

Usability Impact on Effectiveness of Parental Controls

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Parental controls are tools that enable guardians to protect their children from exposure to material they deem inappropriate. This paper details our study of parents and their children on their ability to configure parental controls on entertainment and communication devices. We discovered considerable difficulty on behalf of both parents and children in setting up parental controls on most devices. Additionally, we observed a discrepancy between participants' confidence in successfully setting the parental controls and their actual performance.

INTRODUCTION

The emergence of digital technology in communications and entertainment has introduced new capabilities. Part and parcel of these new capabilities are new responsibilities to guard against access to unintentional or unsuitable material by children. Most emerging technologies have integrated parental controls that provide the ability to control their child's experience.

The V-chip is among the better known parental control devices, now found in all television sets manufactured as of January, 2000. The subject matter and material (e.g. language, violence, nudity, etc.) within each program determines its "parental guidelines" rating. Parents can consequently use the V-chip to block programs with certain ratings. Many digital video recorders (DVRs) also allow similar filtering of programming based on content.

However, children also have exposure to questionable material through other means. The Entertainment Software Rating Board (ESRB) rating system monitors video and computer games, but games now also support online connectivity which permits interaction and communication with other gamers, potentially introducing additional questionable material. ESRB ratings include: Early Childhood, Everyone, Everyone 10+, Teen, Mature, Adults Only, and Rating Pending, as well as content descriptors such as "Blood and Gore" and "Mature Humor." Likewise, mobile phones introduce a risk of children communicating with people unknown to them or their parents. Consequentially, some

mobile phones are marketed towards allowing parents to limit their child's communication.

The aim of these parental control features is to protect children, but they are useful only to the extent that they can be used. In short, parents need to be able to easily and confidently configure parental controls in order for them to be useful. The question we posed was a simple one: how usable are parental control interfaces? We tested the parental control features on four devices currently on the market to determine the usability. While we know that these are simply commercial instantiations of such schemes – thus limiting the generalizability of findings – we do believe that these devices iconify the intention of many well-intentioned device makers.

Aside from understanding what the successful completion rates are, another purpose in this research was to understand if there are differences between children and their parents in either completion rates or confidence. We assumed that children would outperform their parents on key tasks because of the cultural belief that the children have grown up with this technology and are presumed to have a greater comfort level than their parents.

METHOD

Participants

We tested twenty parent-child pairs for a total of forty participants. Parents' and children's

ages ranged from 30 to 50 years and 10 to 13 years old, respectively. Each participant had a one-on-one session with a moderator. The sessions lasted 75 minutes during which the participants used the parental controls on four different devices. For their time, each dyad received \$100 upon completion of the session.

Stimuli

The parental control interfaces on four different devices were used in this study: television with V-chip, Xbox 360 game console, Firefly mobile phone, and TiVo digital video recorder. The Xbox 360 tasks involved parental controls for both the local console and “Xbox Live,” its online portal.

Procedure

Stimuli order was counterbalanced within and between devices across dyads and participants. Several tasks (detailed for each device below) were performed for each device to personalize and turn on parental controls.

We designed the questions and tasks to address the following:

- **Awareness:** do participants know that parental control capabilities exist?
- **Utility:** do participants find these features useful and beneficial in their management of their children’s technology world?
- **Concepts:** do participants have a mental model of how the control works?
- **Usability:** are participants able to successfully complete the task of adjusting and setting parental controls?

Participants were instructed to perform the tasks as if they were setting the parental controls for their child (in case of the parents) or their younger sibling (in case of the children).

Within each portion of the test, the tasks performed by the participants followed the same pattern. Participants were asked to restrict a young child’s access to some sort of media (television programming, movies, or video games) according to a related ratings system. The next step was to

then secure the settings so they could not be changed by a child at a later time. Finally, participants rated their confidence in having successfully set up the parental controls on each device.

RESULTS

Success and failure rates were calculated for each device overall, and for each group on every task. For questions that examined participant awareness, percentages were calculated per group. Chi-Squares were used to analyze all data related to task performance in this study, using the Fisher Exact test and Yates’ Continuity Correction when appropriate (critical value of 10.205). Ratings for confidence in successfully setting up the device were made on a 5-point Likert scale. For confidence ratings, a value of ‘1’ referred to ‘not at all confident’ and a value of ‘5’ referred to ‘very confident’. Differences between parents and children for the ratings questions were analyzed using two-tailed paired samples *t*-tests. All Chi-Squares and *t*-tests were carried out at a corrected alpha level of 0.0014. First, overall performance on the devices will be reviewed followed by device performances per participant group, and confidence ratings.

The best overall performance resulted for TiVo (69% success rate), followed by the Firefly (64% success rate), V-Chip (58% success rate), and the Xbox 360 gaming console (53% success rate). A Chi-Square analysis showed a marginally significant difference between the participants who successfully set up the parental controls on each device and those who failed to do so ($X^2(3) = 15.06, p = 0.0018$).

Firefly Mobile Phone

Unlike most mobile phones, the Firefly phone does not have a numeric keypad, but rather has dedicated buttons to constrain communications to specified numbers. In some ways the Firefly was designed to be difficult (or non-obvious) to set up certain features; inquisitive young ones should not

be able to easily or unintentionally re-set parameters that parents have put into place.

Tasks. In order to successfully set up the device, participants were required to (a) configure dedicated buttons, (b) change the PIN to protect the numbers from being changed without their permission, and (c) turn on “call screening” which only allows incoming calls from those programmed numbers.

A Chi-Square analysis using a Yates’ Continuity Correction did not produce a significant difference between the overall performances of parents and children on this device. Parents only showed a slightly lower failure rate than children, 34% versus 39%. Failures were often due to difficulty with navigating the small LED screen.

TiVo Digital Video Recorder

Participants were required to (a) filter TV and movie programming for the DVR, and (b) turn on parental controls. Of all the devices, participants had the most success setting parental controls on the DVR. Nevertheless, a combined 31% of parents and children failed. The Chi-Square analysis of a 2x2 contingency table was not significant.

Success with the DVR parental controls may be attributed to several factors. Foremost, the parental control status was more salient when changing settings. In addition, the interface benefited from a design that used complete words and descriptions rather than one- or two-letter abbreviations.

Television with V-Chip

Before attempting tasks on the TV, we assessed participants’ awareness of the television ratings system. Twenty percent (20%) of parents and 30% of children were entirely unaware of the rating system - and those that professed awareness displayed only partial or incorrect knowledge. (Note that the ratings are shown at the beginning of virtually every television program.)

Tasks. Participants first (a) blocked a young child from viewing television programming meant for teenagers, and then (b) blocked a child from

watching movies meant for teenagers. Finally, participants (c) ensured that the settings were enabled and saved in the system.

Although we observed a lower failure rate by the parents on the tasks – 35% to children’s 49% -- a Chi-Square analysis of 2x2 contingency table with a Yates’ Correction for Continuity was not significant. Failures on the V-Chip stemmed from interface usability issues and a lack of understanding of the TV ratings system. There was (verbalized) confusion over whether a choice was selected and what the selections meant. This last failure point was two-fold: Participants were unsure what content their selection would block, and were unsure if one selection was adequate to block all ratings “higher” than the one selected.

After the tasks, we asked participants to identify the meaning of the content descriptors displayed for each television show (i.e., FV – Fantasy Violence, V – Violence, L – Language, S – Sexual Content, D – Suggestive Dialog). Most participants were unable to describe the significance of the letter. They particularly struggled with “FV” and “D”. Only 9% of parents and 7% of children knew “Fantasy Violence” and 3% and 0% respectively knew “Suggestive Dialog.”

Xbox 360 Game Console

Similar to the awareness level of the television ratings system, 20% of parents and 25% of children were unaware of a game ratings system.

Tasks. For this device, tasks were split between console controls and Xbox Live controls. The console control tasks (a) required participants to restrict a child from playing games meant for teenagers and from playing DVDs meant for teenagers. They were then (b) asked to set a pass code and a pass code reset question.

Xbox Live controls (c) required participants to restrict a young child’s communication with other gamers in the Xbox Live community, (d) limit who may view the young child’s online gamer profile, and (e) block the child from downloading Xbox Live content.

Participants exhibited particular difficulty blocking games intended for teenagers (or older). Sixty percent (60%) of parents and 75% of

children *failed* at this task. A Chi-Square analysis using continuity correction was not significant. Similar difficulty was observed when participants attempted to restrict DVD movies with certain ratings where 75% of participants failed.

In the tasks for Xbox 360, participants repeatedly struggled with a divide between their mental models and the visual representation of parental controls. As demonstrated in Figure 1, despite having a description of the selection on the right-hand side of the display, participants verbalized their confusion as to whether their selection was the highest rating allowed, or the lowest rating blocked.

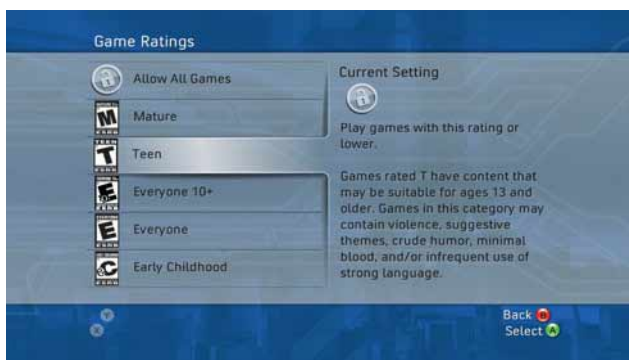


Figure 1. The padlock icon and description on the right-hand side of the Xbox 360 parental controls did not offer strong affordance to what ratings are blocked.

For the Xbox Live online portal, we asked participants to restrict communications with other online gamers: 60% of parents and 45% of children were unable to do so. Chi-Square analyses of each task were not significant between groups.

Confidence vs. Performance

After each task, we asked participants whether or not they believed they successfully accomplished the task. Confidence ratings for each device are shown in Figure 2.

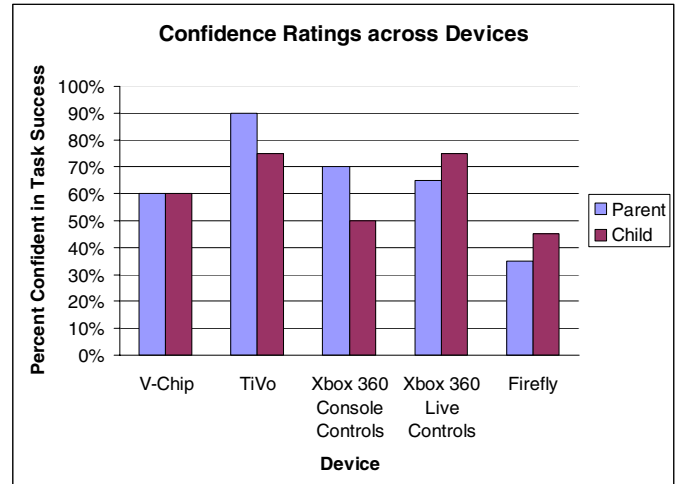


Figure 2. This graph demonstrates participants’ confidence in configuring parental controls on each device.

A matched-pairs *t*-test conducted for each set of parental controls was not significant for any of the differences in confidence ratings between groups.

DISCUSSION

We found low completion rates overall for both parents and their children. The percentages are, in our view, disturbingly low. *At least one third of all participants failed each device.* Juxtapose this finding with the high confidence ratings (i.e., they assumed they had properly set the control) given by participants, and this is a recipe for highly undesirable outcomes. Most participants were victims of a false positive – believing that parental controls were engaged and set correctly when they in fact were not. Consequentially, misplaced trust may be attributed to a parental control that does not protect one’s children as expected.

Furthermore, we are already aware of some parents’ demands for a clearer TV ratings system (Bash 1997) that resulted in the creation of the television content descriptors. Any remaining confusion is likely amplified because TV, movies, and video games all use similarly modeled ratings, but each use unique categories and descriptions. As parental controls work hand-in-hand with the various ratings systems, it was alarming to find that participants’ knowledge of each rating system was superficial at best. The high failure rates when blocking programming, movies, and games, showed

participants were not familiar with the meanings of the individual ratings in each system. Without a deeper understanding of the ratings, parental controls on devices are rendered ineffective at best.

Beyond the confusion with rating systems, poor interface usability only magnifies the difficulties in setting parental controls. Interfaces on devices did not provide adequate feedback about selection or cues about whether a choice was successfully selected. This means that a user may not have realized that they did not choose a setting. Furthermore, interfaces did not make it clear to participants when settings would become active. In several cases, participants failed to set up devices because they were unaware that there was an extra step to save and enable parental control settings.

CONCLUSION

Our results do not endorse discarding or avoiding parental control technologies simply because they can be difficult to use. On the contrary – these controls serve an essential social function, enabling parents to protect their children from inappropriate material. Our hope is that this study will indicate areas where the controls must be improved to ensure success.

On devices themselves, the user interfaces must provide users with better cues about making choices.

Designers of ratings systems should be aware of the possibility for confusion among the rating systems and the impact that can have on learning each system. Some of the content that makes a movie inappropriate for a young child also occurs in other media, so increasing similarity among categories or descriptors in the ratings systems could reduce confusion.

We strongly encourage designers of parent control technologies to test, re-design, and re-test their interfaces so that their customers/users achieve the intended outcomes.

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