

An Exploration of the Effects of Enforced Collaborative Agreement on Teenagers' Gameplay Experience

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Abstract

This paper explores the impact of Enforced Collaborative Agreement (ECA) on teenagers' game play experience. A child-centered approach involving methods such as Fun toolkit and Children's IMI were adapted to study teenagers' game enjoyment. Studies were conducted on 11-16yrs olds who interacted with a digital game that enforced collaboration in a co-located setting using a range of novel interaction techniques. The key contribution of the paper is an insight into the effect of ECA on teenagers' gameplay experience which could inform interaction designers in the creation of products for the user group.

Author Keywords

Collaboration; co-location; teenagers; gameplay experience; enforced collaborative agreement (ECA);

ACM Classification Keywords

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

Introduction

User eXperience (UX) described as the totality of a user's experience while interacting with a product is recognized within the field of Human Computer

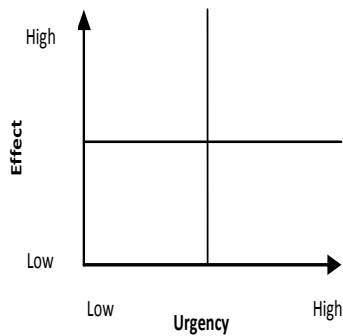


Figure1. Urgency-Effect Model

Interaction (HCI) as an important aspect to consider in the design of interactive products. Majority of studies which explored UX focused on adult users [1] with a growing interest within Child-Computer Interaction (CCI) community [2]. Few UX research and practice have focused on teenagers (children aged 11-19 years and henceforth referred to as teens) despite the fact they represent nearly one-fifth of the world's population [3]. However, the importance of understanding the needs, priorities, capabilities and desires of teenagers in teen-product design cannot be overemphasized as teenagers differ from adults and children [3], [4]. This implies that knowledge gained from studies conducted with adult or child users may not be helpful in the design of products for this user group [4].

In this paper, we explored teen UX within the context of gaming by focusing on enjoyment, one of the dimensions of gameplay experience [5]. Enforced Collaborative Agreement (ECA), a type of interaction where players must agree on controller inputs at the same time in order to play a digital game was adopted in this study. Figure1 shows the various possibilities for ECA: High-Urgency-Low-effect, High-Urgency-High-Effect, Low-Urgency-Low-Effect and Low-Urgency-High-Effect. These spaces alter the way collaborative agreement is reached in different types of games. For example, space invader game is in the High-Urgency/Low-effect space because players need to interact quite rapidly otherwise they get killed by the bomb but the degree to which players interaction influences game play is small. We focused on exploring teen's gameplay experience within the High-Urgency-Low-effect part of the model. Child-centered methods such as Fun toolkit and Children's IMI which have not

been extensively used in studies with teens were adapted to evaluate teen's game enjoyment.

Game design

To explore the aim of the study, we created a replication of a space invader game with ECA where players must agree on controller inputs at the same time in order to play (Figure2). The space invader game was chosen because of its simplicity and it falls within the High-Urgency/Low-effect space of the model. Adobe Flash CS6 was used to rapidly prototype the game and enable support for multiple controller input and the different types of controllers (game pad, dance mat and wiimote). Two versions of the game were developed: collaborative where players must agree (in their controller inputs) in order to control the 'cannon' and earn points together and single-player which allows individual play. For simplicity, the game had just one level. In order to help participants collaborate, the concept of an 'interaction map' was decided upon. This enabled participants to see their own control inputs alongside those of their co-players within the game environment.

Experimental studies

In order to explore the aim of this work, two studies were carried out. The first study was intended to act as a pilot for a bigger and more detailed study with enhanced data collection. It also served as a platform to test the methodologies as well as monitor the operation of study design. Results showed that the participants did not seem to have any issues completing the evaluation forms and tended to enjoy the game. However, the game was only played for a short duration of two minutes. [6] showed that there is a relationship between enjoyment and the time spent

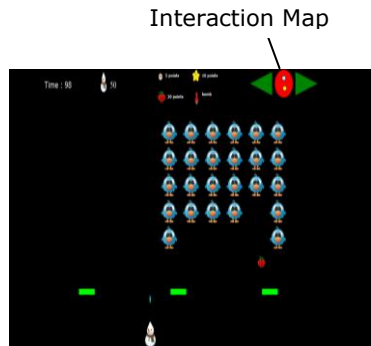


Figure2. Space Invader Game

playing a game thus there was need to know if the participants would still enjoy the game with increased length of play. Hence, a second study was conducted with increased duration of play.

Method

Participants

Twelve participants aged between 14 and 16 years old participated in the first study while eight participants aged 15 years olds participated in the second study. The participants were selected and grouped in pairs by the class teacher. Codes were used to maintain the anonymity of the participants.

Procedure

The studies began by each child completing a background questionnaire on their experience in technologies and gaming. Then, the researcher talked each pair through the rules of the game and explained that the game would be played using three different controllers. A within-subject design approach in which pairs played both the single and collaborative versions of the game using all three controllers (game pad, dance mat and Wiimote) was used in the study. A 3x3 Latin square design approach was used to select the order in which each pair played. The duration of play varied in the two studies. In the first study, each child in a pair played the single player version individually for 30 seconds before playing the collaborative version for two minutes while in the second study, the duration of play was one minute and four minutes for the single and collaborative versions respectively. Each participant completed an evaluation form consisting of the Children IMI interest/enjoyment scale after playing the single and collaborative versions of the game for each controller type. Each pair completed an evaluation form

(one per child) at the end of each session to capture their thoughts on the technology using Smileyometer and Again-Again table [7]. Afterwards, each pair completed a Funsorter[7] based on which controller they 'liked the most', 'was most fun' and 'was easiest to play with'. The researcher observed the pairs all through the entire sessions.

Results/Discussion

The participants' profiles from the two studies are shown in Table1. The participants appeared to be enthusiastic and engaged well with the activities in the studies, some shouting, laughing and jumping while others focused all their attention on the gameplay. The IMI which compared the participant's enjoyment of the two game versions gave very little differences in result. The mean scores are: 3.19 for game pad, 3.13 for wiimote and 2.92dance mat (single player) and 3.39 for game pad, 3.45 for wiimote and 2.78 for dance mat (collaborative condition). The questionnaire revealed that a small number of participants, 34% from first study and 13% from second study, preferred to play alone and did not enjoy playing with their partners while 58% and 62% of the participants in the first and second studies respectively did not prefer to play the game alone and enjoyed playing with their partners. As expected, there was a clear correlation between the participant's preference and enjoyment of the collaborative element of the game reasons being that it was fun, challenging and promoted teamwork. Figure3 and Figure4 show for each construct ('liked the most', 'was most fun' and 'was easiest to play with'), how many participants ranked each controller highest in the first and second studies respectively. While the number of participants was small, the two figures showed that the dance mat was clearly the most fun controller. The

	<i>1st Study</i>	<i>2nd study</i>
<i>Prior experience with controllers</i>		
Shooting	42%	62%
Physical fitness	42%	25%
Adventure	50%	75%
Racing	25%	50%
<i>Prior experience with computer games</i>		
Wiimote	75%	50%
Gamepad	50%	63%
PS2/PS3	67%	75%
Keyboard	50%	100%
Dance mat	0%	12%

Table1. Participant's prior experience on technology and gaming

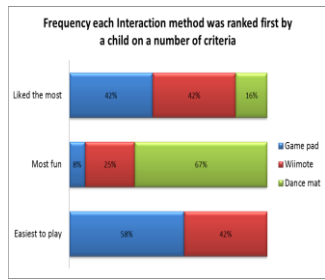


Figure3. Rankings of the three controllers in the first study

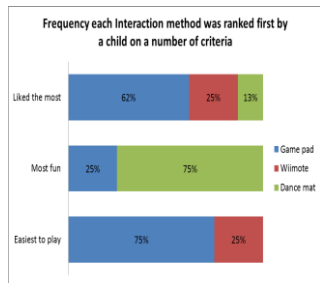


Figure4. Rankings of the three controllers in the second study

data also implies that the game pad was easiest to play the game with. These results could be due to the novelty factor as majority (all apart from one across both studies) of those who participated in the study had no previous experience with the dance mat. Also, a high familiarity with the game pad could be the reason for the participants ranking the game pad as easiest to use controller. Contrary to the conclusions of [7] which indicated that people would like to do fun things again, results from this study shows that the dance mat is a fun controller that the participants liked, but they would not like to use it again. Only one person had experience playing the game with dance mat and two people claimed they had technical problems with the dance mat. This could be attributed to lack of prior experience with the dance mat causing frustration and the participants finding it challenging to put their foot in the right place on the dance mat. Due to the fact that teenagers are more advanced and judgmental compared to children [3], the Fun toolkit revealed how much the participants enjoyed the game and the issues they had with the interaction techniques.

Conclusion

This work successfully explored the effects of ECA on teen's gameplay experience within a one part of the ECA model. The studies conducted utilized a set of user-centric methods including Fun toolkit and Children's IMI to explore gameplay experience with teenagers and develop rich set of insights and understanding. Result showed that the methods were useful in evaluation of game enjoyment with teenagers. Contrary to the conclusions of previous studies, the dance mat is a fun controller but the participants would not use it again. This work is limited in the number of children who participated in the study however,

ongoing studies are exploring other types of applications e.g. serious games where ECA can be applied with larger and more varied participants.

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