and teen self-regulation. We will conduct user studies to measure users' perceptions of my proposed mobile app alternatives. Our designs will also be respectful of a teen's privacy by abstracting some of the low level details of the teen's mobile activities, as opposed to current apps which provide these details.

Figure 2: Proposed Studies

Research Status
In Spring 2016, I switched research advisors and topics. As I still want to graduate in the next 2 years, I have had to quickly come up to speed on my new dissertation work. My advisor helped introduce me to HCI literature and develop the conceptual TOSS framework (**Figure 1**). I completed the feature analysis as my first project, and this work will be published in CSCW 2017. With the help of undergraduate Senior Design students, I have completed a preliminary version of the prototype for my third study. My next step is to complete the survey study before finalizing the prototype and conducting user studies. I am in the process of creating a blueprint of my survey and planning to launch it in fall 2016.

Expected Contributions
The expected contributions of my work will be five-fold: 1) The theoretical framework of TOSS based on prior literature and value sensitive design to better understand the different strategies for adolescent online safety, 2) A structured, qualitative feature analysis of existing apps for providing fellow HCI researchers working in this area an in-depth knowledge of available features of currently available apps for promoting adolescent online safety in mobile platforms, 3) A mapping between TOSS framework and feature analysis that help producing qualitative results of existing apps and designing better adolescent online safety apps, 4) Reasons for why existing teen online safety apps have a low adoption rate, and 5) A new mobile app prototype based on value sensitive design approaches to help increase user adoption and better meet the needs of parents and teens.

References

[1] Amanda Lenhart. Mobile Access Shifts Social Media Use and Other Online Activities. *Pew Research Center: Internet, Science & Tech*, 2015. http://www.pewinternet.org/2015/04/09/mobile-access-shifts-social-media-use-and-other-online-activities/.

[2] Erickson, L.B., Wisniewski, P., Xu, H., Carroll, J.M., Rosson, M.B., and Perkins, D.F. The boundaries between: Parental involvement in a teen's online world. *Journal of the Association for Information Science and Technology 67*, 6 (2016), 1384–1403.

[3] Friedman, B., Kahn, P.H., and Borning, A. Value Sensitive Design and Information Systems. *Human-Computer Interaction and Management Information Systems: Foundations. M.E. Sharpe*, (2006), 348–372.

[4] Hashish, Y., Bunt, A., and Young, J.E. Involving Children in Content Control: A Collaborative and Education-oriented Content Filtering Approach. *Proceedings of the 32Nd Annual ACM Conference on Human Factors in Computing Systems*, ACM (2014), 1797–1806.

[5] Ko, M., Choi, S., Yang, S., Lee, J., and Lee, U. FamiLync: Facilitating Participatory Parental Mediation of Adolescents' Smartphone Use. *Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing*, ACM (2015), 867–878.

[6] Lenhart, A. Teens, Social Media & Technology Overview 2015. *Pew Research Center: Internet, Science & Tech*, 2015. http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/.

[7] Livingstone, S. and Helsper, E.J. Parental mediation of children's internet use. *Journal of broadcasting & electronic media 52*, 4 (2008), 581–599.

[8] Mitchell, K., Jones, L., Finkelhor, D., and Wolak, J. Trends in Unwanted Online Experiences and Sexting : Final Report. *Crimes Against Children Research Center*, (2014).

[9] Monica Anderson. Parents, Teens and Digital Monitoring. *Pew Research Center: Internet, Science & Tech*, 2016. http://www.pewinternet.org/2016/01/07/parents-teens-and-digital-monitoring/.

[10] Strauss, A. and Corbin, J. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. SAGE Publications, Inc, Thousand Oaks, 1998.

[11] Wisniewski, P., Ghosh, A.K., Rosson, M.B., Xu, H., and Carroll, J.M. Parental Control vs. Teen Self-Regulation: Is there a middle ground for mobile online safety? *Proceedings of the 20th ACM Conference on Computer Supported Cooperative Work & Social Computing*, ACM (2017).

[12] Wisniewski, P., Islam, A.K.M., Lipford, H.R., and Wilson, D. Framing and Measuring Multi-dimensional Interpersonal Privacy Preferences of Social Networking Site Users. *Communications of the Association for Information Systems 38*, 1 (2016).

[13] Best Choice for Teens' Cyber Safety – Parental Control App! https://www.hackread.com/teens-cyber-safety-protection-parental-control-app/.

[14] IDC: Smartphone OS Market Share. *www.idc.com*. http://www.idc.com/prodserv/smartphone-os-market-share.jsp.