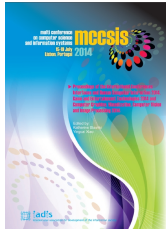Home   Digital Library   Members   Conferences   About IADIS   Contacts

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USABILITY EVALUATION OF PLAYSTATION MOVE MOTION CONTROLER

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ABSTRACT

The several known studies of usability in videogames describe the elements contributing to the immersion and satisfaction in the videogame playing experience, as well as the importance of tests that secure the good performance of elements such as interface, graphics, sound, history, gameplay and replayability. This paper demonstrates an evaluation of the user´s interaction with the Playstation Move motion controller through usability tests. The goal is to understand the overall usability, the influence of environmental conditions and the use of two controllers simultaneously. This study will also contribute to the understanding of how important it is to use simultaneous but different methodologies, namely questionnaires, heuristic evaluations and direct observation of the users. It was concluded that different light conditions do not affect the use of the controllers, the accuracy and ergonomics are very good, but the button layout is not ideal. The controller´s calibration is time consuming but afterwards the acquisition is almost immediate.

KEYWORDS: *HCI, usability, interaction, video-games.*

1. INTRODUCTION

Usability is defined with the ease of use of any system that interacts with the user (Jorgensen, 2004). Usability inspection techniques have the potential to improve the game design process. Usability research generally operates within the ISO 9241-11 usability standard, which defines usability as the "extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use" (9241-11, ISO, 1998). This standard led (Sauro & Kindlund, 2005) to conclude that effectiveness can be measured in completion rates and errors, efficiency from time on task, and satisfaction using standardized satisfaction questionnaires. Usability research in games is quite recent and most studies did not reach a consensus on several aspects. Usability studies are important to make the interface intuitive and also not to "disturb" the experience of playing (MARTIN & WIEMEYER, 2012). The techniques to evaluate usability include heuristic evaluations by specialists, observation of users' interaction, questionnaires that assess satisfaction. Prototypes are also widely used during the evolutionary development of tests products (Pinelle, et al., 2008). This work is not intended to discuss the concepts involved in the usability of games but show how an usability study is important, showing some ways to do so through traditional methodologies, to assess the use of technology in the game PlayStation Move system such as heuristic evaluations, questionnaires and   direct observation of users. The aim of this study was to evaluate the usability, experience and gameplay using a group of inexperienced users to use the system in conjunction with PlayStation Move game Sports Champions. We intended to evaluate the influence of varying conditions of light and the simultaneous use of two controllers (by the same user). We want to find potential difficulties in using and adapting to controllers and interface (button layout, ergonomics, precision, calibration and sensitivity).

2. METHODOLOGY

2.1 Sample and characterization

In order to test the usability of the PlayStation Move motion controller and the remaining system, six users were invited with the ages ranging from 14 to 27 years old. All users were completely inexperienced with the PS Move controller. Some had already had contact with some systems with motion sensors and almost all had some experience with typical videogames. Throughout the study, it was tried to find the main flaws of this system as Wall as the user's difficulties and propose some ways to improve.

2.1 Method of analysis and test steps

The quality of this interface was analysed in several ways, using different approaches: questionnaires, methodology of observing users and heuristics approaches. In this study it was necessary to understand the different characteristics of each approach to define which one is more appropriate to evaluate the interface of a system in a given context. The entire sessions were recorded on digital video in order to be further analysed, namely what the users verbalized, their body and facial expressions, hesitations, signs of fatigue and satisfaction/dissatisfaction. The times clocked and calibration of motion controllers were also registered.

To perform this evaluation the team analysis employed a methodology considering the following steps:

1. All users were presented to the evaluation team and were informed on the tasks intended to be evaluated.
2. It was made a questionnaire to gauge the videogame experience, frequency of play, the preferences and experience with motion-sensing controls.
3. The observation of users was performed individually in a closed, wide and large room. Each user had some initial guidance especially on the best way to grab the controller in the ideal position and some safety tips. Two rounds were performed.
    a. First round:
        - Natural light was diminished and only one artificial light was kept lit in the room;
        - Users calibrated the equipment for the first time (no help was given) and the time was recorded until completion;
        - Users played all Sport Champions modes.
    b. Second round:
        - Natural light was present giving the room the most amount of lighting;
        - The controller was calibrated (for the first time with high luminosity);
        - Users played all Sport Champions modes;
4. After the two rounds, users filled a new questionnaire about their experience and satisfaction using the PS Move controllers with the Sports Champions game.

3. RESULTS AND DISCUSSION

The results were grouped and presented through graphs in order to facilitate the understanding of some basic concepts of usability: Functionality, Reliability, Efficiency and Calibration time. All results are based on surveys of the user's satisfaction test, use of video recordings, questionnaires and notes from the evaluation team's members. The scale used for presentation of the results was the scale of Likert for better interpretation and standardization.

3.1 System Functionality Evaluation

The functionality of the system can be defined as a set of guidelines to show that an interface meets the basic functional requirements with the primary aim of obtaining the desired efficiency. In *Figure (1)* the following assessments are present: "Ease in using the PS Move controller", "Ease of finding buttons when prompted" "Adaptation of the controller to the hand."
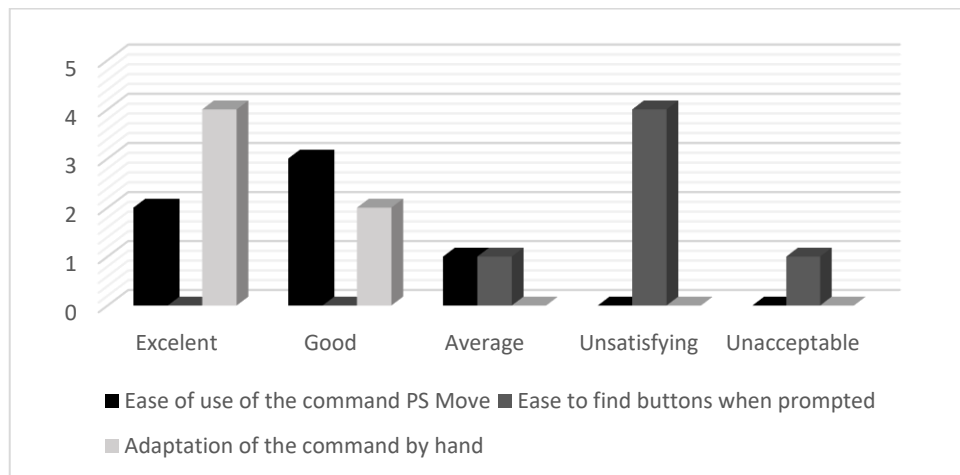
Figure 1: Levels of ease of three items assessed

Tasks "Ease in using the PS Move controller" and "Adaptation of the controller to the hand" show an average value (4.2) and (4.7) respectively, that reflect an high satisfaction index value (excellent).

The task "Ease of finding buttons when prompted" shows an average value (2.0), which reflects an index of low satisfaction (unsatisfactory).

3.2 System Reliability under different lighting conditions

The reliability of a system is defined as the probability of operating without failure for a specified period of time in a specific environment. This requirement is very important for the analysis of software quality, since it directly reflects the flaws and the environment in which they occur. During the tests (1st and 2nd round) there were no glitches in the system, as expected. In addition, users felt equally comfortable performing the tasks in all lighting conditions. The reliability score was 100%.

3.3 System Efficiency when two PS Move controllers are used simultaneously

The efficiency of two PS Move controllers used simultaneous was evaluated considering the number of errors and access time to the buttons. Five requests were made to each user to find some buttons during the game, and the mistakes and access times were registered. In contrast, the same process was evaluated considering only one controller. The results presented in Figure (2) shows that using two controllers results in a higher error rate and very high average access times.
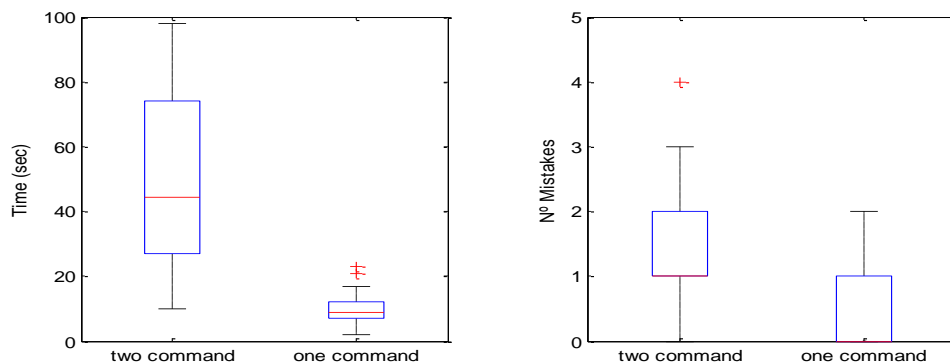

Figure 2: Boxplots of access time and mistakes using one and two PS Move controllers

When the questionnaires were analysed, it was found that users considered the interaction with one controller very easy and positive, however two controllers used simultaneously produced a low degree of satisfaction,

thereby promoting a ("do not use" (unsatisfactory) by all users. The results of direct observation and the questionnaire were in consonance.

4.4 Calibration time´s

During user testing the task "calibration PS Move command" for each user was repeated 9 times. The first 7 calibrations were carried out in the 1st round of tests (in low light). The following 2 calibrations were performed in the 2nd round (with high luminosity).
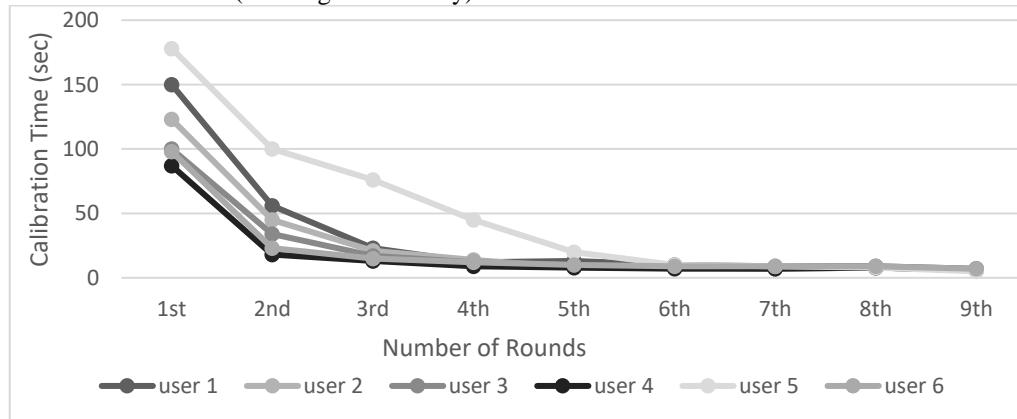

Figure 3: Calibration Time considering the 6 users during 9 round

The first calibration (1st round) was requested by the system, even before the user comes into any of the game modes. Proved to be quite time consuming for all users (average time of 120 seconds), since it was something completely new. The following six calibrations were performed prior to each of the different modes (by request of the game). In the 2nd calibration, mean times (6 users) dropped to about 46 seconds. In the 3rd calibration the average time went down to about 27 seconds. In the 7th calibration, the time spent calibrating dropped to 9 seconds (meantime) as well as in two remainder calibrations. This fact is visible by the Learning Curve obtained *Figure (3)*. The Learning Curve is a graph that reflects the evolution of a system for learning, showing over time the consolidation of user learning. The times recorded show that the calibration time is independent of lighting conditions, since there was no time variation between the average time of the last calibration of each round. There is a good efficiency in the calibration of the controllers, requiring a period of adaptation. This is very important to the overall efficiency of the system, since that task is performed several times.

CONCLUSION

Usability is an essential attribute to assign quality to a system or interface. It is essential to develop studies like this in order to understand if the systems with motion sensors and controllers like PlayStation Move are configured to be used by all users, even the most inexperienced in videogames. Typically surveys do not provide reliable data, however when paired with the results from the evaluation team, it yield a value of zero false positives and zero negatives, so in this case, the answers from the users were in consonance with the team's observations, and therefore can be considered conclusive. It was concluded that some necessary tasks are hindered by inexperience, however it was also determine that the controllers have great precision, good ergonomics (adjustment by hand is ideal) and time adaptation to the controllers is relatively short. Regarding the arrangement of buttons on the PS Move controller, they should be more intuitive. The major difficulties of users consisted in finding the buttons quickly when they were asked for a few games. The fact of not being backlit and not having sufficient description, led to great difficulties in gameplay. This was the main usability problem found in the whole system. The variability of brightness does not influence the use of system controllers and PS moves. The calibration's time did not vary as a function of luminosity and gameplay remained without any faults. In most cases, the simultaneous use of the two PS Move controllers by the same user proved to be a simple and intuitive task. Throughout the tests, users complained of some problems in the game, especially the lack of correspondence between the colours of the controllers lights (blue and pink) and the colours displayed on the screen (blue and green) for calibration tasks, for example. This led to several hesitations. In general, the usability of the controllers was quite high, allowing a great gameplay to users and

obtaining a high level of satisfaction. The most negative aspect noted is the button layout on the commands, which led to some difficulties. For further work there are some important items that were not evaluated that should also be important to study the usability of the PS Move. Some interesting subjects to study: "evaluation of the influence of distance in the use of controller", the "performance of the controller in Multiplayer games" (maximum simultaneous players), comparing the accuracy of the PS Move's controllers relative to other similar systems (Nintendo Wii and Microsoft Kinect).

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