Playability and Player Experience Research

ABSTRACT
As the game industry matures and games become more and more complex, there is an increasing need to develop methodologies for analyzing and measuring player experience, in order to develop a better understanding of the relationship and interactions between players and games. This panel gathers distinguished European playability and user experience experts to discuss current findings and methodological advancements within player experience and playability research.

Author Keywords
Playability, game experience, user experience, techniques, methodology, experimentation, usability

INTRODUCTION
Games are artifacts that unfold their full potential in the interaction with human players, allowing them to craft their experience individually. With recent advancements in the field of human-computer interaction, new techniques become available for measuring how people interact with technology. Player experience research benefits from this development as it is now possible to approach empirical assessment of computer gameplay. By combining insights gained from numerical recording of parameters (physically from players as well as technically within entertainment software) and approaches toward qualitative assessments of experience (including behavioral observations), it is gradually becoming possible to render a high-resolution image of the complex interactions driving gameplay and player experience.

Since research in this direction is currently in a developmental stage, this panel aims at giving an overview of current state-of-the-art methodologies, paving the way for future research with the goal of establishing empirical standards and progressing toward definitions of player experience. After presenting individual perspectives, the current benefits and challenges faced by research and industry will be discussed.

PERSPECTIVES ON PLAYABILITY RESEARCH
Good playability of a game should be a prerequisite for evaluating game experience. A game design should not contain any problems that could get in the way of an individual game experience. One method of evaluating playability is expert review or heuristics, which is a cost-efficient and effective technique to identify playability problems. It can be used iteratively at any point during the game development process. The method has been used successfully to evaluate traditional software, but for it to be applicable in game evaluations specifically designed heuristics are needed [11]. There are some playability heuristic sets currently available [4, 5, 9, 10], which can guide and help experts to evaluate user interface, gameplay and many other aspects of a game.

Next to general heuristics, which cover different aspects of a game, usability heuristics with a special focus on technical [18] or learning aspects of games [12] are also available. However, the development of playability heuristics is still ongoing and more research is needed to create a coherent set of playability heuristics that can be used to evaluate all kinds of digital games in all kinds of different settings and environments, in players’ homes or on mobile devices. This presentation will investigate the benefits and challenges of applying playability heuristics for gaming in different contexts.

BIOMETRICS AND PLAYER EXPERIENCE
One way of understanding playability is using biometrics or psychophysiological measures. There are two ways to measure game experience within psychophysiology: tonic and phasic. Tonic refers to an analysis of aggregate signal levels during a long period of play. Phasic refers to event-based analysis of playability (for a methodology see [14]). There are several different biometric signals that can be used for measuring playability [13, 15, 20]. An example of phasic game experience analysis is Ravaja’s experiment on facial muscle activity during death events [20]. According to this study a game elicits positive player emotions during death events.

Electromyography (EMG) is a measurement technology for recording the electrical activation of muscles. Together with skin conductance (EDA), facial EMG allows mapping of player emotions in the circumflex model of emotions [21]. In addition, brain waves (EEG) are usually described in terms of frequency bands which allow inferences to be made about mental idleness, cognitive processing, emotions, and sensations of players. Finally, eye trackers measure the saccades (fast movements) and fixations (dwell times) of human gaze, which also allows assessment of cognitive processes. The great benefit of using biometrics is that they covertly record information during gameplay without disturbing the player.

GAMEPLAY METRICS AND PLAYER EXPERIENCE
Game testing during and after production has been performed for decades, however traditionally using informal methods. Recently, a variety of methodologies have been adapted from human-computer interaction (HCI)
to assist with this process [16]. One of the more promising methods considers integrating gameplay metrics with traditional attitudinal data [8, 22]. Gameplay metrics are numerical data obtained from the user interaction with the game software. Metrics are objective; can be collected in large numbers from many users, and map to specific points in a game (for example game events [14, 20]). In comparison, player-based feedback has lower resolution and is inherently biased due to individual preferences. However, while gameplay metrics analysis is excellent for addressing the “what” of player behavior, the data are not always able to answer “why” the behavior emerges. This is one of the primary reasons for why the integration with qualitative methods is essential [8, 17].

Gameplay metrics form a valuable objective data source to user experience research and design, because these data offer quantitative, time-stamped information about the specific behavior of players of computer games (see Figure 1) [3, 8, 23]. By combining metrical game data with other user experience measures – biofeedback, surveys and usability methods – it is now possible to directly link game experience with game design elements.

**Figure 1:** A simple example of a gameplay metrics analysis. The diagram details a time-spent analysis of the choice of weapons equipment for a single player during 25 minutes of *Deus Ex* gameplay.

**A MULTI METHOD APPROACH ON MEASURING PLAYER EXPERIENCE**

Player experience can be measured with a broad range of variables, observing and investigating both reflective (subjectively controllable) and reflexive (objective and uncontrollable) responses. Assessing basic psychometric properties (sensitivity, reliability, validity) of these measures is a defining characteristic of our recent work on measuring and understanding player experience [1, 6, 19].

As a significant first step, we developed and validated the Game Experience Questionnaire (GEQ), which reliably distinguishes between seven different dimensions of player experience: Sensory and Imaginative Immersion, Tension, Competence, Flow, Negative Affect, Positive Affect, and Challenge [2, 7, 19]. In addition to self-report measures, we have observed a number of objective behavioral measures of player experience. The potential of overt (e.g. facial expressions) and covert (e.g. pressure exerted on an interaction device) expressions of behavior is being investigated to validly and reliably assess dimensions of player experience, such as boredom, flow and frustration.

Results using these objective measures are encouraging, showing a positive correlation between pressure exerted on the left button of the computer mouse (generally used for ‘firing’ a weapon in a game), the amount of bodily movement a player exhibits, and several player experiences, including frustration [24, 25].

To conclude, we believe that a multi-measure approach enables a fuller characterization of game experience than any single isolated measure, thus sensitizing us to the rich gamut of experiences associated with digital games.

**REFERENCES**

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