

**Teen Privacy Improvement Ideas for Facebook:
A Study of Parents' and Teens' Perspectives**

by

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ABSTRACT

In this study, a number of teen privacy-enhancing improvement ideas for Facebook were conceptualized and evaluated by a usability study including 6 teens and 6 parents. The improvement ideas are typically in the form of new features which allow teens to communicate with their parents to share any discomforting experience with them or nudge teens to make more informed and rational privacy decisions in case of potential risky interactions on Facebook. For the first group of ideas, two major sources of discomfort were identified as the posts shared by friends including or the messages received from friends requesting for personal information. For the second group of ideas, two major potential risky interactions were identified as publicly sharing sensitive data and being friends with a stranger on Facebook. The usability study results revealed that many teens and parents agreed that the first group of ideas including the “Report to parent” options would be helpful in reducing risks to teens’ privacy on Facebook and they would use these options. They also agreed that the “Are you sure you want to continue?” warning message to pop up in case a teen intends to confirm a stranger adult as a friend would be effective in having the teens reconsider their decision and cancel confirming that person as a friend. On the other hand, some teens and parents believed that the remaining “Are you sure you want to continue?” warning messages to be popped up in case of teens’ intend to share exact location might not be much effective in grabbing the attention of the teens and having them revise their privacy preferences to target a smaller audience and they shall be improved further.

Key words: Teen online privacy, social media, privacy nudges

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ABBREVIATIONS

CMU	Carnegie Mellon University
CUPS	CyLab Usable Privacy and Security Laboratory
IRB	Institutional Review Board
SNS	Social Networking Site

1 INTRODUCTION

In this thesis study, existing academic literature in the under addressed area of teens' online privacy was investigated and a number of privacy-enhancing conceptual improvement ideas were developed for Facebook, one of the most widely used social networking sites (SNS) by teens. According to a recent research involving 1060 teens of age 13 to 17 and living in the United States, 71 percent of all surveyed teens report using Facebook (Lenhart 2015). The same research reveals that 41 percent of all surveyed teens reported Facebook as their most frequently used SNS (Lenhart 2015).

The improvement ideas for Facebook conceptualized in this thesis study are typically in the form of new features which

- allow teens to communicate with their parents and share any uncomfortable experience with them

or

- *nudge*¹ teens to make more informed and rational privacy decisions in case of potential risky interactions

while using Facebook. Hence, two primary research questions addressed by this study are associated with how to ensure these two properties in the proposed improvement ideas.

Later, the usability of these ideas was evaluated by performing a usability study including 6 teens of age 13 to 18 who are active Facebook users and 6 parents of such teens. In the usability study, *paper prototyping*² was used to transfer the conceptual improvement ideas to the participants and to encourage their participation in further improvement of the ideas. The usability study enabled questioning the participants' current attitudes and practices on teen privacy on Facebook and getting their perspectives on the usefulness, ease of use, desirability

¹ The concept of nudging was introduced in 2008 by (Thaler and Sunstein) in their popular book "*Nudge: Improving Decisions about Health, Wealth, and Happiness*". In their book, they define a nudge as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler and Sunstein 2008) (Wang, Leon, et al. 2014).

² Paper prototyping is "a method of brainstorming, designing, creating, testing and communicating user interfaces" (Synder 2003). It is widely accepted as an effective and valuable method for testing the usability of user interfaces since it requires little time and effort to create, iterate and improve, provides early feedback on the designs and is platform-independent (Synder 2003).

and learnability of the ideas demonstrated by each paper prototype. The anecdotal data collected on how the participants perceive and interact with the suggested ideas, as well as their suggestions for further improvement of the ideas are quantitatively presented in this report.

The rationale behind conducting the usability study is to ensure that the proposed improvement ideas for Facebook are usable in addition to being motivated for enhancing teens' privacy. So, the final research question addressed by this study is associated with how to ensure usability.

The improvement ideas proposed and evaluated in thesis study will constitute a part of the iterative design process to be completed within the course of the research project entitled "Helping Teens and Parents Negotiate Privacy" proposed by the CyLab Usable Privacy and Security Laboratory (CUPS) at Carnegie Mellon University (CMU). This project, which is scheduled to be completed in the next 3 years, aims to "develop a set of software tools that enable parents and teens to communicate about teens' online activity while respecting teens' personal boundaries and need for a private space online, as well as empower teens to manage their online risks safely" (CMU CyLab 2015). Similar to the other software tools and features to be designed for various online social networks, mobile apps or other online platforms within the context of the aforementioned CUPS project, one or more of the ideas proposed in this thesis study may later be implemented as plugins, add-ons or extensions on Facebook for improving teens' online privacy.

1.1 The Research Questions

As mentioned in the introductory section, the primary research questions addressed in this thesis study are:

- How can teens share any discomforting experience with their parents and how can parents be more actively involved in protecting their teens' privacy on Facebook?

- How can teens be nudged to make more informed and rational privacy decisions in case of potential risky interactions while using Facebook?
- How can the possible teen privacy-enhancing ideas for Facebook be converted into a more usable form?

1.2 Purpose of the Study

This study aims to contribute to the existing efforts for improving teens' online privacy by proposing usable conceptual improvement ideas for one of the most widely used SNS among teens, Facebook. This study approaches teens' privacy on Facebook from a usability perspective, because without a reasonable level of usability, the proposed ideas would not worth the effort to implement or would be a waste of time if implemented.

1.3 The Research Approach

In this thesis study, first, a comprehensive review of the existing academic literature in the area of teens' online privacy was conducted to identify major risks to teens' privacy on SNS, and teens' and parents' existing strategies for accepting or mitigating these risks. Then, a number of privacy-enhancing improvement ideas for Facebook were conceptually developed. These ideas are typically in the form of new features allowing teens to communicate with their parents and share any uncomfortable experience with them with their parents or nudging teens to make more informed and rational online privacy decisions in case of potential risky interactions on Facebook.

After developing the ideas, an exploratory usability study was performed to evaluate the usability of these ideas based on the opinions of two groups of users and to get their suggestions for refining or further improving them. One of the user groups included 6 teens of age 13 to 18 that actively use Facebook, and the other group included 6 parents who have one or more children of age 13 to 18 and actively using Facebook. Each participant in these two groups of users was interviewed individually.

Finally, participants' current attitudes and practices on teen privacy on Facebook as well as their opinions and suggestions on the proposed improvement ideas for Facebook captured by the usability study were analyzed. The results of this analysis are quantitatively presented and compared as teens' and parents' perspectives, together with their implications for future research and the limitations included in the study.

1.4 Organization of the Thesis

In Chapter 1, the research question and the research approach as well as the purpose of the study were clarified.

In Chapter 2, a brief review of the relevant literature about teen online privacy, particularly teen privacy on social media is provided.

In Chapter 3, the research methodology is described in detail, including the tasks performed in conceptualizing the improvement ideas for Facebook and performing the usability study.

In Chapter 4, a detailed analysis of the usability study results are presented.

In Chapter 5, limitations imposed on this study, as well as some recommendations for future research, are presented.

2 LITERATURE REVIEW

Widespread availability of high speed broadband internet access and emergence of smart phones and tablets, together with the rapid proliferation SNS enormously changed the daily lives of millions of people. Teens, which are inherently more inclined to adopt new technological innovations than adults, have naturally constituted an important user group for SNS. Teens may prefer to be on social media to find their already existing friends, to meet with new friends, to simply follow others' posts and updates or to just spend time. Being on social media helps teens satisfy their needs of independence from parents, social acceptance, self-esteem, identity formulation, sexual exploration or experiencing risk (Lenhart 2015) (The Prevention Researcher 2010). Another major motivation for using SNS by teens is online popularity (Boyd 2007).

On the other hand, by being on social media, teens may inevitably be exposed to certain privacy risks including losing control on personal information, being exposed to age-inappropriate content or being contacted by strangers. (Grant 2006) classifies teens into three groups as naïve dabblers, open-minded liberals and cynical concealers, based on their attitudes for online privacy. Naïve dabblers possess the least level of online privacy awareness; open-minded liberals have a higher level of awareness but a low level of perception of possible negative outcomes of risks to their online privacy and cynical concealers show the highest level of both online privacy awareness and risk perception (Grant 2006). According to (Wisniewski, et al. 2015), teens engage in two types of privacy behaviors on social media; privacy risk-taking behaviors and privacy risk-coping behaviors, which include the sample practices listed in Table 2.1. (Raman and Pashupati 2005) further classify teens' privacy risk coping strategies into two as approach and avoidance. The table also links Grant's (2006) groups of teens based on attitudes for online privacy with privacy risk-taking behaviors and links Raman and Pashupati's (2005) two strategies with privacy risk-coping behaviors.

Table 2.1. Teen privacy behaviors on social media

Privacy risk-taking behaviors	Privacy risk-coping behaviors
<ul style="list-style-type: none"> • Sharing basic information (Cynical concealers) • Sharing more sensitive information (Open-minded liberals) • Engaging in risky interactions (Naïve dabblers) 	<ul style="list-style-type: none"> • Seeking advice from others (Approaching to risk) • Taking remedy/corrective measures (Avoiding from risk)

(Wisniewski, et al. 2015), (Grant 2006), (Raman and Pashupati 2005)

Teens' either being unaware of the sources of, tendency to underplay or underestimating the possible negative consequences of risks may increase their potential to engage in risky interactions such as comfortably friending strangers on social media. Another risky interaction can be automatic sharing of exact location (Wisniewski, et al. 2015).

Some parents may also be unaware of risks surrounding their teens on social media or overly optimistic about their own teens' privacy behaviors on social media. Therefore, not only teens, but also parents shall be made aware of the potential privacy risks on social media. Some parents, who already have a certain level of risk awareness, try to address their concerns about these risks by pursuing two types of parental mediation strategies; direct parental intervention or active parental mediation, which include the sample practices listed in Table 2.2 (Wisniewski, et al. 2015). Direct parental intervention can be referred to as regulated or restricted mediation and active parental mediation can be referred to as a combination of factual mediation and evaluative mediation, as used by (Lwin, Stanaland and Miyazaki 2008) (Eastin, Greenberg and Hofschire 2006).

Table 2.2 Parental mediation strategies for social media

Direct parental intervention (Regulated or restricted mediation)	Active parental mediation (Factual mediation + Evaluative mediation)
<ul style="list-style-type: none"> • Using parental controls • Setting up teens' social media privacy settings 	<ul style="list-style-type: none"> • Talking with teens about their posts (Evaluative) • Reviewing information posted by the teens (Factual) • Commenting on or responding to posts made by the teens (Factual)

(Wisniewski, et al. 2015) (Lwin, Stanaland and Miyazaki 2008) (Eastin, Greenberg and Hofschire 2006)

It can be inferred from Table 2.2 that active parental mediation calls for the use of more instructive and guidance based practices whereas parents following direct parental intervention strategies prefer to be more restrictive about their teens' use of social media. On one hand, being restrictive may help teens avoid risk taking behaviors on social media to some extent. On the other hand, restrictions also minimize teens' chance of learning from mistakes and making their own decisions for when and how to apply risk coping behaviors. Also, excessive parental monitoring may damage teens' trust in their parents, cause teens to hide behaviors from them (Cranor, Durity, et al. 2014) and hamper parent – teen relationship (Livingstone and Bober 2006) (CMU CyLab 2015).

(Wisniewski, et al. 2015) mention that “teens may benefit more from being exposed to risks and allowed to make their own decisions in an environment where they may receive guidance” (CMU CyLab 2015). They also suggest that existing parental monitoring software shall be improved or other technological solutions shall be developed to allow channels for parent – teen communication about teens' online behaviors and safety (Wisniewski, et al. 2015). Similar tools can be developed for Facebook, the most frequently used SNS by teens, to allow them to communicate with their parents and share any discomforting experience with them. This thesis study involves the conceptual development and usability evaluation of some of such tools.

Table 2.3 gives an idea of the typical capabilities provided by top commercial parental monitoring software in the United States (TopTenReviews 2015). In addition to sharing all aforementioned negative implications of direct parental intervention practices, parental monitoring software has a unique drawback. Parents using parental monitoring software may tend to be overly confident about their teens' exposure to online risks, although teens can easily find ways to by-pass such software without their parents' awareness. Also, according to the results of a research by (Cranor, Durity, et al. 2014), some parents admit that they deactivated parental monitoring software because of their frequent false positives and complexity of use.

Table 2.3 Capabilities of typical parental monitoring software

Filtering and blocking	Recording
<ul style="list-style-type: none"> • Website, social network and online search filtering • Website, chat, file transfer, application and gaming content blocking • Profanity masking 	<ul style="list-style-type: none"> • Websites visited • Online searches • Usernames and passwords • Social networking • E-mail • Chat • Screenshot playback

(TopTenReviews 2015)

Both types of parental mediation strategies can help reducing children's likelihood of sharing basic or more sensitive information online (Moscardelli and Divine 2007). But, teens may receive more effective guidance about protecting privacy on social media from parents who prefer using active parental mediation rather than direct parental intervention. At the same time, teens may also be guided by adding some usable privacy-enhancing nudges to existing SNS user interfaces, which may open up a channel of communication with their parents to seek advice or may direct them make more informed and rational privacy decisions.

(Thaler and Sunstein 2008, p.250) state that "people are most likely to need nudges for decisions that are difficult, complex and infrequent, and when they have poor feedback and

few opportunities for learning”. (Acquisti and Gross 2009) proposed the concept of using nudges for improving people’s privacy decisions (Wang, Leon, et al. 2014). Such nudges which are basically “soft paternalistic mechanisms that nudge people towards more thoughtful and informed privacy-related decisions” are referred to as privacy nudges (Wang, Leon, et al. 2014).

Conceptualization and evaluation of privacy nudges for different platforms has been extensively researched in the last few years within the scope of the “CMU Privacy Nudges Project” led by Alessandro Acquisti, Lorrie Cranor and Norman Sadeh (CMU CyLab 2015). Within the context of this project, several research studies have been conducted including what SNS users regret, how they avoid regrets on social media and what types of nudges can be used to help them reduce the likelihood of regrets on SNS. The results of the study by (Wang, Komanduri, et al. 2011) on people’s regrets on Facebook revealed that people mostly tend to regret about sharing too much personal information, friending or unfriending others, tagging photos or using some Facebook applications.

In another study (Sleeper, Balebako, et al. 2013) investigated how people avoid regrets on Facebook and found that people decided not to share the posts that they were about to share primarily in order to avoid presenting themselves in a bad image, being potentially offensive or repetitive, arguing with others or simply because it was not convenient to share.

Finally, in an effort to help people prevent regrets on Facebook, (Wang, Leon, et al. 2014) designed two privacy nudges for Facebook, one for reminding users the potential audience of posts and the other one for allowing users to rethink their decisions about sharing posts. They evaluated their usability by a 6 week field trial with 28 Facebook users and found that user acceptance levels for the audience reminder nudge was high whereas the time delay nudge was perceived as both useful and annoying (Wang, Leon, et al. 2014).

Nudging was used in the study of (Wang, Leon, et al. 2014) to help people avoid regrets on Facebook and the authors tried to observe how adults perceive nudges and interact with them. Interesting results may be obtained if a similar field trial is made among teens, who constitute an important group of Facebook users. Privacy nudges can also be used to encourage teens to

think about the possible implications of being engaged in risky interactions on Facebook without censoring or blocking their ability to use Facebook. This thesis study also involves the conceptual development and usability evaluation of some of such nudges.

3 METHODOLOGY

As identified in the introductory chapter, the main motivation of this thesis study is to address three primary research questions by following a four-phased research approach. The initial phase involves the review of relevant literature on teens' online privacy, specifically teens' privacy on social media. The second phase involves the conceptual development of some privacy-enhancing improvement ideas for Facebook and the transformation of these ideas on paper prototypes. The third phase involves the performance of an exploratory usability study and the final phase involves the representation of the usability study results in a quantitative manner. This chapter describes the two intermediate phases, namely the conceptual development of privacy-enhancing improvement ideas for Facebook and the performance of the usability study in separate subsections. The initial and final phases are already addressed in the previous and subsequent chapters to this chapter.

3.1 Conceptual Development of Privacy-Enhancing Improvement Ideas

Two groups of conceptual improvement ideas for Facebook were developed in this study. The first group of ideas serves for allowing the teen to share any uncomfortable experience on Facebook with parents, as addressed by the first research question. The second group of ideas aims at nudging the teen to make better privacy decisions in cases when he or she is about to be engaged in some sort of risky interactions.

For the first group of ideas, which serve for allowing the teen to share any uncomfortable experience on Facebook with parents, two major sources of discomfort were identified as the posts shared by friends or the messages received from friends. Then, two different "*Report to parent*" options were conceptualized to be added to:

- The "Options" menu which appears when teens want to see the options that they can use about each post in the newsfeed shared by friends

- The “Actions” menu which appears when teens want to see the actions that they can take about each message in the message inbox

If teens feel uncomfortable with a post on Facebook which they think as invading the privacy of themselves or a third person or uncomfortable with a message that they receive from someone, then they may choose the “Report to parent” option to share the discomfort with one or both of the parents and seek advice on what to do.

The “Report to parent” options, which provide a channel for parent – teen communication, also give the parents an opportunity to be actively involved in their teens’ privacy decisions while using Facebook. In other words, parents may benefit from teens’ use of these options as a kind of active parental mediation tool.

For the second group of ideas, which aims at nudging teens to make better privacy decisions in cases when they are about to be engaged in risky interactions, two major potential risky interactions were identified as publicly sharing sensitive data and being friends with a stranger on Facebook. Then, there different warning messages in the form of *“Are you sure you want to continue?”* were conceptualized to pop up when the teen is about to:

- Share his or her current exact location publicly as a status update
- Share his or her future exact location publicly while creating an event
- Confirm a stranger adult as a friend

If teens either consciously or negligently intend to share their current or future exact location publicly, a warning message in the form of *“You are about to add location information to a public post/event. Are you sure you want to continue?”* may pop up to warn them to revise this decision by adjusting privacy preferences and targeting a smaller audience such as only friends or friends of friends.

Similarly, if teens either consciously or negligently intend to confirm an adult with no mutual friends and/or living in a different location, a warning message in the form of *“{name} from*

{city} is {age} years old and you have no mutual friends. Are you sure you want to continue?" may pop up to warn them to review this friending decision.

These warning messages try to nudge the teens to avoid from possible negative consequences of risky interactions by providing them an additional opportunity to take corrective action. They make the hidden privacy risk more apparent to the teen, as proposed by (Wisniewski, et al. 2015) and help the teen to make a more informed privacy decision.

3.2 Usability Study

After conceptualizing the improvement ideas for Facebook, an exploratory usability study was conducted to evaluate their usability. The usability study was performed in late April and early May of 2015 with 6 teens of age 13 to 18 and using Facebook and 6 parents of such teens.

Since the usability study was a kind of human subjects' research, before starting to recruit participants, an approval was received from the CMU Institutional Review Board (IRB) after completing the necessary trainings and documentation.

After getting the necessary IRB Approval, eligible participants were recruited in Pittsburgh, PA through posting flyers in convenient places, online announcements on Craigslist and word of mouth. In order to avoid biases that might result from the potential participation of already privacy-sensitive teens or parents in the study, a neutral language was used in the flyers and announcements advertising the study. For privacy reasons, the teens and parents participating in the study were not allowed to be from the same family. Participants were awarded with \$25 Amazon gift cards.

E-mail communication was used for scheduling the interviews for each participant in the recruitment process and no personally identifying information from the participants was collected except their names and e-mail addresses. Each participant was assigned a unique identifier to be used in the interviewing and data analysis processes.

Each participant was scheduled for a 1 hour in-person interview at the CMU Campus in Pittsburgh, PA. In the interviews, written consent of parent participants and teen participants of age 18 was taken. For teen participants of age 13 to 17, written consent of one of their parents was taken together with the teens' written assent (See Appendix 1 for sample consent and assent forms). For privacy reasons, parents of teens under 18 were kindly requested to leave the interview room after giving their consent for their teens' participation in the study. No deception was used. After receiving consent or assent from participants, the interviews were audio recorded in order to facilitate the analysis of responses.

In the first part of each interview, after explaining the purpose of the study and receiving their written consent or assent, the participants were asked to complete a short questionnaire, which included several demographic questions as well as other questions on the research subject such as their current attitudes and practices on teen privacy on Facebook. The questionnaires were prepared in a format as standardized as possible in order to ease the analysis of answers. They mostly included multiple choice questions as well as some open ended ones. No personally identifiable information was requested about the participants or their families (See Appendices 2 and 3 for sample background questionnaires).

In the second part of each interview, through paper prototypes, the conceptual improvement ideas for Facebook were shown to the participants and their opinions on the usefulness, ease of use, desirability and learnability of them, as well as their suggestions for refining or further improving the ideas were questioned. Again, the questions directed to the participants were prepared in a format as standardized as possible in order to ease the analysis of their opinions and comments on the ideas. More than half of the questions were worded as *"Think of a situation like this. How likely do you think you / your teen(s) would ...?"* and the participants were requested the answer them by choosing from a 5-point symmetric Likert scale of answers *"Very likely / Likely / Neither likely nor unlikely / Unlikely / Very unlikely"* and then adding their comments to the follow up *"Why / Why not?"* questions. The other questions were open ended. Participants were specifically warned not to divulge any personally identifiable information about themselves, their families or other people while answering the questions (See Appendices 2 and 3 for interview scripts).

Obviously, the number of participants in this usability study is statistically insufficient to derive generalizations about teens' and parents' perspectives on teens' privacy on social media or teens' online privacy in general. Instead, the results derived from the usability study are quantitatively presented and compared as anecdotal data representing the perspectives of 6 teens and 6 parents involved in this study. The presented results include some interesting quotes of the participants from their interviews, paying special attention to exclude the quotes which may cause the identification of any participant, his/her family members or others.

4 RESULTS

After conceptualizing two groups of privacy-enhancing improvement ideas for Facebook, their usability was evaluated by 1 hour interviews using paper prototypes. Each conceptual idea was reflected on a paper prototype that is associated with a scenario of events occurring based on the actions of an imaginary teenager, her imaginary parents and imaginary Facebook friends (See Appendix 3 for the interview scripts including paper prototypes). Many teens and parents agreed that the first group of ideas including the “*Report to parent*” options would be helpful in reducing risks to teens’ privacy on Facebook and they would use these options. They also agreed that the “*Are you sure you want to continue?*” warning message to pop up in case a teen intends to confirm a stranger adult as a friend would be effective in having the teens reconsider their decision and cancel confirming that person as a friend. On the other hand, some teens and parents believed that the remaining “*Are you sure you want to continue?*” warning messages to be popped up in case of teens’ intend to share exact location might not be much effective in and need to be improved for grabbing the attention of the teens and having them revise their privacy preferences to target a smaller audience.

4.1 Participant Demographics

6 teens and 6 parents were interviewed. By coincidence, 2 of the teens were male and of age 18, 2 of them were male and of age 15 and the remaining 2 were female and of age 16. They were attending a mix of high schools in Pittsburgh. Half of them have been using Facebook for 4 or more years while the other half have been on Facebook for less than or equal to 1 year. 2 of the teens were Facebook friends with neither parent, 2 of them were only with their mothers and the remaining 2 were with both parents.

Table 4.1 Summary of demographics of teen participants

	Age	Gender	Grade	Number of years using Facebook	Friendship with parents on Facebook
Teen 1	15	M	10	1	Both
Teen 2	15	M	9	less than 1	Only mother
Teen 3	16	F	11	1	Neither
Teen 4	16	F	11	6	Both
Teen 5	18	M	12	4	Only mother
Teen 6	18	M	11	6	Neither

All but one of the parents interviewed were mothers. They had teens in a mix of genders, ages and years of experience with Facebook. 4 of the parents were Facebook friends with their teens. 2 of the parents who were not Facebook friends with their teens mentioned that it was their preference not to friend their teens and one of them (Parent 3 / F) mentioned as a reason that she wanted her son to feel that she trusted him.

Table 4.2 Summary of demographics of parent participants

		Teen(s) using Facebook			
	Gender	Age	Gender	Number of years using Facebook	Friendship with teen on Facebook
Parent 1	F	18	M	5	Yes
		15	F	2	Yes
Parent 2	F	15	F	2	Yes
Parent 3	F	17	M	5	No
Parent 4	M	17	M	4	Yes
		15	M	4	Yes
Parent 5	F	16	F	3	No
Parent 6	F	14	F	5	Yes

4.2 Usability Results for “Report to parent” Options

The first group of ideas proposes the addition of “Report to parent” options to:

- The “Options” menu which appears when teens want to see the options that they can use about each post in the newsfeed shared by friends
- The “Actions” menu which appears when teens want to see the actions that they can take about each message in the message inbox

Many teens and parents agreed that these options would be helpful in reducing risks to teens’ privacy on Facebook and they would use this option. Also, the results show that teens’ likelihood for feeling uncomfortable with and reporting to a parent a message that they receive from someone requesting for personal information is higher than that with a post on Facebook which they think as invading the privacy of a third person. In short, reporting to a parent a message that requests phone number was viewed as a more popular choice than reporting to a parent a post that shares the home address of a friend publicly. Some teens noted that they would prefer reporting to their parents orally or reporting to Facebook. Some parents also mentioned their preference for being reported in person and their teens’ likelihood to do so.

4.2.1 Publicly shared post including personal information of a third party

All but one of the teens agrees that they would be likely or very likely to feel uncomfortable with a public post including the home address of a friend. However, 3 of the parents believe that their teens would be unlikely to feel uncomfortable with that post.

The teen that disagrees with the majority state that *“There is the fact that anyone who finds Josephine and Betsy can go there and do bad things. But, I do not think that there are that many bad people trying to find Josephine and Betsy.”* (Teen 1 / 15 / M). According to one of the parents who believed that her teens would not feel uncomfortable, *“As a parent, I would*

think differently. But, as a teen, I do not think that my son or my daughter would realize that giving out personal information is somewhat troublesome” (Parent 1 / F).

Even if most of the teens would be likely to feel uncomfortable with the post, 3 of them stated that they would not use the “Report to parent” option. *“I am disproving of Josephine putting Eric’s address out there, I would not call on her out on it. I would not report her for it” (Teen 5 / 18 / M).* Half of the parents also agreed that their teens would not use this option but report to them in person. Nevertheless, most of the teens and parents agree that this option would be helpful in reducing risks to teens’ privacy on Facebook.

4.2.2 Message requesting personal information from the teen

All teens agree that they would be likely or very likely to feel uncomfortable with a disturbing message requesting personal information from them. All parents also agree that their teens would be likely or very likely to feel uncomfortable with that message.

Although all teens agree on their likelihood to feel uncomfortable, one of the teens note that he would not use the option but would report to Facebook as an abuse and unfriend the person sending that message. Similarly, even if all parents agree on the likelihood of their teens to feel uncomfortable, one of them has some doubts on her son’s likelihood to report the message to her. She believes that her son would just delete the message without taking any action.

All teens agreed that this option would be helpful in reducing risks to teens’ privacy on Facebook and their parents would be happy to use it. However, a teen noted that *“I just think that if you are gonna report to your parents, you should know how your parents would feel. There are some parents out there that instead of actually helping, they just make their child feel bad.” (Teen 6 / 18 / M).*

4.3 Usability Results for “Are you sure you want to continue?” Warnings

The second group of ideas proposes the popping up of warning messages in the form of “Are you sure you want to continue?” when the teen is about to:

- Share his or her current exact location publicly as a status update
- Share his or her future exact location publicly while creating an event
- Confirm a stranger adult as a friend

Many teens and parents agreed that the “*Are you sure you want to continue?*” warning message to pop up in case a teen intends to confirm a stranger adult as a friend would be effective in having the teens reconsider their decision and cancel confirming that person as a friend. This message was demonstrated in two different forms, one of which just provided the age, city and friendship information about the person sending the friend request, and the other one including a randomly selected real news story about a teen who experienced trouble as a result of becoming friends with a stranger adult on Facebook. Many teens and parents believed that the first form of warning message would be helpful for making teens to revise their friending decision. However, some teens and parents expressed doubts about the second form of warning message such as being scary or revictimizing.

On the other hand, some teens and parents believed that the remaining “*Are you sure you want to continue?*” warning messages to be popped up in case of teens’ intention to share exact location would not be much effective in grabbing the attention of the teens and having them revise their privacy preferences to target a smaller audience, either because the wording of the messages were viewed to be vague or improper and or due to teens’ tendency to skip warning messages without reading. These messages need to be improved for higher usability.

4.3.1 Publicly sharing current exact location

All but one of the teens agree that they would be likely or very likely to stop and change their privacy preferences from public to a smaller audience after reading the warning message at the time of sharing a public status update. However, only 3 of the parents believe that their teens would be likely or very likely to do so.

The teen that disagrees with the majority states that *“Not just for Facebook, but in general, I do have a habit of skipping (warning messages).”* (Teen 6 / 18 / M). One of the parents who believed that her teens would not feel uncomfortable points to teens’ tendency to ignore the sensitivity of exact location notes that *“My daughter, for instance, would just think ‘Whoever can come and meet us at Dunkin Donuts?’”* (Parent 1 / F).

All teens and all but one of the parents agree that this option would be helpful in reducing risks to teens’ privacy on Facebook. One of the teens says that *“I often forget to change the preferences and having a reminder would be nice.”* (Teen 3 / 16 / F). One of the parents note the requirement for going back and forth to change the privacy preference as an obstacle for teens. *“Unfortunately, in the mind of a teenager, they are thinking like this (going back and changing the privacy preferences) is a challenge.”* (Parent 2 / F).

4.3.2 Publicly sharing future exact location

3 of the teens believe that they would be likely or very likely to stop and change their privacy preference from public to a smaller audience after reading the warning message at the time of creating a public event, but the remaining 3 think that they would be unlikely or very unlikely to do so. 4 of the parents believe that their teens would be likely or very likely to change their privacy preference. One of the remaining parents state that *“I do not think they totally understand the difference between public and private.”* (Parent 1 / F).

All but two of the teens and all but one of the parents agree that this option would be helpful in reducing risks to teens’ privacy on Facebook. One of these teens says that *“I do not see any problem that would be anything.”* (Teen 1 / 15 / M) and the other one believes that warning messages are not deterrent at all. No obstacles are identified in the ideas other than teens’ likelihood of just clicking “Continue” without reading and without considering the consequences.

4.3.3 Confirming a stranger adult as a friend

None of the teens report being friends with a stranger on Facebook. All of them express knowing the person offline or having a good number of mutual friends as criteria for friending people on Facebook. Similarly, all parents report that they talked about their teens on this issue and warned them to friend only people that they know in person.

All teens agree that they would be unlikely or very unlikely to continue friending after reading either one of the warning messages at the time of friending a stranger adult with no mutual friends. Similarly, all parents believe that their teens would be unlikely or very unlikely to do so. All teens and all parents agree that this option would be helpful in reducing risks to teens' privacy on Facebook. However, they have different opinions about the second form of the warning message, which includes a random real news story about a teen who had some troubles with a stranger adult that she friended on Facebook, such as:

"No, don't do that! This (the second message) just assumes every men that sends a friend request is a pedophile." (Teen 2 / 15 / M)

"Clearly it is relevant, but also slightly offensive at the same time. I think it is over the top. Because that news story is about someone. So, I would not just want that news story put out and put out, like a revictimization. I mean if I was that 15 year old girl, I would not want that news story write there. I would be rather upset." (Teen 5 / 18 / M)

"That is a lot better, because maybe somebody that does not even care might care a little bit after reading this. That is good, because it shows an example of what can happen." (Teen 6 / 18 / M)

"That's a very powerful message but I do not know if it would send the right message to change their mind." (Parent 1 / F).

"(My daughter) might probably have nightmares for the rest of the week." (Parent 2 / F)

"If the first (warning message) did not do it (change their mind), this would definitely do it." (Parent 4 / M)

5 CONCLUSION

In this section, limitations imposed on the study are presented together with some suggestions for future research.

5.1 Limitations

One of the limitations imposed on the study is that the participants in the usability study were recruited in Pittsburgh, PA for convenience and they do not represent a meaningful sample of all teens of age 13 to 18 who actively use Facebook or of parents of such teens living in the United States or in other countries. In addition to that, the number of participants is statistically insufficient to derive generalizations regarding teens' and parents' perspectives on the research subject.

A diverse set of teens and parents was tried to be recruited for the usability study. No specific exclusion was applied while recruiting participants except the teens' age range and necessity of being active Facebook users. At the end, the ratio of males to females for the teens participated in the usability study turned out to be 2:1, which was pretty random. However, even if no exclusion was made based on gender, all but one of the parent participants was female, which constitutes a limitation for reflecting fathers' perspectives in the result. On the other hand, some interesting inferences can be made from this fact, such as fathers' unawareness or disinterestedness or unwillingness to discuss on their teens' use of Facebook or mothers' tendency to be more interested and/or more engaged in their teens' use of Facebook. The latter inference was also confirmed by the single father participant by mentioning that although both he and his wife are Facebook users and both are friends with their two sons on Facebook, he logs in to his account 3-4 times a month just to follow others' posts and updates whereas his wife checks in to her account and reviews their teens' posts and friends on a daily basis.

5.2 Suggestions for Future Research

As mentioned before, the improvement ideas proposed and evaluated in thesis study will constitute a part of the iterative design process to be completed within the course of the research project entitled “Helping Teens and Parents Negotiate Privacy”, which is scheduled to be completed in the next 3 years proposed by the CUPS at CMU. In the iterative process, these ideas and similar ideas to be conceptualized for other social media platforms and applications will be improved iteratively based on the feedback received from users in usability studies. Hence, the ideas in this study are not finalized and they are open to be improved further.

For the first group of ideas, which serve for allowing the teen to share any uncomfortable experience on Facebook with parents, two major sources of discomfort were identified as the posts shared by friends or the messages received from friends. In the usability study, the scenario associated with such a post included publicly sharing a home address and the scenario associated with such as message included requesting phone number from the teen. These scenarios can be modified to get user feedback on other types of basic personal information such as e-mail address or date of birth.

For the second group of ideas, which aims at nudging the teen to make better privacy decisions in cases when he or she is about to be engaged in risky interactions, two major potential risky interactions were identified as publicly sharing sensitive data and being friends with a stranger on Facebook. In the usability study, the scenarios associated publicly sharing sensitive data included sharing current exact location publicly as a status update or future exact location publicly while creating an event. These scenarios can also be modified to get user feedback on other types of sensitive personal information such as personal photos or videos.

For the second group of ideas, the warning messages in the form of “Are you sure you want to continue?” can be made more effective by rephrasing as “Do you want to share this post only with your friends or friends of friends?” or adding the dropdown box listing privacy preferences in the warning popup to eliminate the need for going back and forth to change the

preference or using some visual effects like highlighting some words or putting some danger signs etc. The effectiveness of these improvements can also be evaluated by conducting further usability studies. As (Sunshine, et al. 2009) suggest using ways in the background to prevent users from making unsafe connections would be much useful than using SSL warnings which users can not understand or which are not much effective at all, warnings in our case, which teens have a high tendency to skip or ignore, can be also minimized by finding ways like embedding them in the original Facebook page where a risky interaction is about to occur.

Also, the usability study can be performed with a greater number of teens and parents to include a richer variety of perspectives.

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APPENDIX 1

Carnegie Mellon University

Consent Form for Participation in Research for parent/teen # ____ (to be completed by the researcher)

Study Title: Evaluating the usability of suggested additions to social media applications for improving teens' online safety

Principal Investigator: Lorrie Faith Cranor

Professor at SCS/ISR and EPP, Carnegie Mellon University
5000 Forbes Avenue, Pittsburgh, PA 15213 Pittsburgh, PA,
412-2687534, lorrie@cs.cmu.edu

Other Investigator(s): Abigail Marsh, PhD student

Ayşe Gul Mirzaoglu, Master Student

Sponsor(s): Microsoft

Purpose of this Study

The purpose of the study is to contribute to the existing efforts for improving teens' online safety by proposing usable additions to social media applications widely used by teens. In this study, user feedback will be taken on the usability of the paper prototypes designed by the researchers. These paper prototypes are mockups drawn on paper demonstrating suggested additions to existing social media applications in an effort to improve teens' online privacy and security. The suggested additions are typically in the form of new features allowing teens to share any uncomfortable experiences with their parents or nudging teens to make more informed and rational privacy decisions. The usability of the paper prototypes will be evaluated by asking participants' opinions on the usefulness, ease of use and desirability of the suggested features.

Procedures

Participants will be interviewed in-person in order to get their feedback on the paper prototypes. Individual interviews will be made at the CMU Pittsburgh Campus and are expected to be completed in at most 1 hour.

In the first part of the interview, the participants will be asked to complete a short survey. The survey will include some demographic questions as well as other questions on the research subject such as how teens use social media applications and how parents are currently addressing their concerns about online risks surrounding their kids. In the second part of the interview, the paper prototypes will be shown to the participants and their opinions on the usefulness, ease of use and desirability of the suggested features will be asked. These opinions will then be used as feedback for evaluating the usability of the suggested features.

Audio recordings will be made during the interviews in order to facilitate the analysis of user feedback on the suggested features.

Participant Requirements

Teens using social media and parents of teens using social media will participate in the study. Teens will be of age 13 to 18. There is no range on the age of parents. For privacy reasons, the teens and parents participating in the study will not be from the same family.

For convenience, participants will be located in the Pittsburgh region. All Participants should understand and speak English. We will not specifically include or exclude individuals from minority groups. Teen participants must be actively using Facebook and parent participants must be the parents of such teens.

Risks

The risks and discomfort associated with participation in this study are no greater than those ordinarily encountered in daily life or during being trained in a classroom setting.

Benefits

There is no direct or indirect benefit to participants.

Compensation & Costs

Participants will be provided \$25 Amazon gift cards. The gift cards will be funded by Microsoft. There will be a transportation cost to reach the CMU campus for the participants.

Confidentiality

By participating in the study, you understand and agree that Carnegie Mellon may be required to disclose your consent form, data and other personally identifiable information as required by law, regulation, subpoena or court order. Otherwise, your confidentiality will be maintained in the following manner:

Your data and consent form will be kept separate. Your consent form will be stored in a locked location on Carnegie Mellon property and will not be disclosed to third parties. By participating, you understand and agree that the data and information gathered during this study may be used by Carnegie Mellon and published and/or disclosed by Carnegie Mellon to others outside of Carnegie Mellon. However, your name, address, contact information and other direct personal identifiers in your consent form will not be mentioned in any such publication or dissemination of the research data and/or results by Carnegie Mellon.

The researchers will take the following steps to protect participants' identities during this study: (1) Each participant will be assigned a number; (2) The researchers will record any data collected during the study by number, not by name; (3) The consent forms will be stored in a locked cabinet so that they will not be accessed by anyone other than the authorized researchers; (4) The audio recordings of the interviews will be stored in an encrypted hard drive.

Please initial here: _____YES _____NO

Rights

Your participation is voluntary. You are free to stop your participation at any point. Refusal to participate or withdrawal of your consent or discontinued participation in the study will not

result in any penalty or loss of benefits or rights to which you might otherwise be entitled. The Principal Investigator may at his/her discretion remove you from the study for any of a number of reasons. In such an event, you will not suffer any penalty or loss of benefits or rights which you might otherwise be entitled.

Right to Ask Questions & Contact Information

If you have any questions about this study, you should feel free to ask them now. If you have questions later, desire additional information, or wish to withdraw your participation please contact the Principal Investigator by mail, phone or e-mail in accordance with the contact information listed on the first page of this consent.

If you have questions pertaining to your rights as a research participant; or to report concerns to this study, you should contact the Office of Research Integrity and Compliance at Carnegie Mellon University. Email: irb-review@andrew.cmu.edu . Phone: 412-268-1901 or 412-268-5460.

Voluntary Consent

For Competent Adults (parents / teens of age 18)

By signing below, you agree that the above information has been explained to you and all your current questions have been answered. You are encouraged ask questions about any aspect of this research study during the course of the study and in the future. By signing this form, you agree to participate in this research study.

PARTICIPANT SIGNATURE

DATE

I certify that I have explained the nature and purpose of this research study to the above individual and I have discussed the potential benefits and possible risks of participation in the study. Any questions the individual has about this study have been answered and any future questions will be answered as they arise.

SIGNATURE OF PERSON OBTAINING CONSENT

DATE

IRB No: HS15-228
Approved: 04/16/2015
Expires: 04/15/2016
Modified:

Version 6.2013

Carnegie Mellon University

Consent Form for Participation in Research for teen # ____ (to be completed by the researcher)

Study Title: Evaluating the usability of suggested additions to social media applications for improving teens' online safety

Principal Investigator: Lorrie Faith Cranor

Professor at SCS/ISR and EPP, Carnegie Mellon University
5000 Forbes Avenue, Pittsburgh, PA 15213 Pittsburgh, PA,
412-2687534, lorrie@cs.cmu.edu

Other Investigator(s): Abigail Marsh, PhD student

Ayşe Gul Mirzaoglu, Master Student

Sponsor(s): Microsoft

Purpose of this Study

The purpose of the study is to contribute to the existing efforts for improving teens' online safety by proposing usable additions to social media applications widely used by teens. In this study, user feedback will be taken on the usability of the paper prototypes designed by the researchers. These paper prototypes are mockups drawn on paper demonstrating suggested additions to existing social media applications in an effort to improve teens' online privacy and security. The suggested additions are typically in the form of new features allowing teens to share any uncomfortable experiences with their parents or nudging teens to make more informed and rational privacy decisions. The usability of the paper prototypes will be evaluated by asking participants' opinions on the usefulness, ease of use and desirability of the suggested features.

Procedures

Participants will be interviewed in-person in order to get their feedback on the paper prototypes. Individual interviews will be made at the CMU Pittsburgh Campus and are expected to be completed in at most 1 hour.

In the first part of the interview, the participants will be asked to complete a short survey. The survey will include some demographic questions as well as other questions on the research subject such as how teens use social media applications and how parents are currently addressing their concerns about online risks surrounding their kids. In the second part of the interview, the paper prototypes will be shown to the participants and their opinions on the usefulness, ease of use and desirability of the suggested features will be asked. These opinions will then be used as feedback for evaluating the usability of the suggested features.

Audio recordings will be made during the interviews in order to facilitate the analysis of user feedback on the suggested features.

Participant Requirements

Teens using social media and parents of teens using social media will participate in the study. Teens will be of age 13 to 18. There is no range on the age of parents. For privacy reasons, the teens and parents participating in the study will not be from the same family.

For convenience, participants will be located in the Pittsburgh region. All Participants should understand and speak English. We will not specifically include or exclude individuals from minority groups. Teen participants must be actively using Facebook and parent participants must be the parents of such teens.

Risks

The risks and discomfort associated with participation in this study are no greater than those ordinarily encountered in daily life or during being trained in a classroom setting.

Benefits

There is no direct or indirect benefit to participants.

Compensation & Costs

Participants will be provided \$25 Amazon gift cards. The gift cards will be funded by Microsoft. There will be a transportation cost to reach the CMU campus for the participants.

Confidentiality

By participating in the study, you understand and agree that Carnegie Mellon may be required to disclose your consent form, data and other personally identifiable information as required by law, regulation, subpoena or court order. Otherwise, your confidentiality will be maintained in the following manner:

Your data and consent form will be kept separate. Your consent form will be stored in a locked location on Carnegie Mellon property and will not be disclosed to third parties. By participating, you understand and agree that the data and information gathered during this study may be used by Carnegie Mellon and published and/or disclosed by Carnegie Mellon to others outside of Carnegie Mellon. However, your name, address, contact information and other direct personal identifiers in your consent form will not be mentioned in any such publication or dissemination of the research data and/or results by Carnegie Mellon.

The researchers will take the following steps to protect participants' identities during this study: (1) Each participant will be assigned a number; (2) The researchers will record any data collected during the study by number, not by name; (3) The consent forms will be stored in a locked cabinet so that they will not be accessed by anyone other than the authorized researchers; (4) The audio recordings of the interviews will be stored in an encrypted hard drive.

Please initial here: ☐ YES ☐ NO

Rights

Your participation is voluntary. You are free to stop your participation at any point. Refusal to participate or withdrawal of your consent or discontinued participation in the study will not result in any penalty or loss of benefits or rights to which you might otherwise be entitled. The Principal Investigator may at his/her discretion remove you from the study for any of a number of reasons. In such an event, you will not suffer any penalty or loss of benefits or rights which you might otherwise be entitled.

Right to Ask Questions & Contact Information

If you have any questions about this study, you should feel free to ask them now. If you have questions later, desire additional information, or wish to withdraw your participation please contact the Principal Investigator by mail, phone or e-mail in accordance with the contact information listed on the first page of this consent.

If you have questions pertaining to your rights as a research participant; or to report concerns to this study, you should contact the Office of Research Integrity and Compliance at Carnegie Mellon University. Email: irb-review@andrew.cmu.edu . Phone: 412-268-1901 or 412-268-5460.

Voluntary Consent

For Minors (teens of age below 18)

Parent of the minor:

By signing below, you agree that the above information has been explained to you and all your current questions have been answered. You understand that you may ask questions about any aspect of this research study during the course of the study and in the future. By signing this form, you agree that your child may participate in this research study.

PARENT SIGNATURE

DATE

PRINT THE CHILD'S NAME

Minor's Assent:

This research has been explained to me and I agree to participate.

MINOR'S SIGNATURE

DATE

I certify that I have explained the nature and purpose of this research study to the above individual and I have discussed the potential benefits and possible risks of participation in the study. Any questions the individual has about this study have been answered and any future questions will be answered as they arise.

SIGNATURE OF PERSON OBTAINING CONSENT

DATE

IRB No: HS15-228

Approved: 04/16/2015

Expires: 04/15/2016

Modified:

Version 6.2013

APPENDIX 2

Teen interview script for the protocol “Evaluating the usability of suggested additions to Facebook for improving teens’ online safety”

The following is a preliminary version of the interview script for teen participants. We will ask these questions or questions of a similar nature to our teen participants.

A. Introduction

{Good morning/good afternoon} and welcome to our study, my name is _____ and my colleague’s name is _____. We will be moderating your interview today.

To begin, we would like you to review the consent form. It contains important information about today’s interview. If you have any questions about it, please ask us.

{To the parent of the teen} If you consent to the terms in the form and allow your child to participate in the study, please sign the form.

{To the teen} If you would like to participate in the study, please sign the form to give your assent and hand it back to us.

In this study, we are interviewing a group of teens aged 13 to 18 and are actively using Facebook, and a group of parents of such teens. The purpose of the study is to contribute to the existing efforts for improving teens' online safety. We have six possible improvement ideas to Facebook user interface that would make it more friendly for teens and parents to use and to communicate. These are typically in the form of new features allowing teens to share any uncomfortable experiences with their parents or nudging teens to make more informed and rational privacy decisions. Our goal is to figure out whether you find these ideas usable and how to make them more usable based on your suggestions.

During this interview, I will first ask you some background questions. Then, I will demonstrate you six possible improvement ideas for Facebook by using paper prototypes, in

other words some mockups drawn on paper. Finally, I will ask your opinions on the usefulness, ease of use and desirability of these ideas. Note that these are not in any way things that have been done with Facebook's knowledge or permission nor we will be actually changing Facebook. These are just conceptual ideas to be reflected on paper for the sake of demonstration.

Sometimes, I may be reading from the interview script just to be sure that we have addressed all questions included. None of the questions will investigate any personally identifiable details about you or your family. You are free to choose not to answer any questions, or to stop the interview at any point if you feel uncomfortable. Your honest responses are very valuable for us.

Also, we would like to make an audio recording of this session for facilitating the analysis of your responses. This recording will only be used for the purposes of this study and will only be accessible to the researchers.

Now, I would like you to answer the questions on the form that I will be distributing in a minute. Please take your time to read and answer these questions to the fullest extent possible. Please do not divulge any identifiable private information about another person as we do not have permission from those individuals to have that information. Whenever you are ready, we can start the next part of our study.

B. Background questions

1. Age:
2. Gender: (M / F)
3. Grade in school:
4. When did you start using Facebook?

5. Are you friends with your parents on Facebook?

- ☐ No ☐ Yes, only with my ☐ Yes, with both of them

6. What kinds of personal information do you publicly share on Facebook?

- ☐ Real name and last name ☐ Home address
☐ Phone number ☐ School name
☐ Location ☐ Other (Please explain below)

7. Have you ever adjusted any of the Facebook privacy settings?

- ☐ I am not aware of those settings
☐ I am aware of them, but not sure about how and when to adjust them
☐ I am aware of them, but have never felt the need to adjust them
☐ I have adjusted the settings once or more in order to:

8. Have you ever reported to Facebook any age-inappropriate content that made you feel uncomfortable?

- ☐ I am not aware of the option of reporting age-inappropriate content to Facebook
☐ I am aware of that option, but not sure about how and when to use it
☐ I am aware of that option, but have never felt uncomfortable with any content on Facebook

☐ I have used that option once or more in order to:

9. Do you have any criteria for adding friends in Facebook?

☐ No

☐ Yes (Please explain below)

10. Which properties of Facebook make you feel comfortable about your online safety?

(Check all that apply)

☐ Existence of a privacy policy

☐ Existence of privacy settings

☐ Being friends with your parents

☐ Other (Please explain below)

11. Which of the following risks make you feel uncomfortable about your online safety while using Facebook? (Check all that apply)

☐ That my personal data may be publicly accessible

☐ That I may be exposed to age-inappropriate content

☐ That I may be contacted by strangers

☐ Other (Please explain below)

12. How likely do you think you might engage in some sort of risky interactions through Facebook?

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

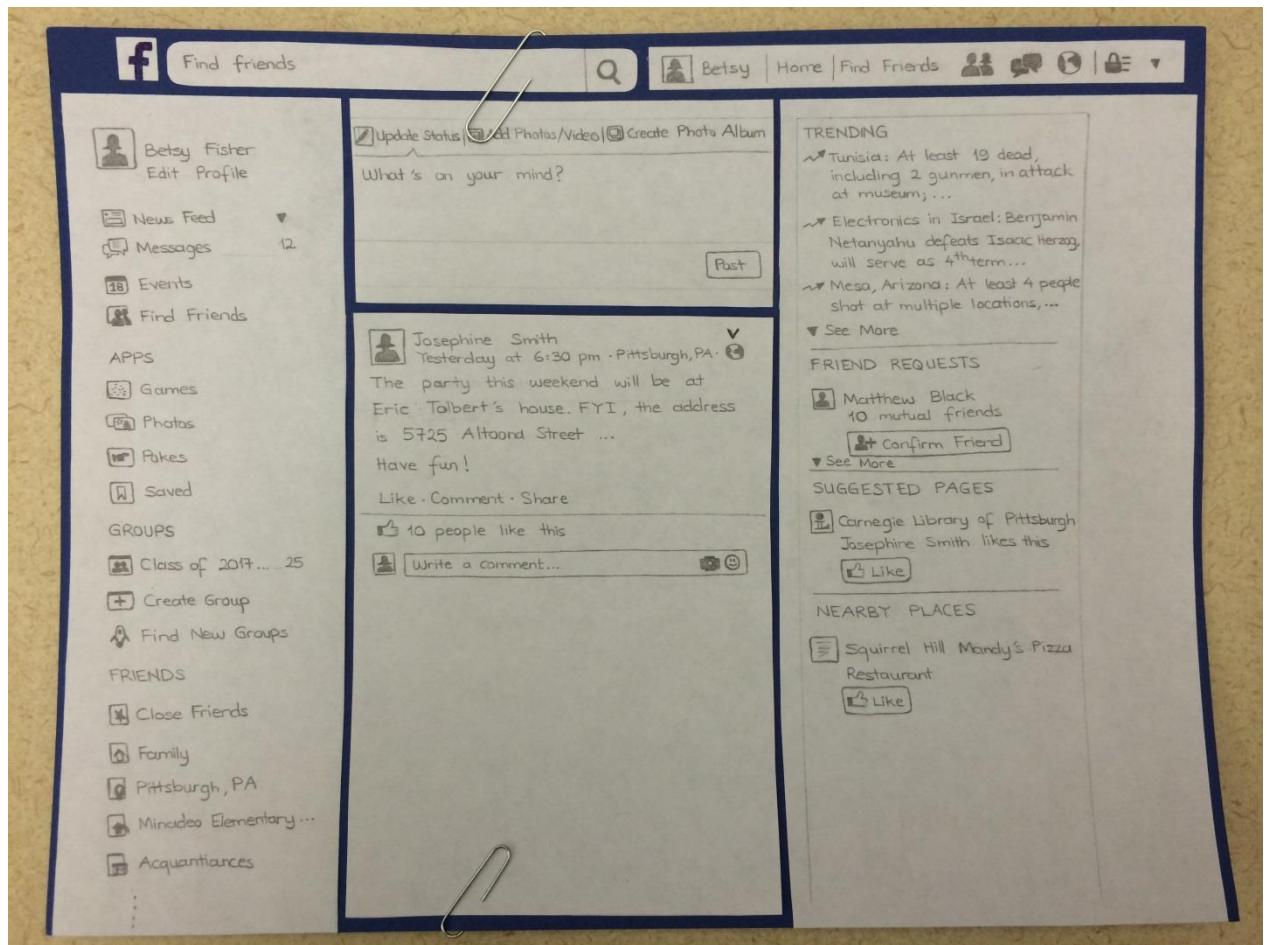
C. Questions for evaluating the usability of possible improvement ideas to Facebook

In this part of the study, by using paper prototypes, I will demonstrate six possible improvement ideas for Facebook. Each prototype is associated with a scenario of events occurring based on the actions of an imaginary teenager Betsy Fisher and her imaginary Facebook friends. For each idea, we will ask some questions and request your opinions about them. Again, please do not divulge any identifiable private information about another person while answering the questions.

Now, let's start reviewing the prototypes. Note that we are not testing you, instead we are just testing the usability of the six features that we will demonstrate on paper prototypes.

Prototype 1: A friend of Betsy publicly posts personally identifiable information.

Let's look at the first prototype:

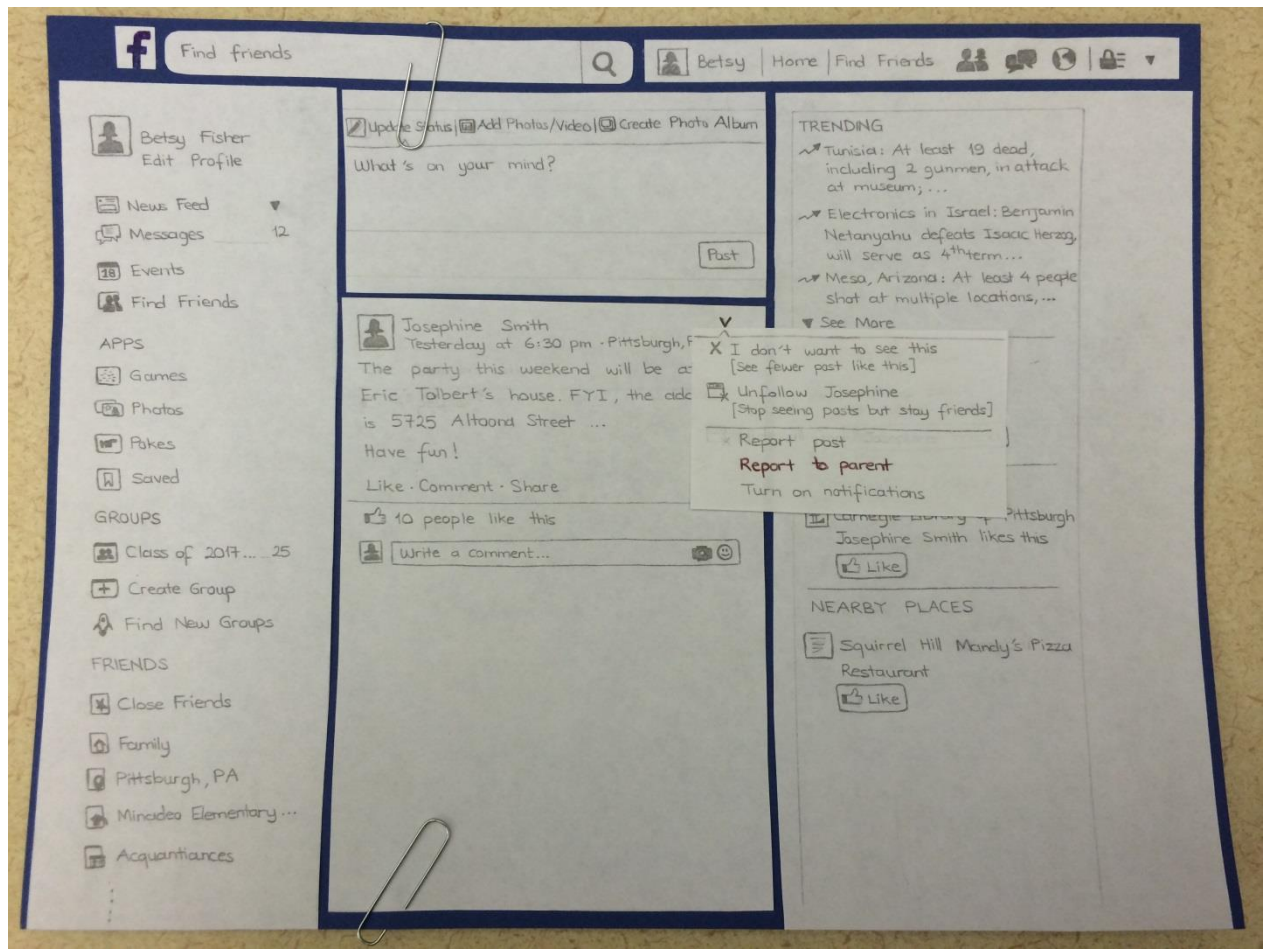


As you see, a friend of Betsy, Josephine, shares a public post and the post includes the home address of one of their mutual friends, Eric. The post includes the message “The party...”.

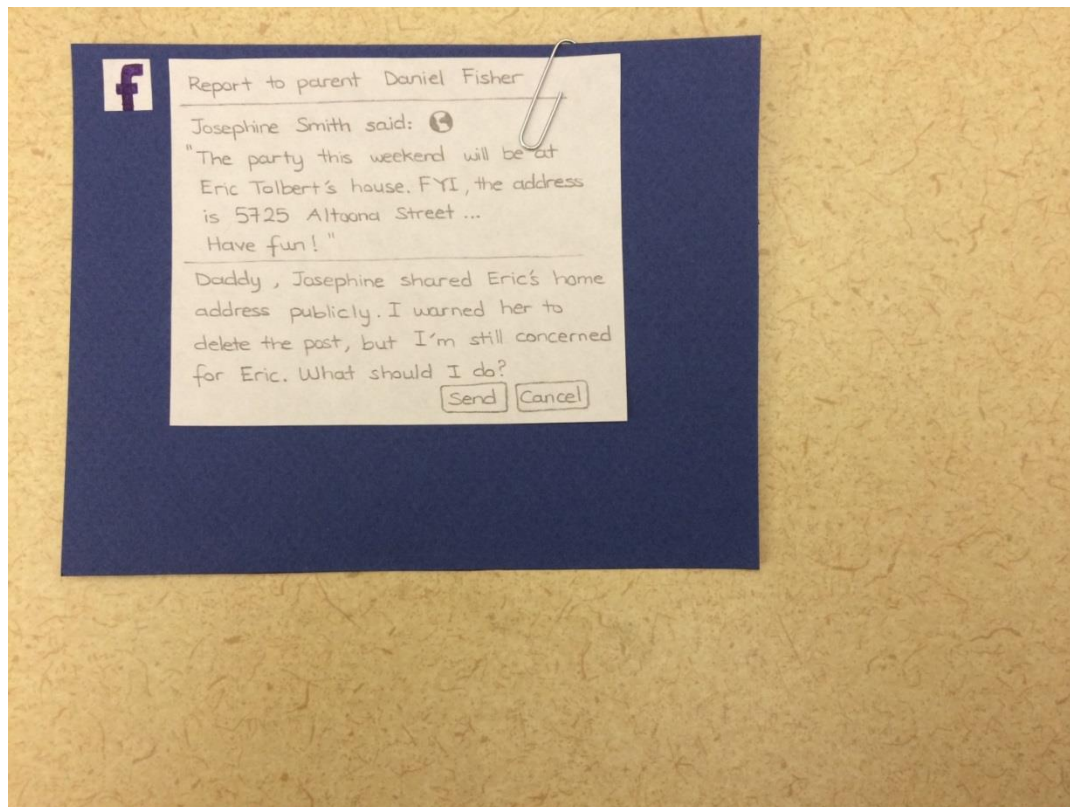
- **Think of a situation like this. If you were Betsy, how likely do you think you would feel uncomfortable with this post?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Imagine that Betsy feels somewhat uncomfortable with this post since Josephine publicly shares Eric’s home address. Here, the first idea steps in. Let’s see it:



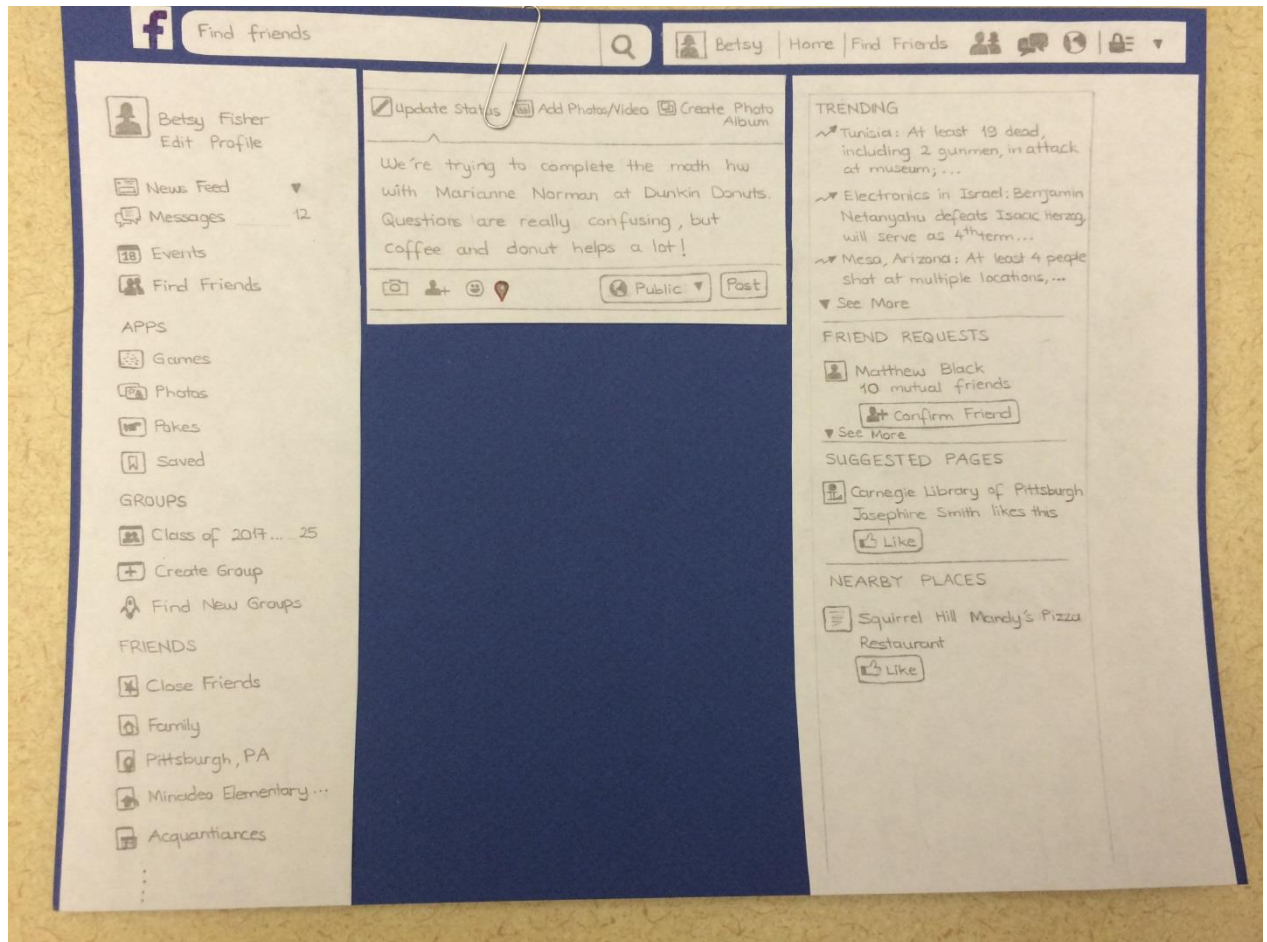
As you see, this idea involves the addition of “Report to parent” option to the existing options provided by Facebook for each post. Imagine that Betsy selects this option to share her feeling of discomfort with one of her parents. Then, a popup screen appears for Betsy to type in a message and send it to her father, as follows:



- **If you were Betsy, how likely do you think you would be using this feature?**
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely
- **How likely do you think other teens would be using this feature?**
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

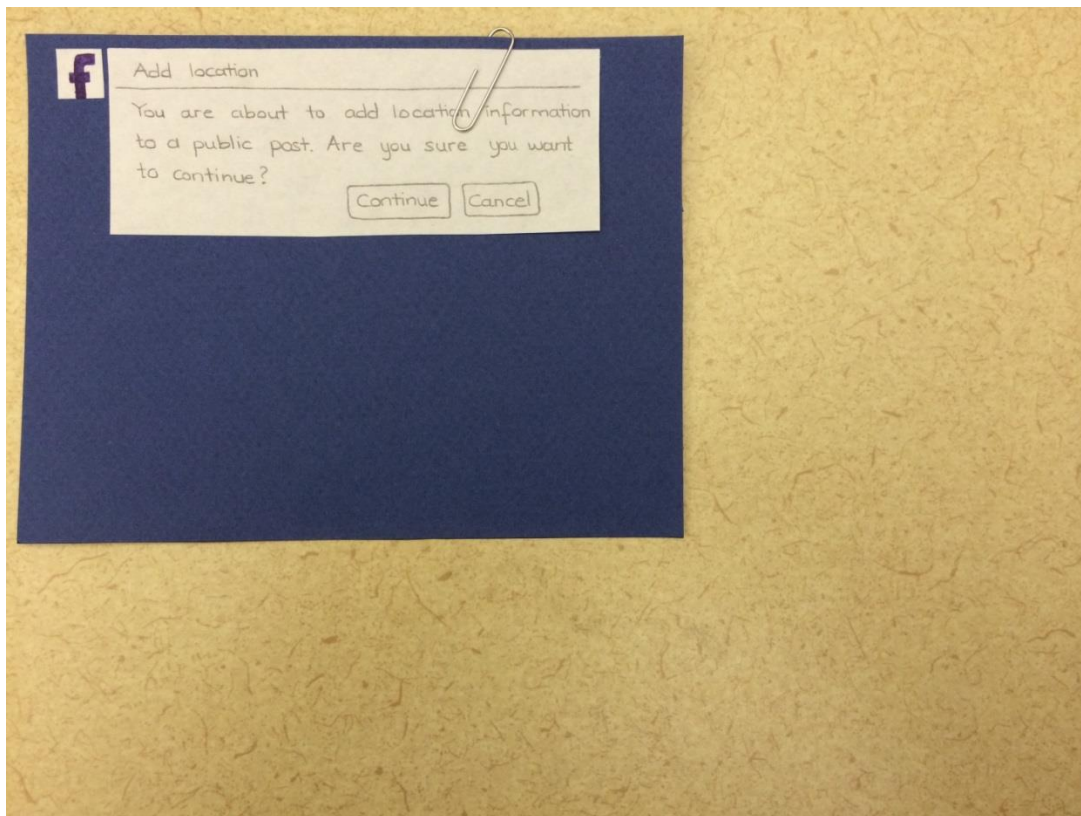
Prototype 2: Betsy publicly posts personally identifiable information.

Let's look at the second prototype:



As you see, Betsy herself shares a public post this time. The post includes the message “We’re trying to...”. Imagine that Betsy wants to add the exact location of the Dunkin Donuts in which she is currently with her friend Marianne.

When Betsy clicks / touches on the location symbol below the message to add her exact location, the second idea steps in and a popup screen appears for warning Betsy to confirm her post. Let’s see it:



- **If you were Betsy, how likely do you think you would stop and change your privacy preferences when you read this warning?**

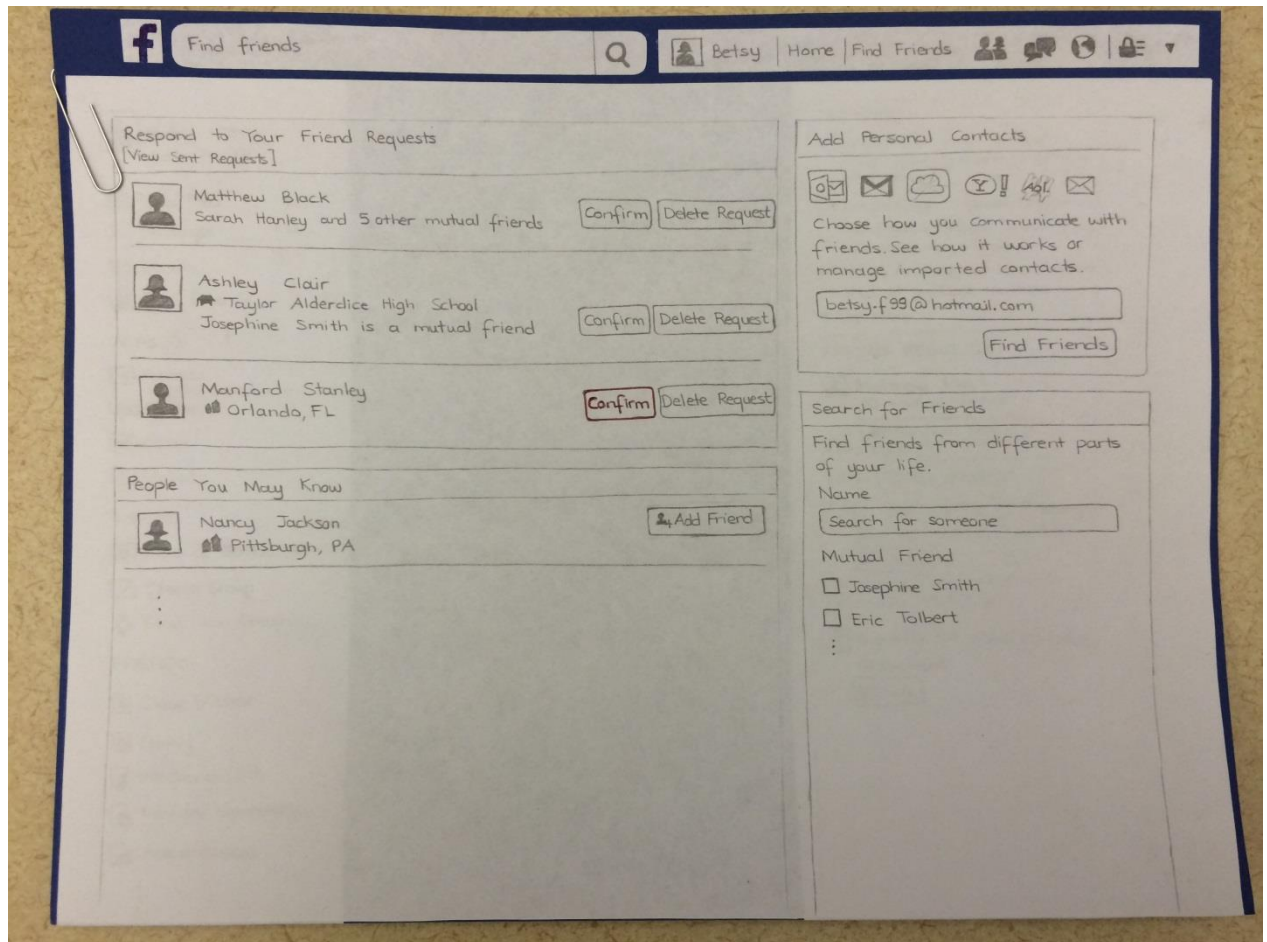
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

- **How likely do you think other teens would stop and change their privacy preferences when they read this warning?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Prototype 3: Betsy confirms a stranger as a Facebook friend.

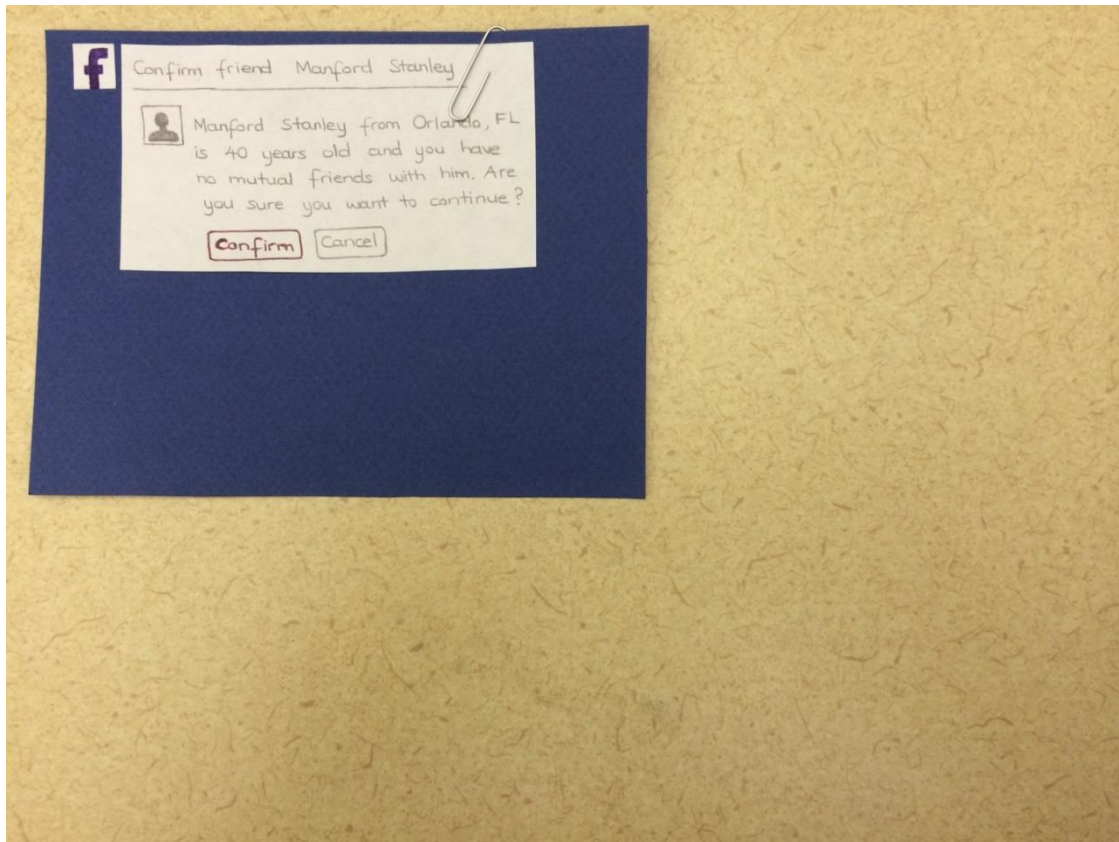
Let's look at the third prototype:



As you see, Betsy sees a number of friend requests here. One of the requests comes from Manfred, who is an adult and has no mutual friends with Betsy.

- **Have you ever been friends with a stranger on Facebook?**

Imagine that Betsy wants to confirm Manfred as a friend and clicks / touches on the "Confirm" button. Now, the third idea steps in and a popup screen appears for warning Betsy to review her decision about confirming Manfred as a friend. This warning may be in one of the two following forms. The first one may be similar to the following:



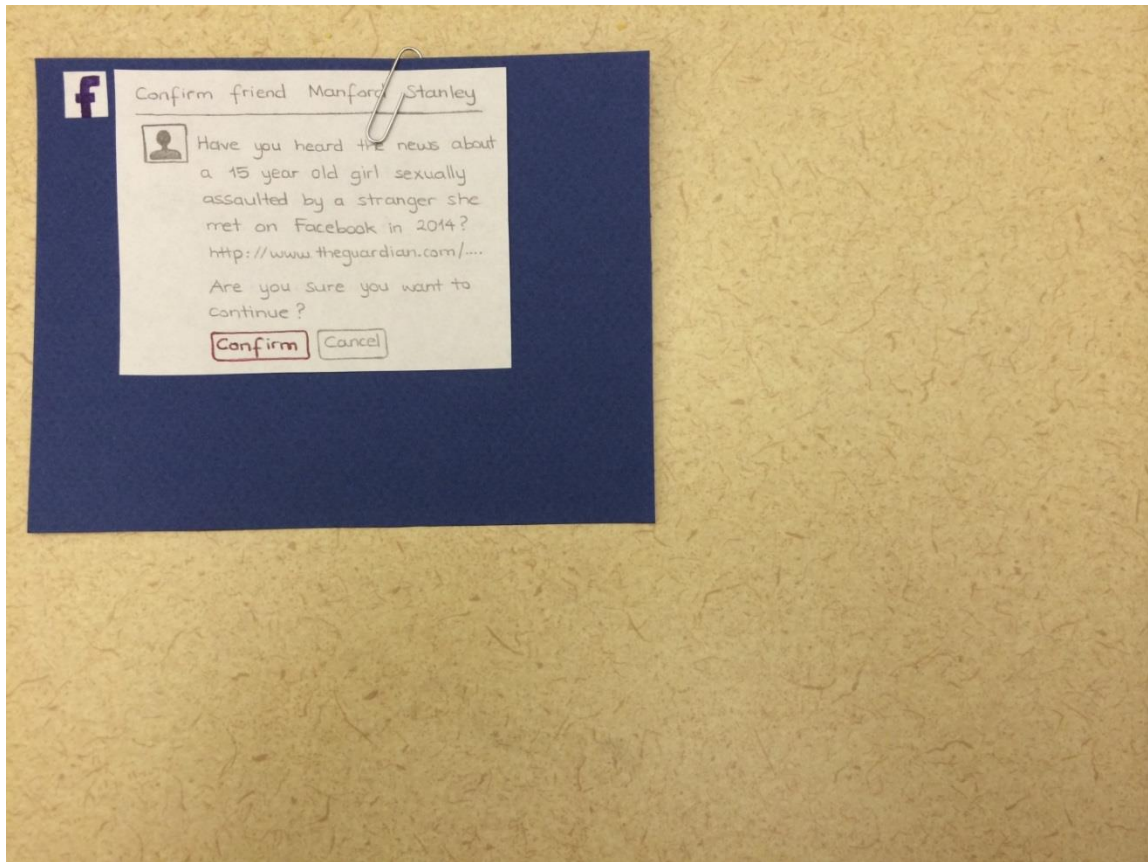
- **If you were Betsy, how likely do you think you would continue confirming Manford as a friend when you read this warning?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

- **How likely do you think other teens would continue confirming Manford as a friend when they read this warning?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Let's see the second one:



- **If you were Betsy, how likely do you think you would continue confirming Manford as a friend when you read this warning?**

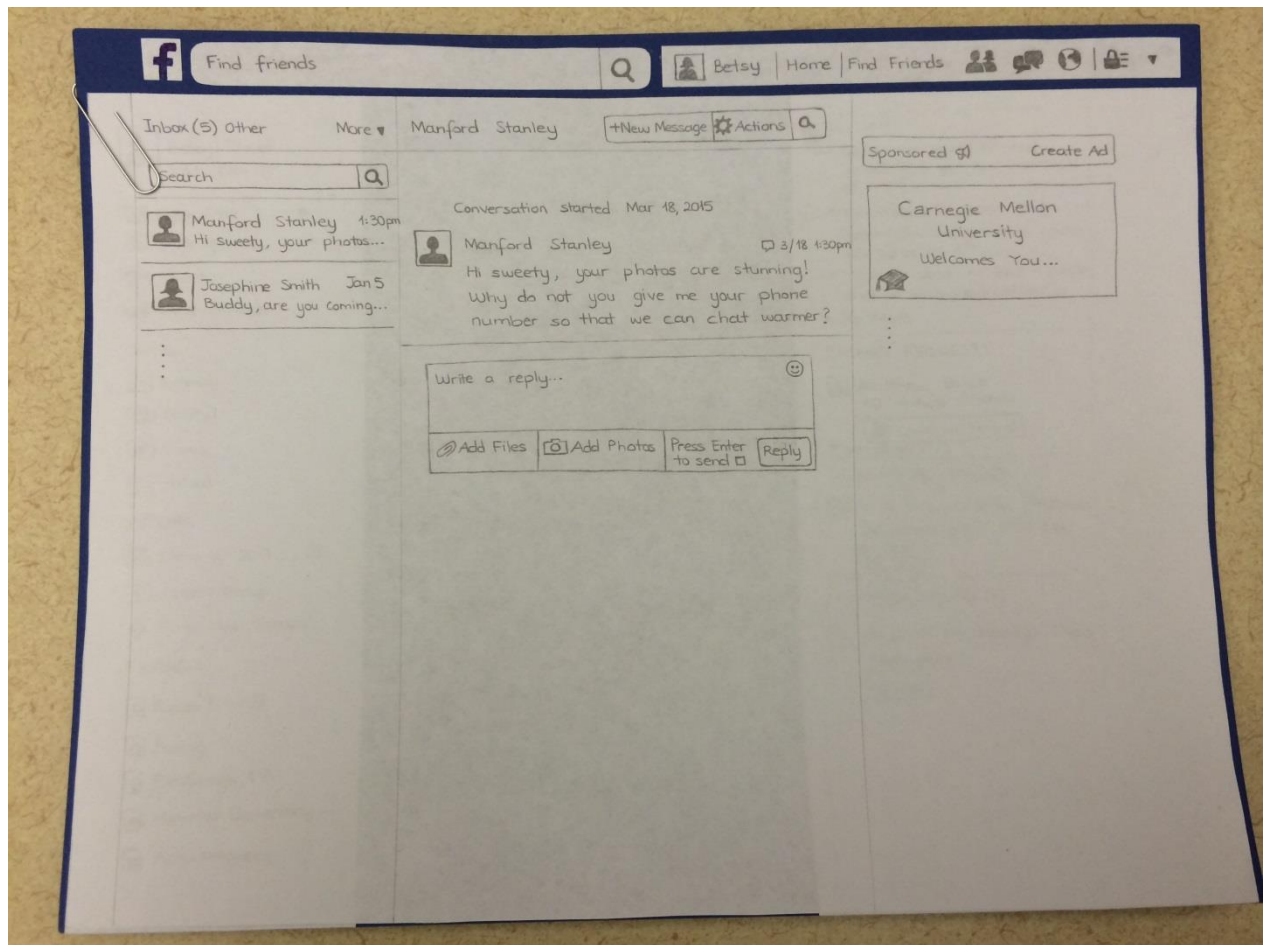
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

- **How likely do you think other teens would continue confirming Manford as a friend when they read this warning?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Prototype 4: Manford sends a disturbing message to Betsy.

Let's look at the fourth prototype:

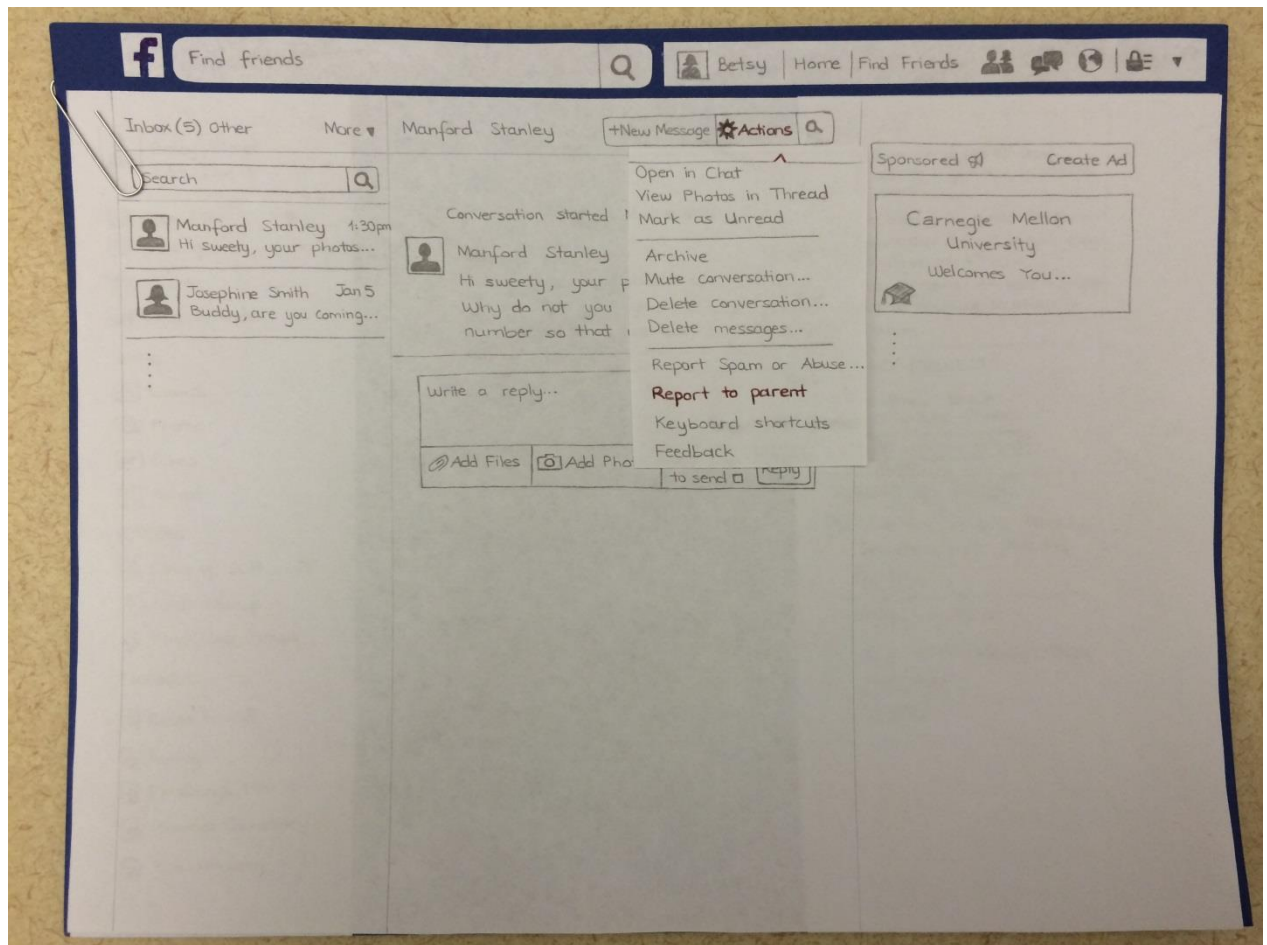


As you see, Betsy sees a number of messages from her friends here. One of the messages comes from her newly added friend Manford. The message is “Hi sweetie, ...”.

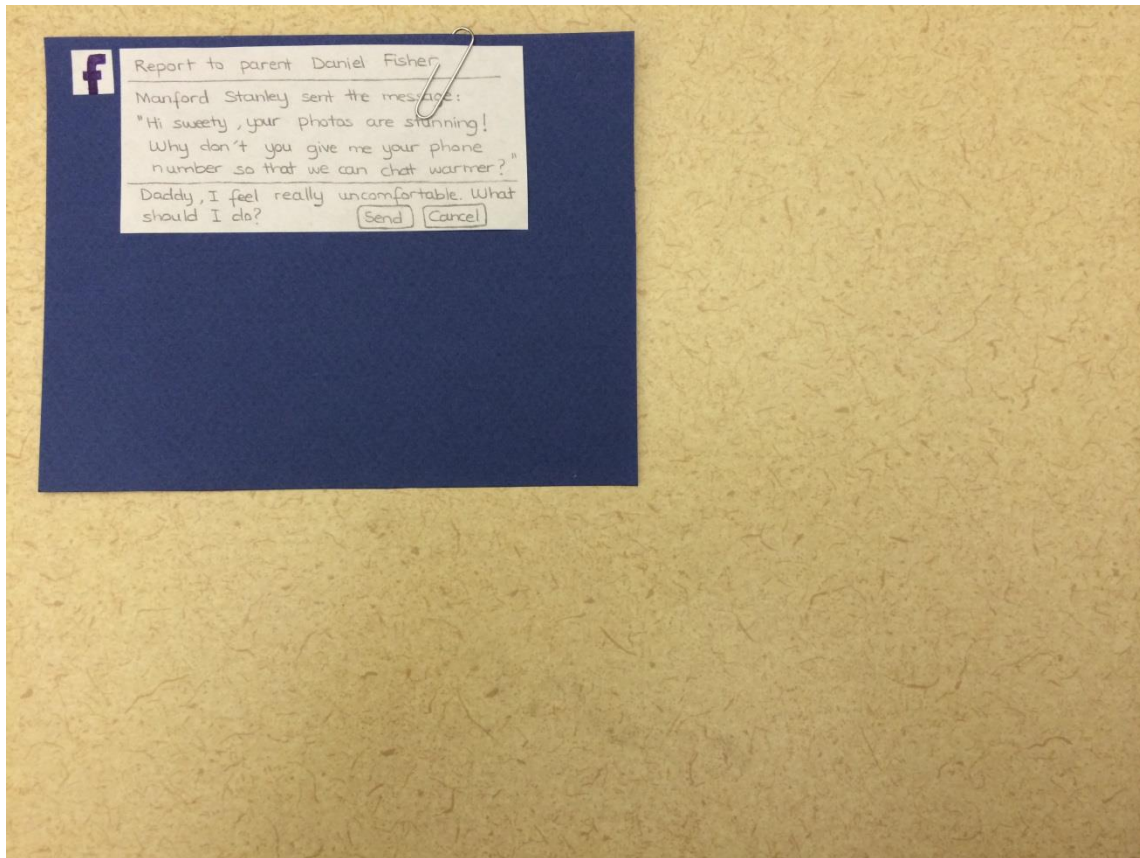
- **Think of a situation like this. If you were Betsy, how likely do you think you would feel uncomfortable with this message?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Imagine that Betsy feels somewhat uncomfortable with this message. Here, the fourth idea steps in. Let's see it:



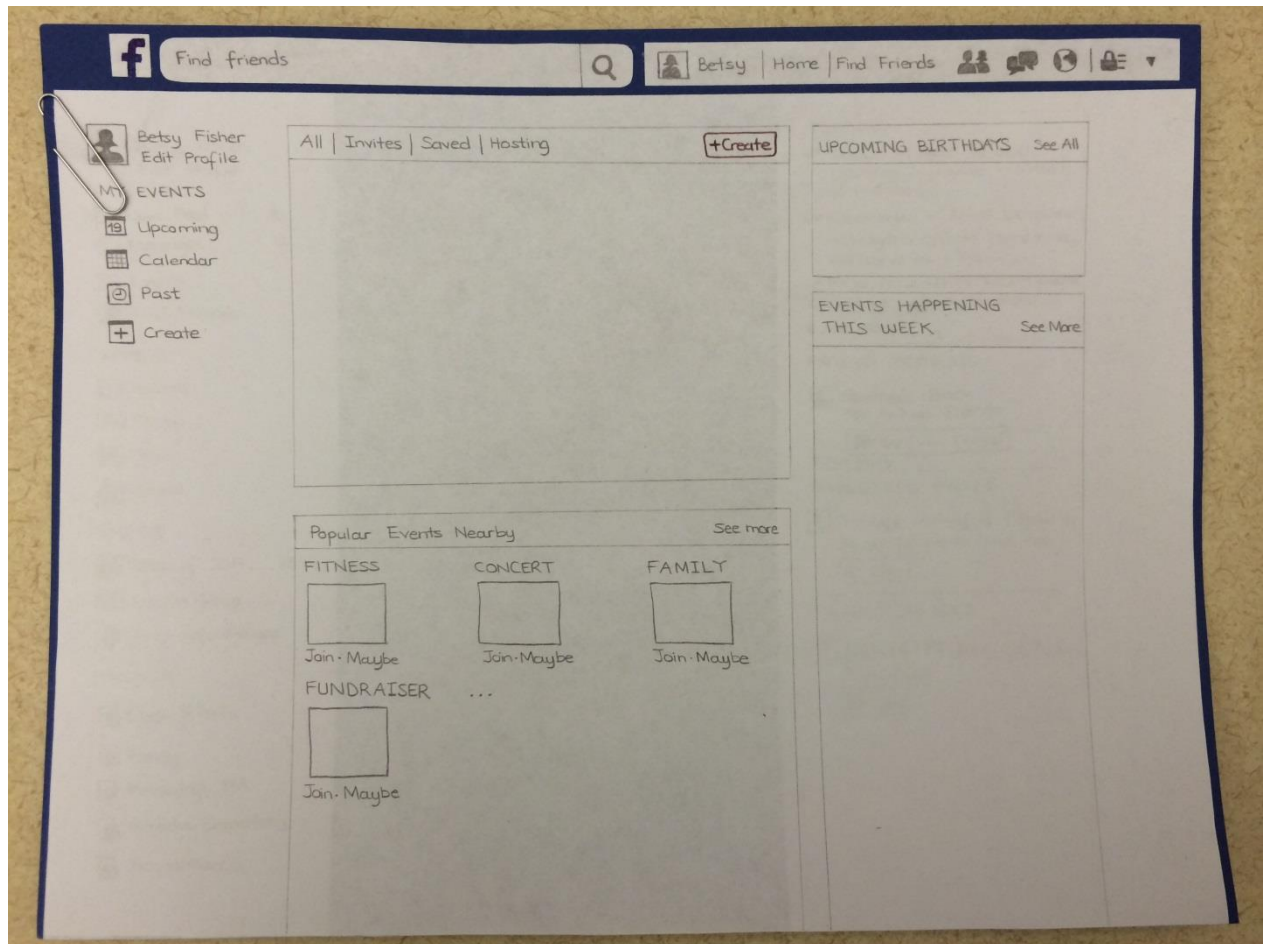
As you see, this feature involves the addition of “Report to parent” option to the existing “Actions” list provided by Facebook for each message. Imagine that Betsy selects this option to share her feeling of discomfort with one of her parents. Then, a popup screen appears for Betsy to type in a message and send it to her father, as follows:



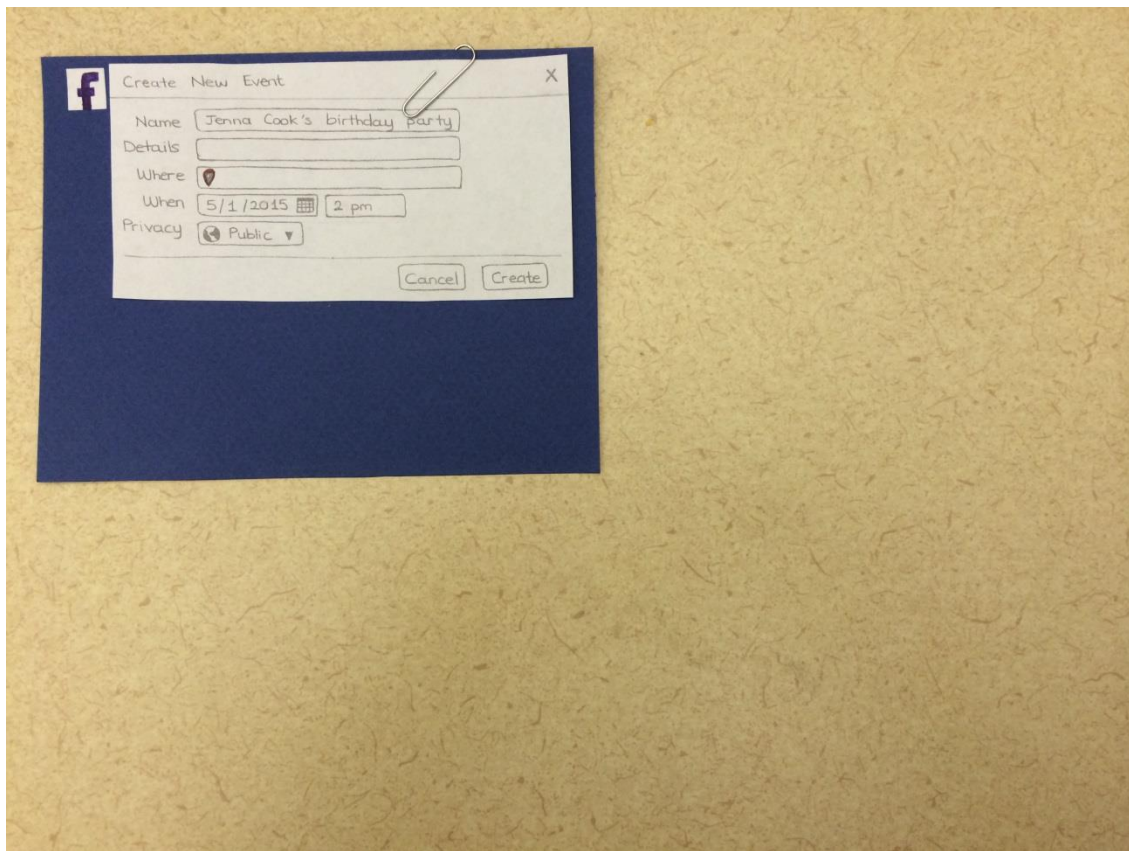
- **If you were Betsy, how likely do you think you would be using this feature?**
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely
- **How likely do you think other teens would be using this feature?**
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Prototype 5: Betsy publicly posts the time and location of an event.

Let's look at the fifth prototype:

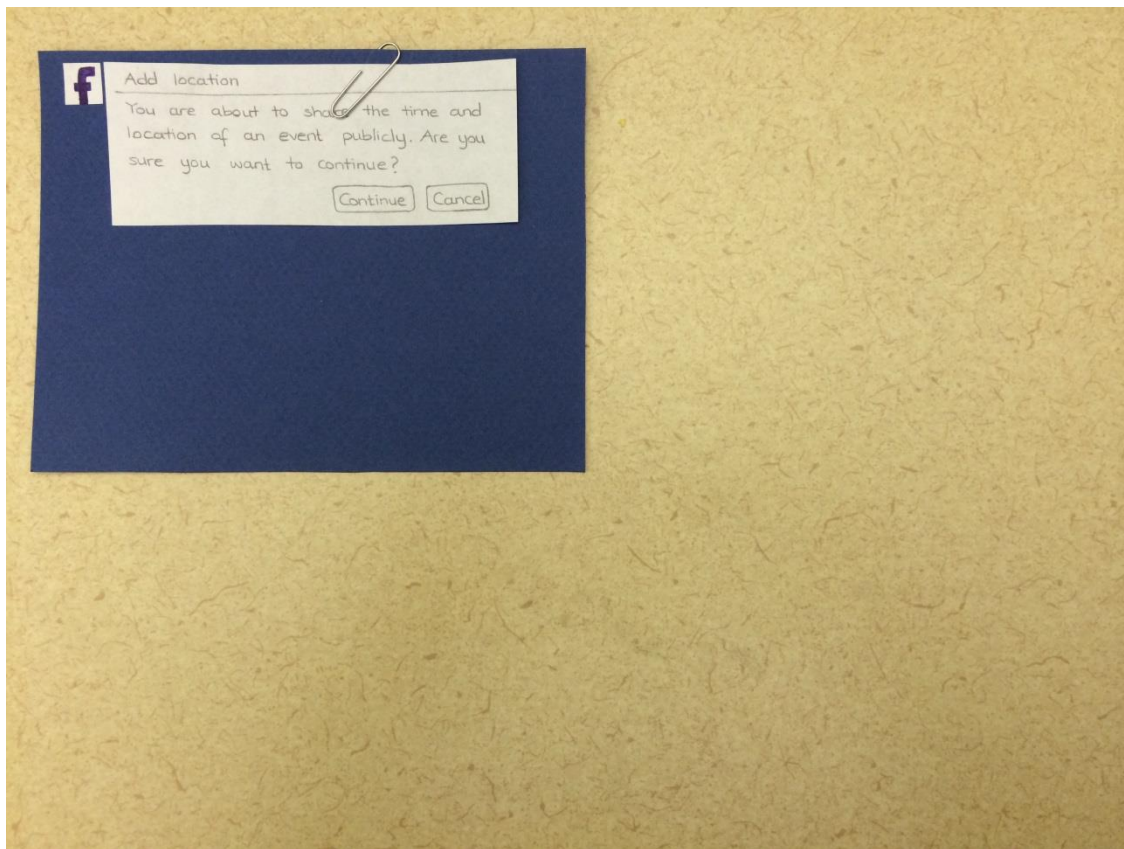


As you see, Betsy creates a new event here. When she touches / clicks on the “Create” button, a popup screen appears to allow Betsy to enter the details of the event. Note that this popup screen is not a proposed feature, instead it is already provided by Facebook, and it is as follows:



As you see, Betsy creates this event for announcing Jenna's birthday party publicly. Imagine that she enters the date and time of the party and then wants to add the location information.

When Betsy clicks / touches on the location symbol to add the exact location of the party, the fifth idea steps in and a popup screen appears for warning Betsy to confirm her post. Let's see it:



- **If you were Betsy, how likely do you think you would continue sharing this post publicly when you read this warning?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

- **How likely do you think other teens would continue sharing this post publicly when they read this warning?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Common questions to be asked for each prototype:

- **Do you think that this idea would be helpful for reducing the risks to your online safety?**
- **Would your family use this idea?**

- **Are there any obstacles to using this idea, including discomfort or confusion?**
- **Is there anything that would make this idea better?**

Final question to be asked after finishing all prototypes:

- **Of all the ideas discussed today, which one(s) do you think would be the most helpful for reducing the risks to your online safety?**

D. Ending the interview

Thank you for coming here and helping us today. We really appreciate your opinions and suggestions. We hope that you had a pleasant experience.

APPENDIX 3

Parent interview script for the protocol “Evaluating the usability of suggested additions to Facebook for improving teens’ online safety”

E. Introduction

{Good morning/good afternoon} and welcome to our study, my name is _____ and my colleague’s name is _____. We will be moderating your interview today.

To begin, we would like you to review the consent form. It contains important information about today’s interview. If you have any questions about it, please ask us.

If you consent to the terms in the form and would like to participate in the study, please sign the form and hand it back to us.

In this study, we are interviewing a group of teens aged 13 to 18 and are actively using Facebook, and a group of parents of such teens. The purpose of the study is to contribute to the existing efforts for improving teens' online safety. We have six possible improvement ideas to Facebook user interface that would make it more friendly for teens and parents to use and to communicate. These are typically in the form of new features allowing teens to share any uncomfortable experiences with their parents or nudging teens to make more informed and rational privacy decisions. Our goal is to figure out whether you find these ideas usable and how to make them more usable based on your suggestions.

During this interview, I will first ask you some background questions. Then, I will demonstrate you six possible improvement ideas for Facebook by using paper prototypes, in other words some mockups drawn on paper. Finally, I will ask your opinions on the usefulness, ease of use and desirability of these ideas. Note that these are not in any way things that have been done with Facebook’s knowledge or permission nor we will be actually changing Facebook. These are just conceptual ideas to be reflected on paper for the sake of demonstration.

Sometimes, I may be reading from the interview script just to be sure that we have addressed all questions included. None of the questions will investigate any personally identifiable details about you or your family. You are free to choose not to answer any questions, or to stop the interview at any point if you feel uncomfortable. Your honest responses are very valuable for us.

Also, we would like to make an audio recording of this session for facilitating the analysis of your responses. This recording will only be used for the purposes of this study and will only be accessible to the researchers.

Now, I would like you to answer the questions on the form that I will be distributing in a minute. Please take your time to read and answer these questions to the fullest extent possible. Please do not divulge any identifiable private information about another person as we do not have permission from those individuals to have that information. Whenever you are ready, we can start the next part of our study.

F. Background questions

1. Gender: (M / F)

2. Please write down the following information about your teen(s) who actively use Facebook.

Age	Gender	Are you friends on Facebook?	About when he/she started using Facebook?
<input type="text"/>	<input type="text"/> (M / F)	<input type="text"/> (Y / N)	<input type="text"/>
<input type="text"/>	<input type="text"/> (M / F)	<input type="text"/> (Y / N)	<input type="text"/>
<input type="text"/>	<input type="text"/> (M / F)	<input type="text"/> (Y / N)	<input type="text"/>
<input type="text"/>	<input type="text"/> (M / F)	<input type="text"/> (Y / N)	<input type="text"/>

3. Have you ever talked with your teen(s) about when and how to adjust Facebook privacy settings?

☐ I am not aware of those settings

☐ I am aware of them, but have never talked with my teen(s) about them

☐ I have talked with my teen(s) about them once or more (Please explain below)

4. Have you ever talked with your teen(s) about reporting to Facebook any age-inappropriate content that makes them feel uncomfortable?

☐ I am not aware of the option of reporting age-inappropriate content to Facebook

☐ I am aware of that option, but have never talked with my teen(s) about it

☐ I have talked with my teen(s) about that option once or more (Please explain below)

5. Have you ever talked with your teen(s) about their criteria as a teen about what types of people they should be friending on Facebook?

☐ No

☐ Yes (Please explain below)

6. Which properties of Facebook make you feel comfortable about your teen(s)' online safety?
(Check all that apply)

☐ Existence of a privacy policy

☐ Existence of privacy settings

☐ Being friends with your teen(s)

☐ Other (Please explain below)

7. Which of the following possible risks make you feel uncomfortable about your teen(s)' online safety while using Facebook? (Check all that apply)

- ☐ That your teen(s)' personal data may be publicly accessible
- ☐ That your teen(s) may be exposed to age-inappropriate content
- ☐ That your teen(s) may be contacted by strangers
- ☐ Other (Please explain below)

8. How likely do you think your teen(s) might engage in some sort of risky interactions through Facebook?

- ☐ Very likely
- ☐ Likely
- ☐ Neither likely nor unlikely
- ☐ Unlikely
- ☐ Not at all

9. Are you using any methods to ensure your teen(s)' online safety while using Facebook?

- ☐ No
- ☐ Yes, by using parental monitoring software
- ☐ Yes, by talking to my teen(s) about Facebook
- ☐ Yes, by being friends with my teen(s) on Facebook
- ☐ Other (Please explain below)

G. Questions for evaluating the usability of possible improvement ideas to Facebook

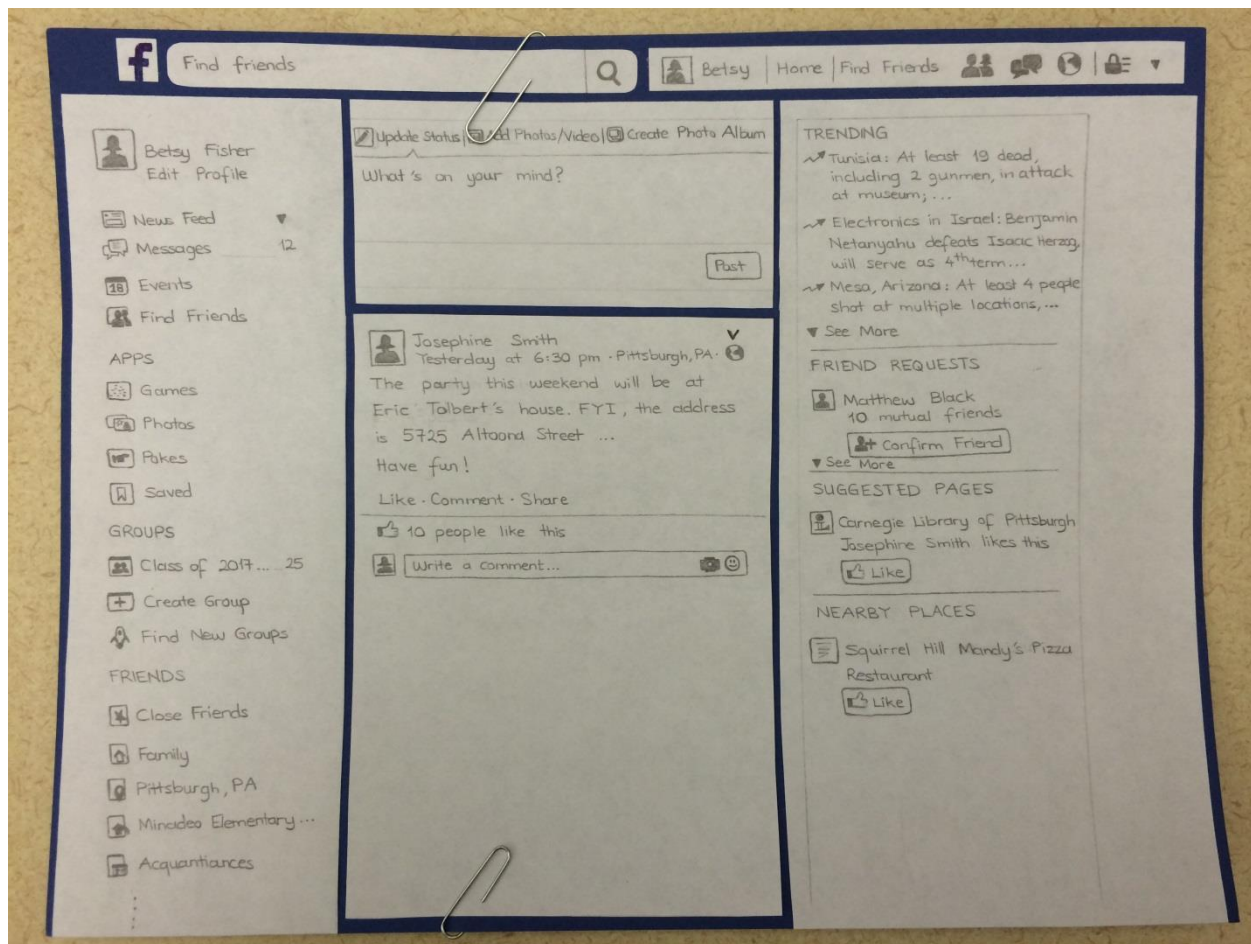
In this part of the study, by using paper prototypes, I will demonstrate six possible improvement ideas for Facebook. Each prototype is associated with a scenario of events occurring based on the actions of an imaginary teenager Betsy Fisher and her imaginary Facebook friends. For each idea, we

will ask some questions and request your opinions about them. Again, please do not divulge any identifiable private information about another person while answering the questions.

Now, let's start reviewing the ideas. Note that we are not testing you or your teen(s), instead we are just testing these ideas.

Prototype 1: A friend of Betsy publicly posts personally identifiable information.

Let's look at the first prototype:

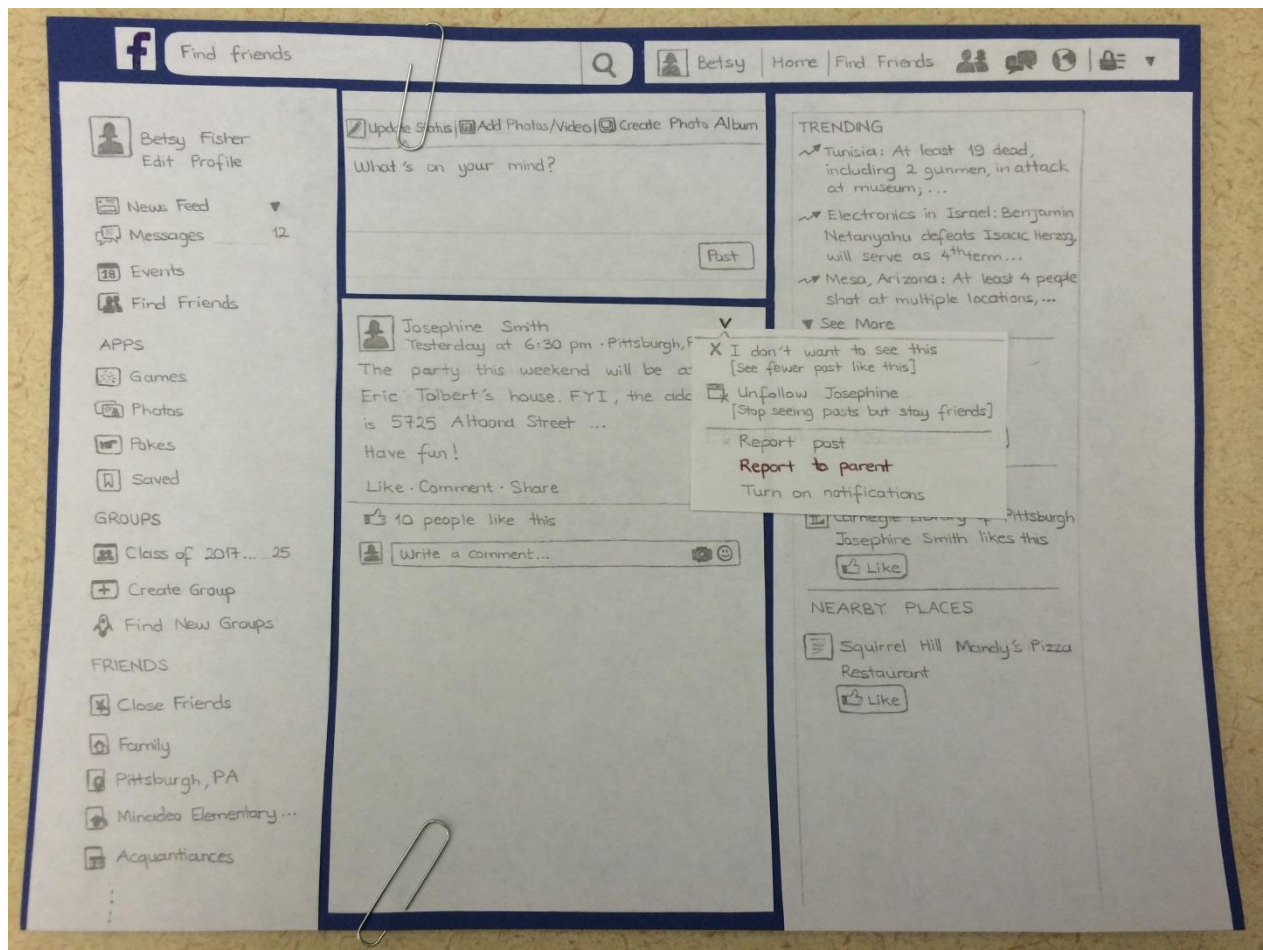


As you see, a friend of Betsy, Josephine, shares a public post and the post includes the home address of one of their mutual friends, Eric. The post includes the message “The party...”.

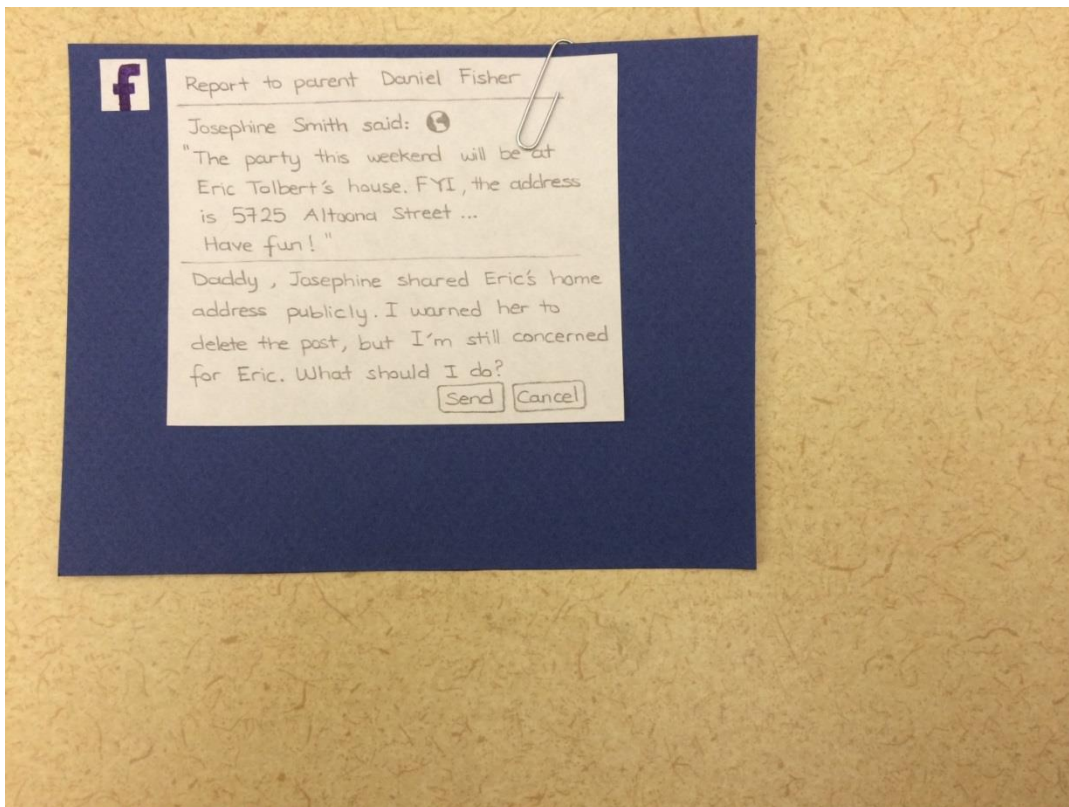
• **Think of a situation like this. If your teen(s) were Betsy, how likely do you think they would feel uncomfortable with this post?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Imagine that Betsy feels somewhat uncomfortable with this post since Josephine publicly shares Eric's home address. Here, the first idea that we would like to show you steps in. Let's see it:



As you see, this idea involves the addition of “Report to parent” option to the existing options provided by Facebook for each post. Imagine that Betsy selects this option to share her feeling of discomfort with one of her parents. Then, a popup screen appears for Betsy to type in a message and send it to her father, as follows:



• **If your teen(s) were Betsy, how likely do you think they would be using this feature?**

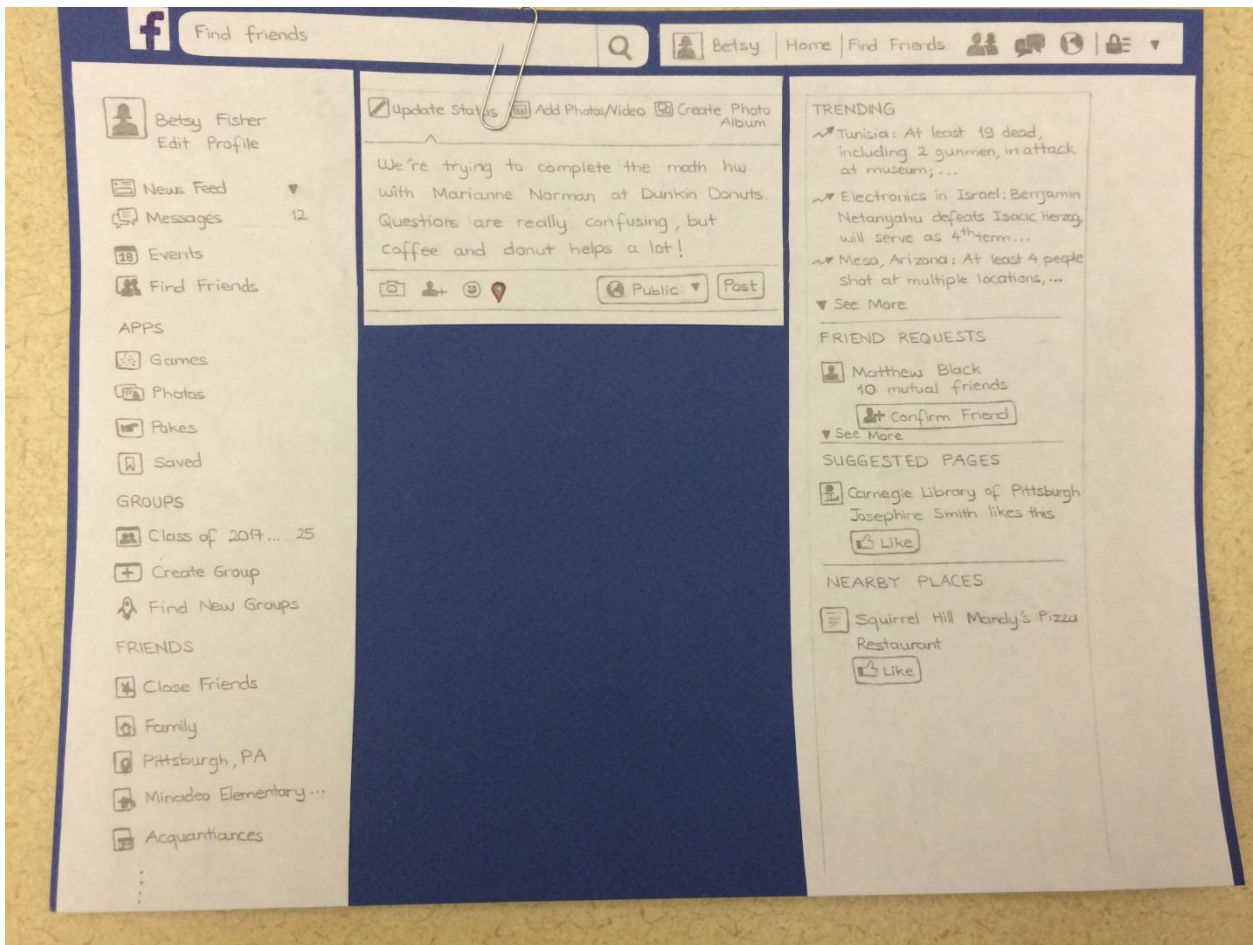
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

• **How likely do you think other teens would be using this feature?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

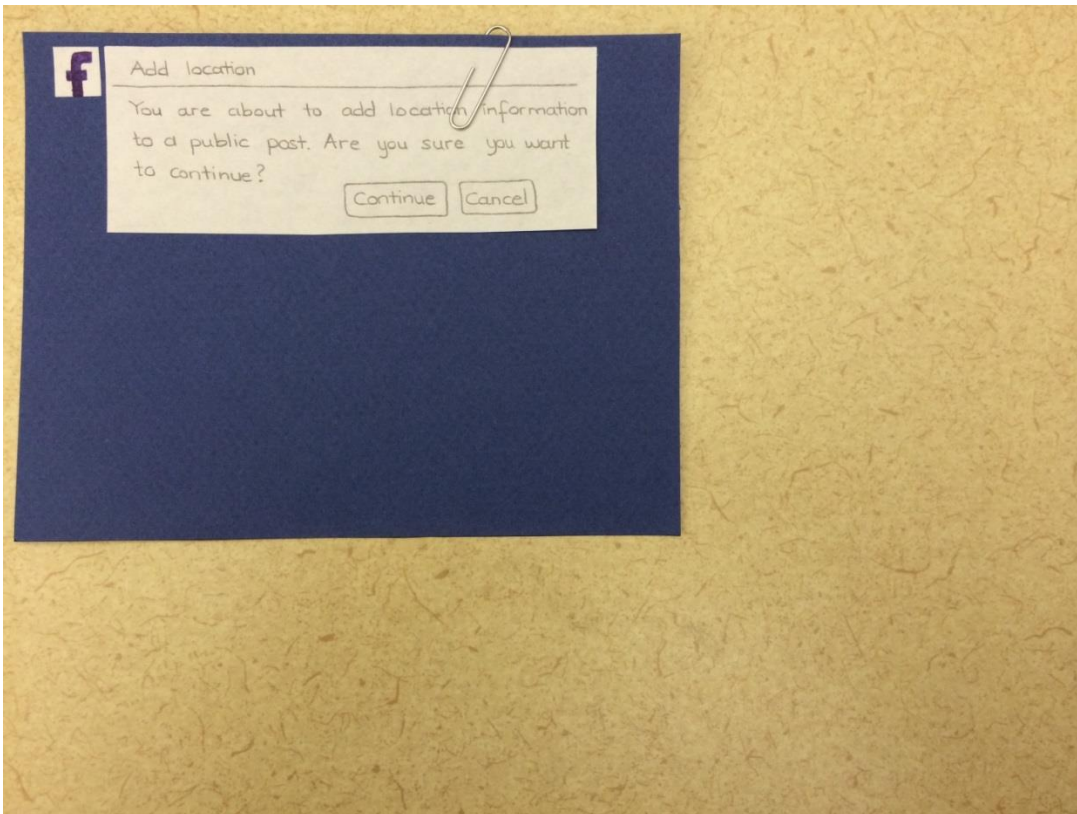
Prototype 2: Betsy publicly posts personally identifiable information.

Let's look at the second prototype:



As you see, Betsy herself shares a public post this time. The post includes the message “We’re trying to...”. Imagine that Betsy wants to add the exact location of the Dunkin Donuts in which she is currently with her friend Marianne.

When Betsy clicks / touches on the location symbol below the message to add her exact location, the second idea steps in and a popup screen appears for warning Betsy to confirm her post. Let’s see it:



• If your teen(s) were Betsy, how likely do you think they would stop and change their privacy preferences when they read this warning?

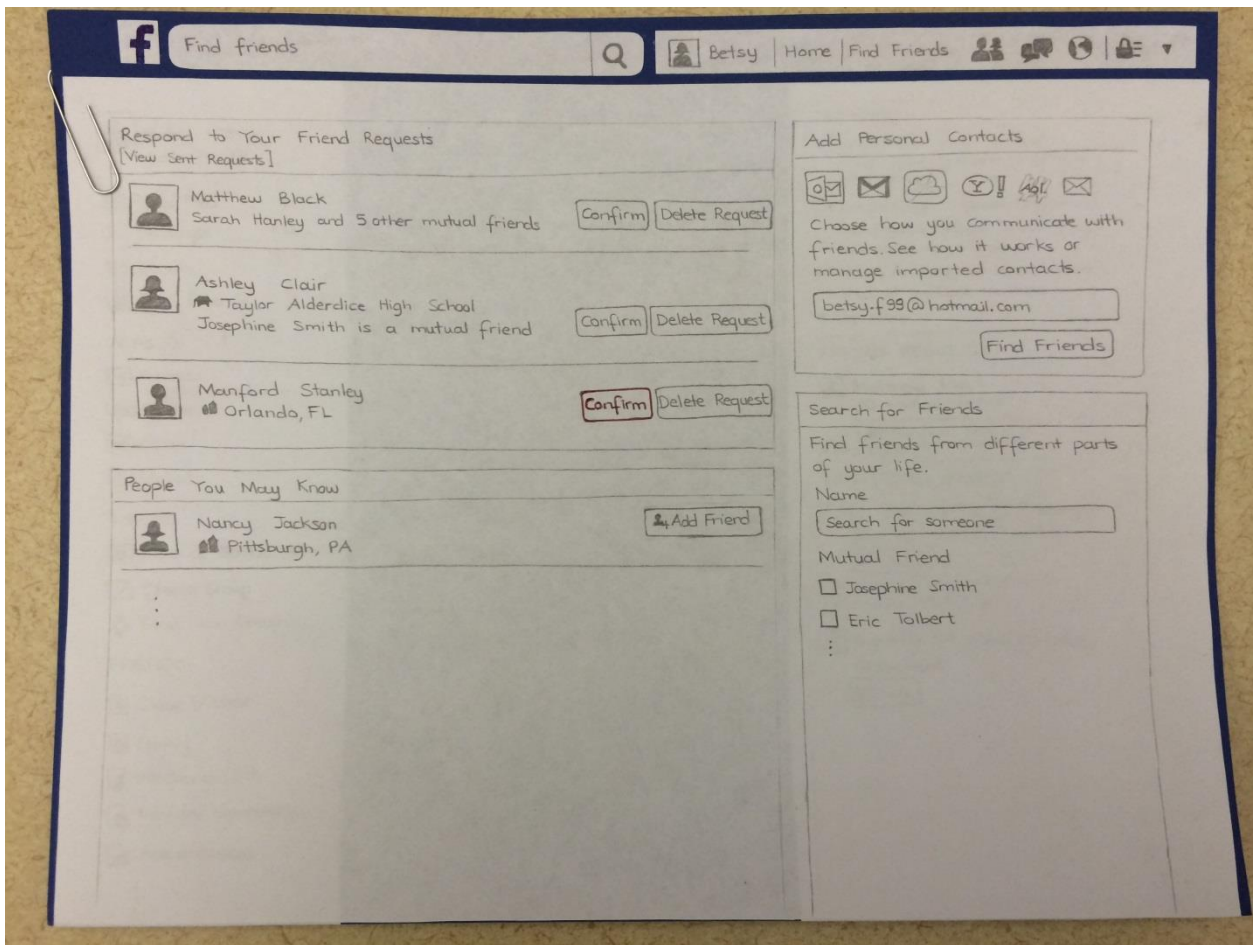
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

• How likely do you think other teens would stop and change their privacy preferences when they read this warning?

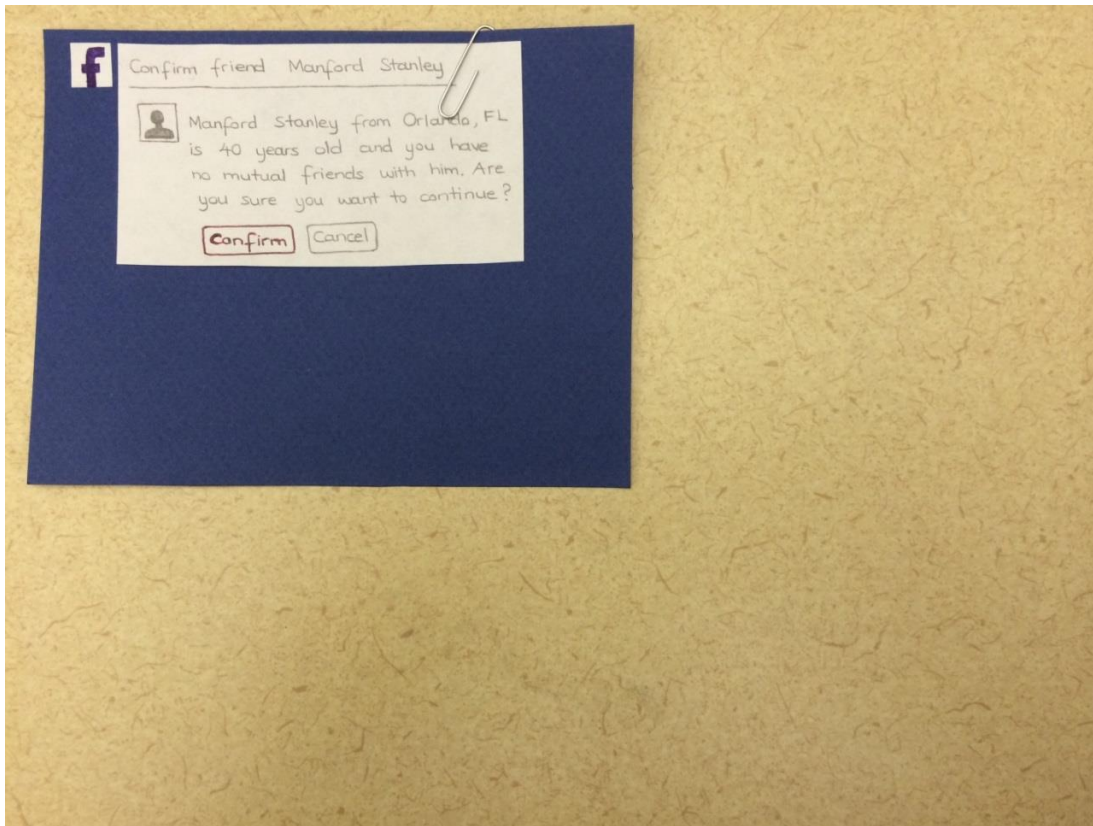
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Prototype 3: Betsy confirms a stranger as a Facebook friend.

Let's look at the third prototype:



As you see, Betsy sees a number of friend requests here. One of the requests comes from Manford, who is an adult and has no mutual friends with Betsy. Imagine that Betsy wants to confirm Manford as a friend and clicks / touches on the “Confirm” button. Now, the third idea steps in and a popup screen appears for warning Betsy to review her decision about confirming Manford as a friend. This warning may be in one of the two following forms. The first one may be similar to the following:



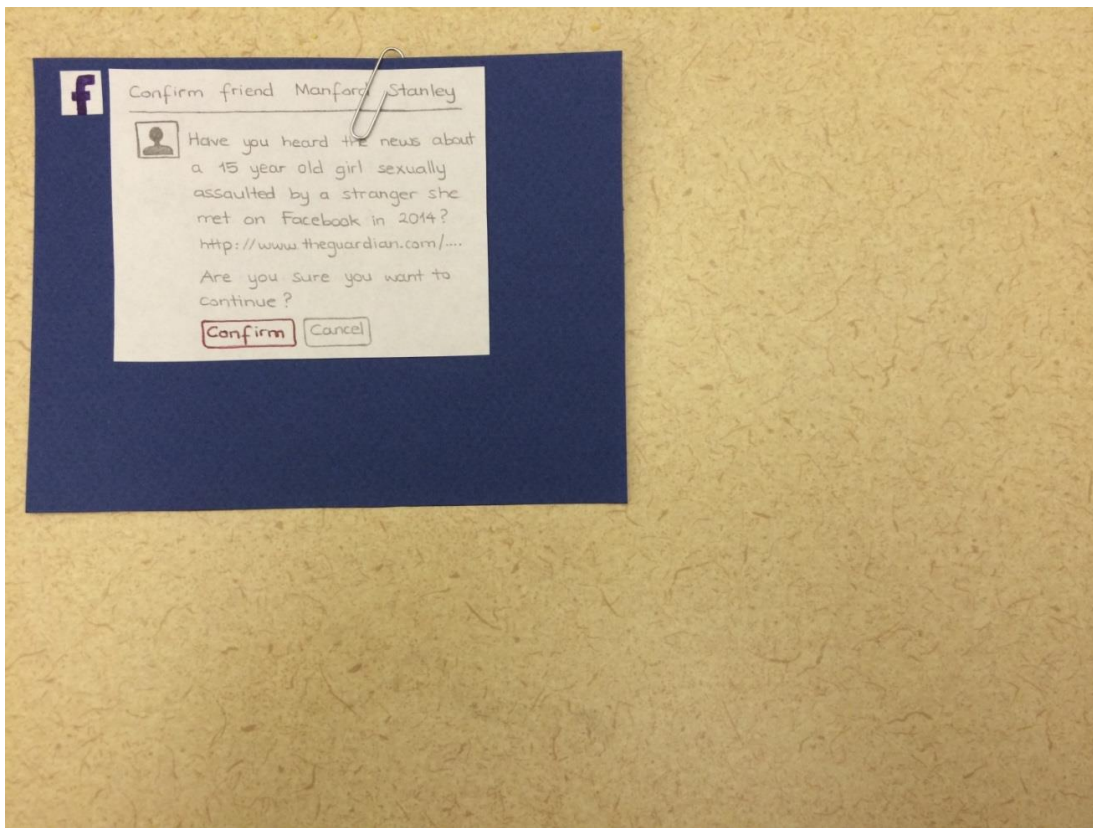
•If your teen(s) were Betsy, how likely do you think they would continue confirming Manford as a friend when they read this warning?

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

•How likely do you think other teens would continue confirming Manford as a friend when they read this warning?

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Let's see the second one:



•If your teen(s) were Betsy, how likely do you think they would continue confirming Manford as a friend when they read this warning?

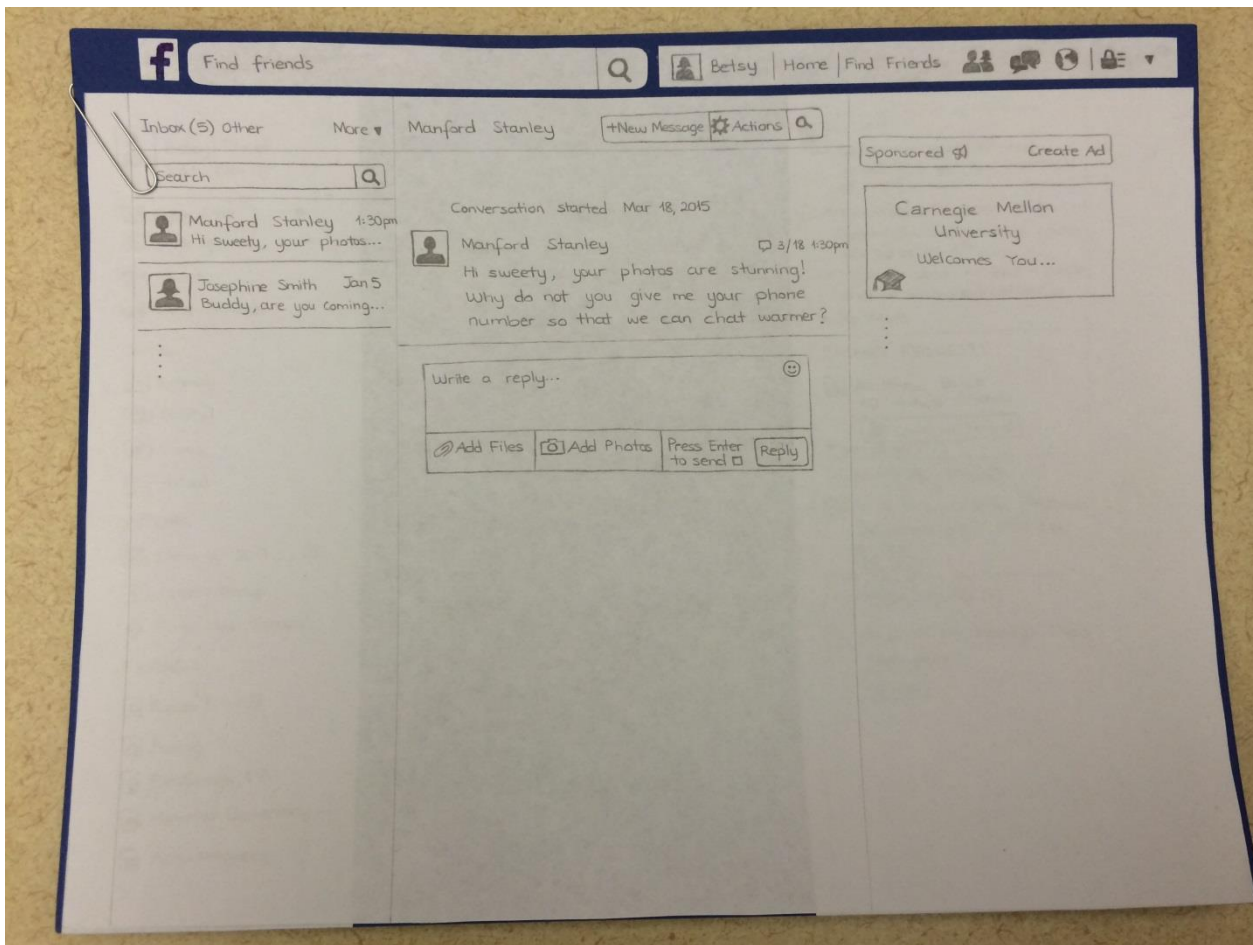
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

•How likely do you think other teens would would continue confirming Manford as a friend when they read this warning?

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Prototype 4: Manford sends a disturbing message to Betsy.

Let's look at the fourth prototype:

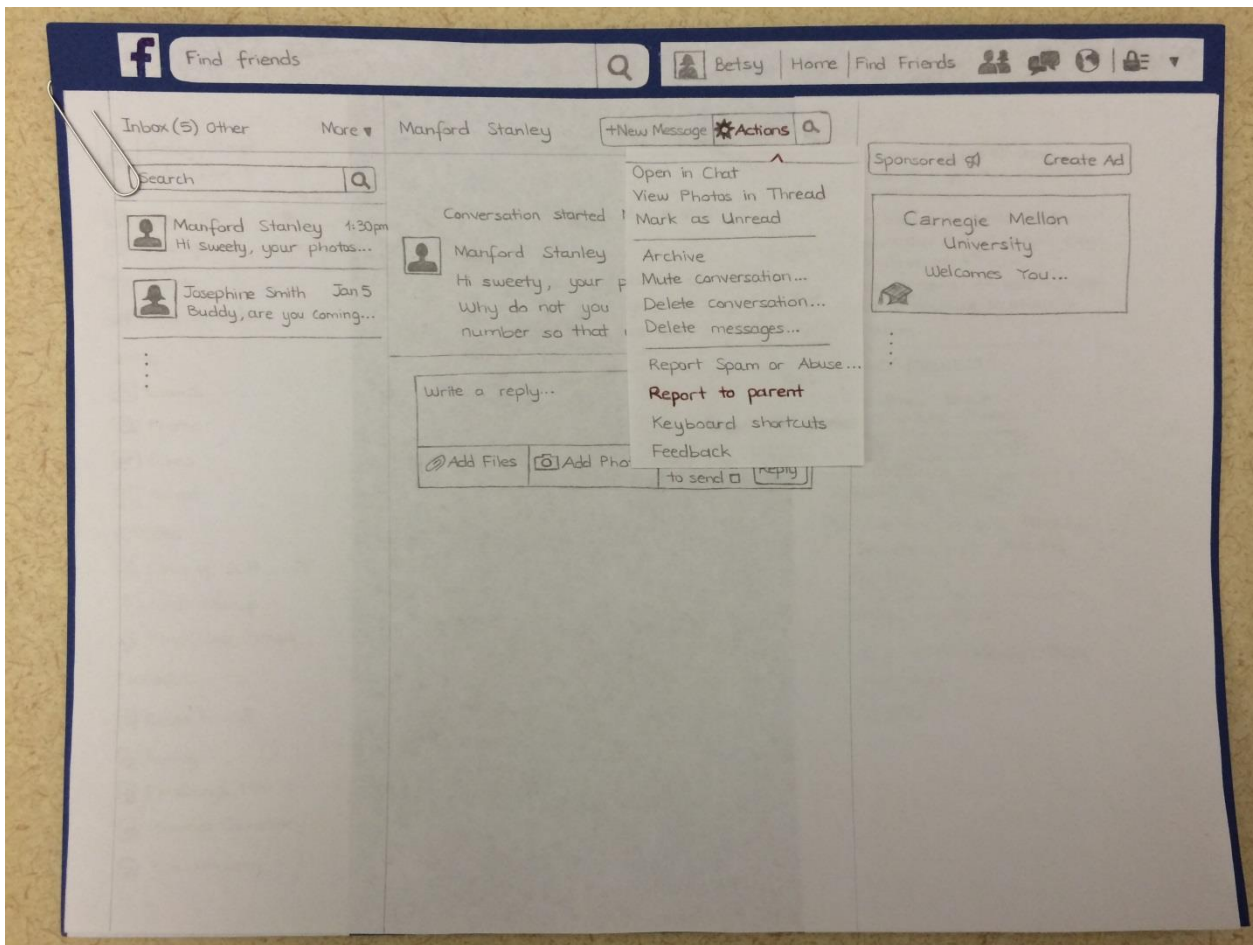


As you see, Betsy sees a number of messages from her friends here. One of the messages comes from her newly added friend Manford. The message is “Hi sweetly, ...”.

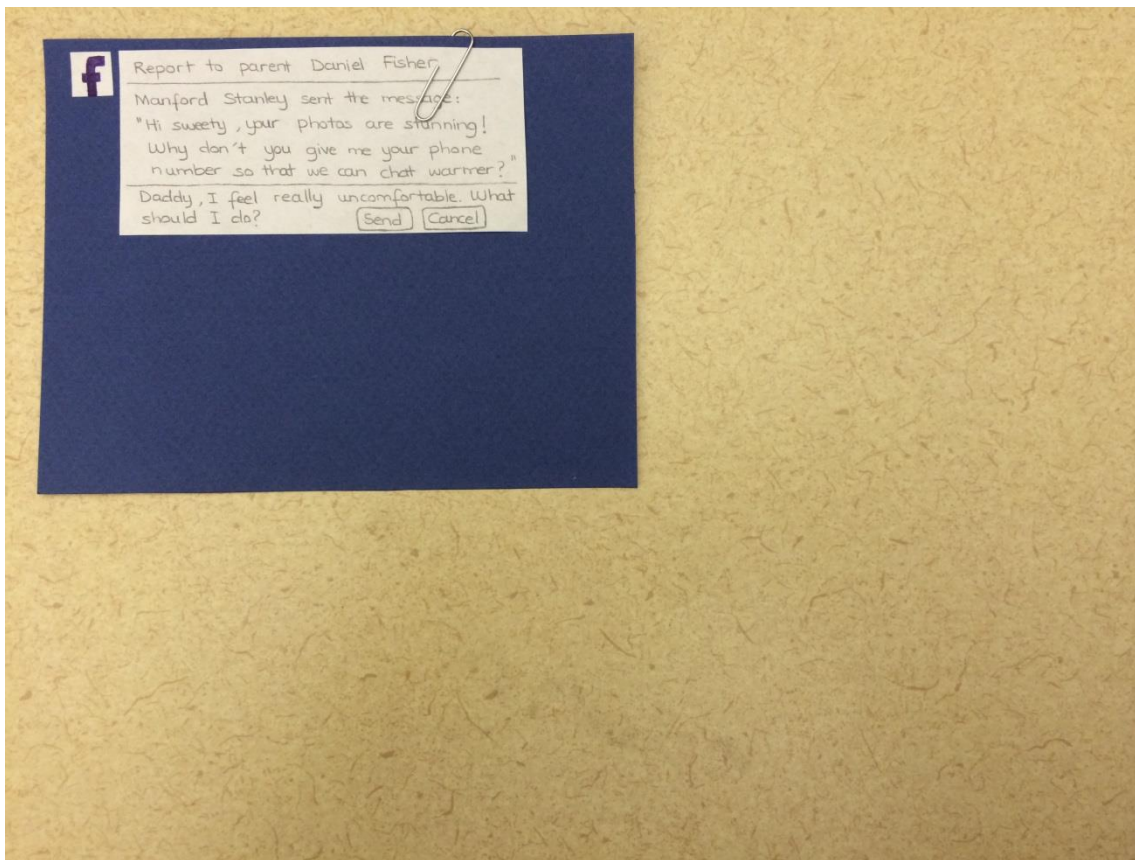
• **Think of a situation like this. If your teen(s) were Betsy, how likely do you think they would feel uncomfortable with this message?**

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Imagine that Betsy feels somewhat uncomfortable with this message. Here, the fourth idea steps in. Let's see it:



As you see, this idea involves the addition of “Report to parent” option to the existing “Actions” list provided by Facebook for each message. Imagine that Betsy selects this option to share her feeling of discomfort with one of her parents. Then, a popup screen appears for Betsy to type in a message and send it to her father, as follows:



• **If your teen(s) were Betsy, how likely do you think they would be using this feature?**

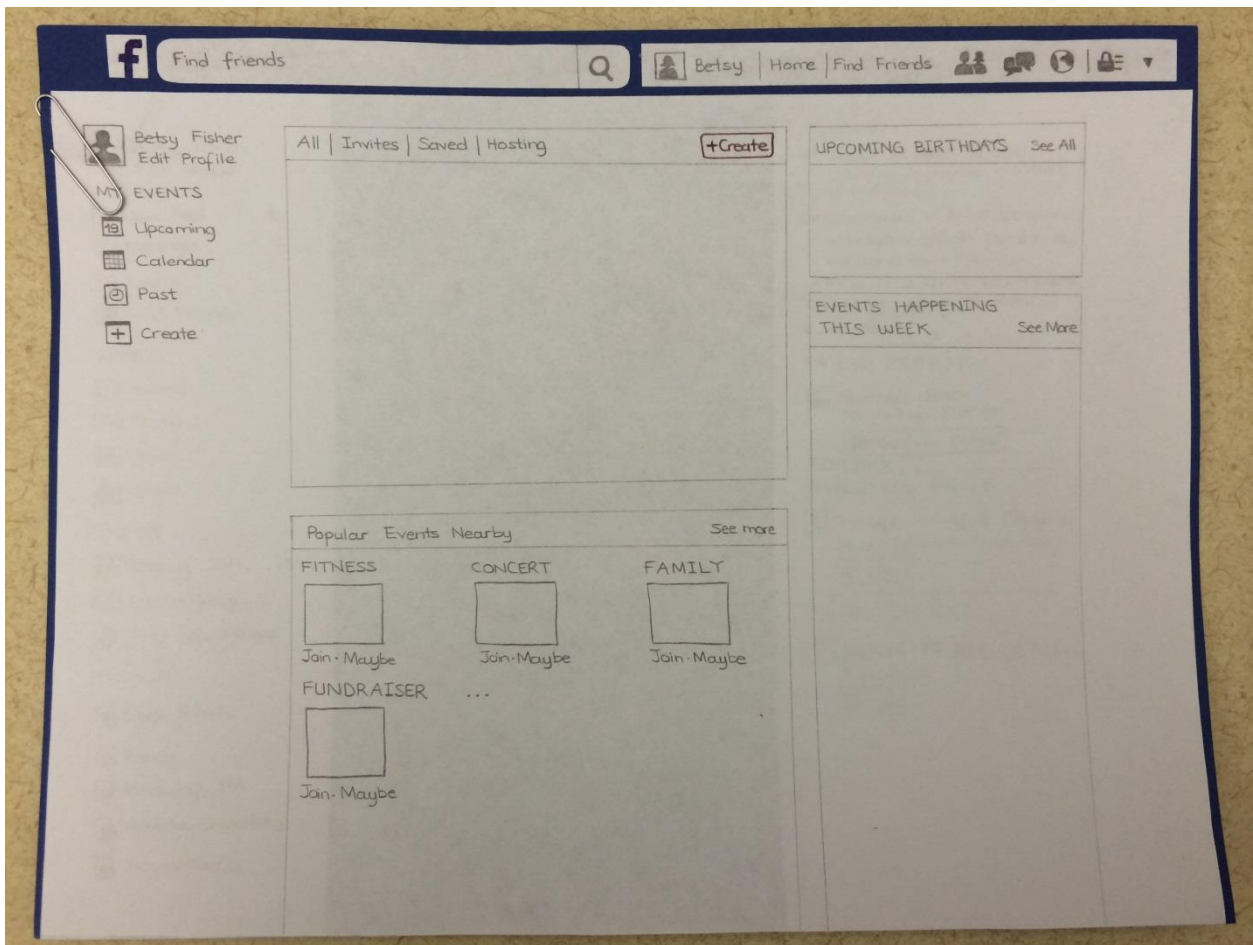
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

• **How likely do you think other teens would be using this feature?**

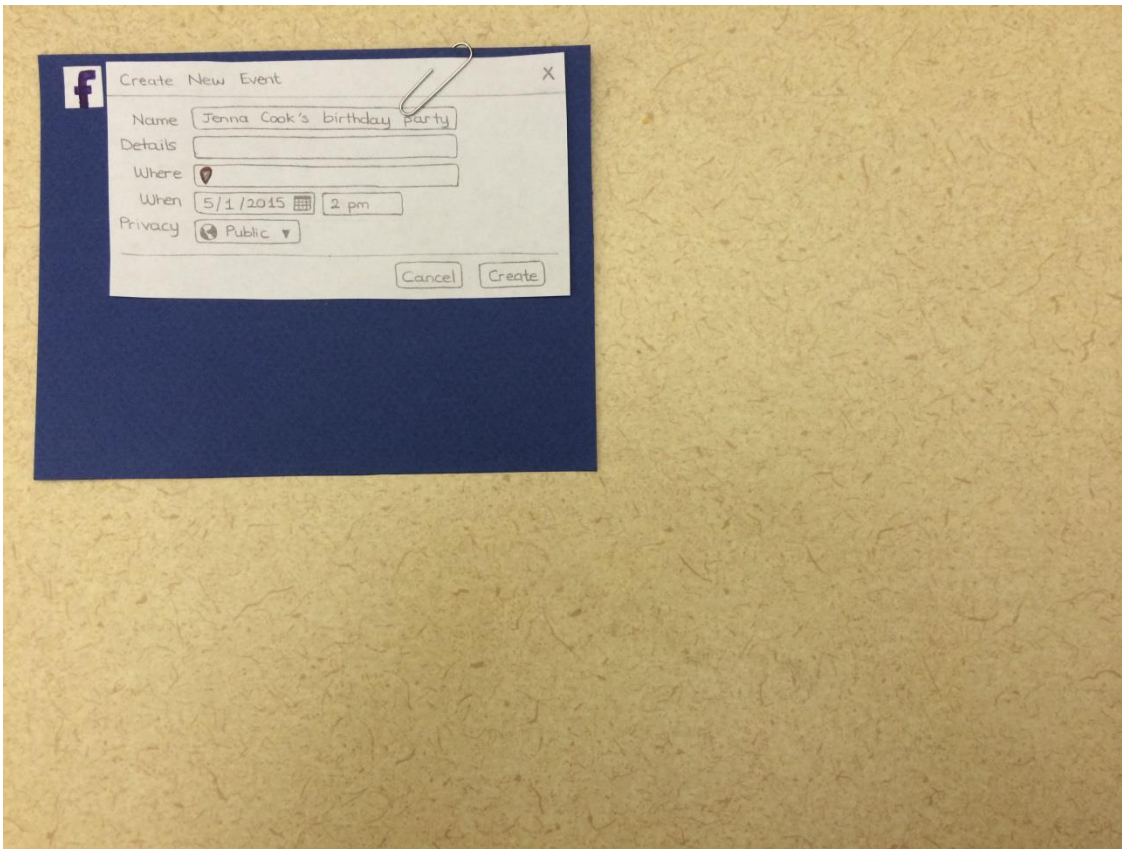
☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Prototype 5: Betsy publicly posts the time and location of an event.

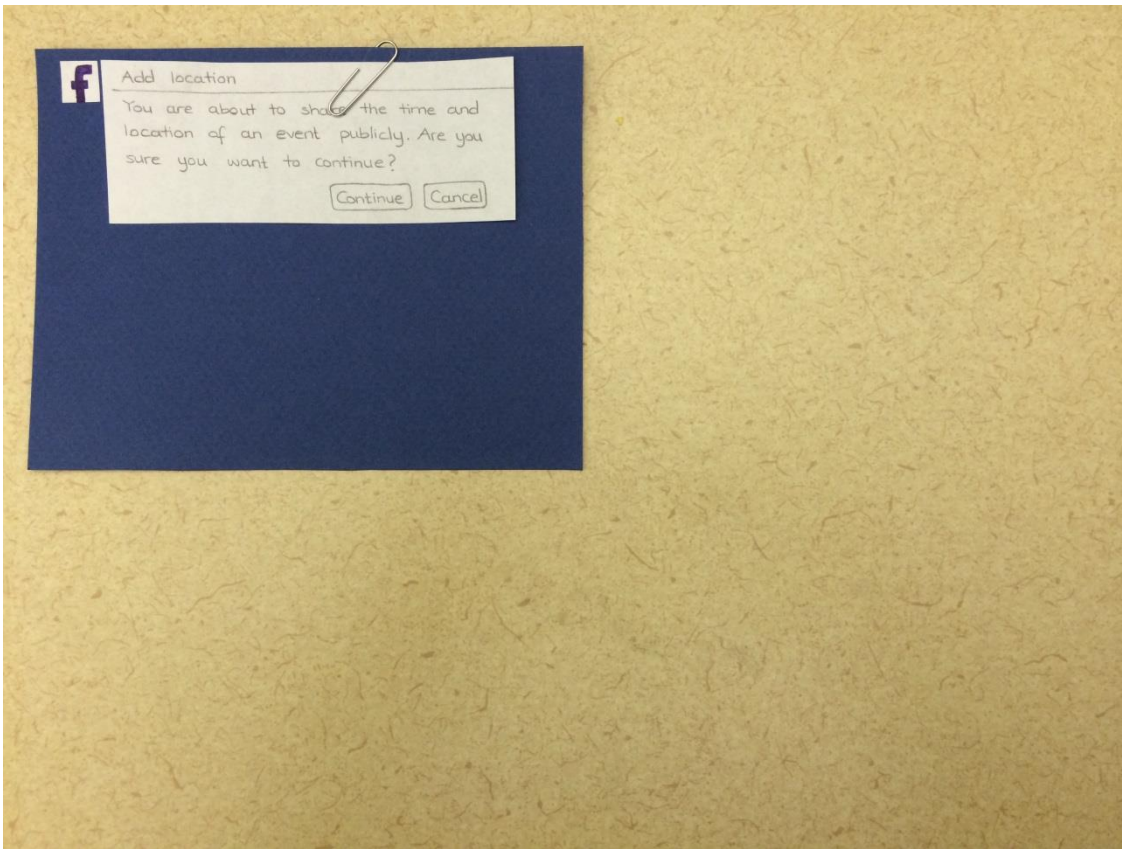
Let's look at the fifth prototype:



As you see, Betsy creates a new event here. When she touches / clicks on the “Create” button, a popup screen appears to allow Betsy to enter the details of the event. Note that this popup screen is not a proposed feature, instead it is already provided by Facebook, and it is as follows:



As you see, Betsy creates this event for announcing Jenna's birthday party publicly. Imagine that she enters the date and time of the party and then wants to add the location information. When Betsy clicks / touches on the location symbol to add the exact location of the party, the fifth idea steps in and a popup screen appears for warning Betsy to confirm her post. Let's see it:



•If your teen(s) were Betsy, how likely do you think they would continue sharing this post publicly when he/she reads this warning?

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

•How likely do you think other teens would continue sharing this post publicly when they read this warning?

☐ Very likely ☐ Likely ☐ Neither likely nor unlikely ☐ Unlikely ☐ Very unlikely

Common questions to be asked for each prototype:

- **Do you think that this idea would be helpful for reducing the risks to your teen(s)' online safety?**
- **Would your family use this idea?**
 - **Are there any obstacles to using this idea, including discomfort or confusion?**
- **Is there anything that would make this idea better?**

Final question to be asked after finishing all prototypes:

- **Of all the ideas discussed today, which one(s) do you think would be the most helpful for reducing the risks to your teen's online safety?**

H. Ending the interview

Thank you for coming here and helping us today. We really appreciate your opinions and suggestions. We hope that you had a pleasant experience during the study. Have a nice day.