Too Many Questionnaires: Measuring Player Experience Whilst Playing Digital Games

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Abstract. Player experience is an important area of research in digital games. The findings are crucial for the developers, designers and reviewers of games, allowing for the better understanding of player experience whilst playing digital games. Questionnaires are a way to directly measure the reported experiences of players. This approach in games research, however, is challenging for new researchers because of the proliferation of questionnaires available. The problem is knowing which questionnaires are measuring what aspect of experience. This paper sets out the need for positioning the various questionnaires in relation to each other. We list all the current available questionnaires to measure engagement whilst playing digital games. We, therefore, argue that further investigation on these questionnaires is needed to produce better quality questionnaires and reduce confusion amongst player experience researchers.

1 Introduction and Motivation

Terms such as fun, flow, presence and immersion amongst others have been used to describe the experience of playing digital games [1,2]. Though there are many objective (e.g. physiological assessment, such as heart rate measurements, electromyography (EMG), electrodermal activity (EDA), etc.) and subjective (e.g. interviews and focus groups) ways of assessing player experience, they must all at some point reference the subjective nature of individuated experiences. Questionnaires are a useful research method to directly quantify the subjective player experience because they are both easy to deploy and provide a standardised test for quantifying a particular aspect of experience under consideration [3]. Additionally, questionnaires allow players to express their subjective experience albeit within the parameters set by the items of the questionnaire.

Questionnaire is a technique that allows participants to convey their thoughts and feelings within the framework of set questions. These questions act as prompts to the participant – allowing them to consider specific aspects of their gaming experience. More importantly, the written questionnaire also ensures that the same specific aspects are considered by all participants, hence, offering consistency and uniformity.

However, there are a few drawbacks of using questionnaires to measure player experience. Aside from the more obvious problems, such as participants not taking a questionnaire seriously, there is also a less evident and more profound

problem – namely the wording of the questions themselves that reduce the face validity [3], and equally the way in which (and the scale upon which [4]) the participants answer them.

As there are many aspects of player experience, there are many questionnaires that are currently used in order to measure them. Some questionnaires take a broad brush approach looking at all aspects of gaming experience [5,6], others take a specific aspect, such as immersion [7] or motivation [8]. In one sense this proliferation of questionnaires helps researchers to home in on the aspect of concern, but at the same time it can be confusing as to whether questionnaires that purport to measure the same thing (or even apparently different things) are in fact measuring the same thing.

This is not to say that there should only be one questionnaire. The variety in questionnaires is necessary to allow a nuanced focus on different aspects of games. But where, for example, different questionnaires claim to be measuring engagement, they ought to produce consistent and correlated results.

2 Player Engagement Questionnaires

Existing models of player experience use their own questionnaires to measure the overall engagement when playing a game based on certain aspects that influence the game enjoyment. A summary of the most widely used questionnaires is presented in Table 1.

Such a large number of existing questionnaires poses a challenge for new researchers, who may not necessarily be familiar with every specific detail of each theory. Choosing one of them is therefore often based on their availability – many of these questionnaires are not available publicly, or it may be needlessly challenging to obtain some of them. So eventually only those ones that are easily accessible tend to be used for measuring player experience.

Moreover, in order to obtain reliable results, the data needs to be gathered using a reliable questionnaire. Unfortunately, some of existing questionnaires are not statistically validated, and are eventually avoided as they are presumed to not be trustworthy.

Gaming Engagement Questionnaire (GEQ) [5] and Immersive Experience Questionnaire (IEQ) [7], are prominent examples of questionnaires set up in a similar way in order to evaluate player experience. Amongst other questionnaires reviewed in table 1, these two are available publicly and have more similarities between them, than the rest of them. The GEQ was initially developed to assess the impact of deep engagement in violent video games. The questionnaire itself consists of 19 positively worded questions answered on a five-point Likert scale: the higher the score that the user gives for each question, the more engaged they are deemed to be. The formulation of the questionnaire puts engagement on a single dimension that ranges up from immersion to flow. This questionnaire, however, has relatively little empirical validation that has been undertaken to establish the reliability of the questionnaire in part because of its (relatively) recent introduction to the field.

Questionnaire	Components
Flow Questionnaire [9]	Clear goals High concentration Reduced self-consciousness Distorted sense of time Direct and immediate feedback Balance between ability level and challenge A sense of personal control Intrinsically rewarding activity
Presence Questionnaire [10]	Control factor Sensory factor Distraction Realism factor
Immersive Experience Questionnaire (IEQ) [7]	Emotional involvement Cognitive involvement Real world dissociation Challenge Control
GameFlow Questionnaire [11]	Concentration A sense of challenge Player skills Control Clear goals Feedback Social interaction Immersion
Game Engagement Questionnaire (GEQ) [5]	Absorption Flow Presence Immersion
Player Experience of Needs Satisfaction (PENS) [12]	Competence Autonomy Relatedness Presence (Immersion)
Social Presence in Gaming Questionnaire (SPGQ) [13]	Psychological involvement (empathy) Psychological involvement (negative feelings) Behavioural engagement

Table 1. Questionnaires measuring user engagement whilst playing digital games.

On the other hand, the IEQ is a widely used questionnaire in determining the levels of immersion experienced by players. It has been tested much more empirically across a far-reaching array of different scenarios and game types, for example [14,15,16]. Similarly to the GEQ, it uses five-point Likert scale questions for measuring player experience, but is specifically focused on the notion of immersion when playing games. Unlike the GEQ, the IEQ uses both positive statements and negative statements. Each positively worded statement has a negatively worded counterpart, adding an additional layer of accuracy. The overall score is composed of the summary of the results from the positive questions, as well as the inverted results of the negative ones. The development of the IEQ also suggested that there are five factors underlying immersion, but in practice immersion is also treated as a single dimension with the factors lending aspect for interpretation of results.

3 Proposed Design for the Future Work

As mentioned earlier, several challenges arise, particularly for the new player researchers, when investigating player experience while playing digital games. Usability also appears to be an issue that affects questionnaires [17].

In this position paper, we, therefore, are proposing our idea to investigate two of the main questionnaires used for measuring the experience of playing digital games, namely the Immersive Experience Questionnaire (IEQ) [7] and the Game Engagement Questionnaire (GEQ) [5] to test whether they are both measuring the same experience. Given the similar emphasis of these two questionnaires, it seems reasonable that they are in fact addressing the same underlying aspect of player experience. However, the question is whether this is in fact the case.

Work is underway to test the hypothesis that the IEQ scores are correlated to the GEQ scores. The design of the experiment will involve the manipulation of player experience by using music, as in work of Sanders et al. [16]. Player experience will be measured using both questionnaires, and the results obtained using each questionnaire will be compared. We believe the results will provide an insight to address any potential problem of having multiple measurement tools.

References

1. R. Bernhaupt, M. Eckschlager, and M. Tscheligi, "Methods for evaluating games: how to measure usability and user experience in games?" in *Proceedings of the international conference on Advances in computer entertainment technology*. ACM, 2007, pp. 309–310.
2. E. Brown and P. Cairns, "A grounded investigation of game immersion," in *CHI '04 extended abstracts on Human factors in computing systems*, ser. CHI EA '04, 2004, pp. 1297–1300. [Online]. Available: http://doi.acm.org/10.1145/985921.986048
3. A. Adams and A. L. Cox, *Research methods for human-computer interaction*. Cambridge, UK: Cambridge University Press, 2008, ch. Questionnaires, in-depth interviews and focus groups.
4. E. A. Greenleaf, "Improving rating scale measures by detecting and correcting bias components in some response styles." *Journal of Marketing Research*, 1992.
5. J. H. Brockmyer, C. M. Fox, K. A. Curtiss, E. McBroom, K. M. Burkhart, and J. N. Pidruzny, "The development of the game engagement questionnaire: A measure of engagement in video game-playing," *Journal of Experimental Social Psychology*, vol. 45, no. 4, pp. 624–634, 2009.
6. H. Qin, P. Rau, and G. Salvendy, "Measuring player immersion in the computer game narrative," *Intl. Journal of Human–Computer Interaction*, vol. 25, no. 2, pp. 107–133, 2009.
7. C. Jennett, A. L. Cox, P. Cairns, S. Dhoparee, A. Epps, T. Tijs, and A. Walton, "Measuring and defining the experience of immersion in games," *International Journal of Human-Computer Studies*, vol. 66, no. 9, pp. 641 – 661, 2008. [Online]. Available: http://www.sciencedirect.com/science/article/pii/S1071581908000499
8. J. P. Gee, "What video games have to teach us about learning and literacy," *Computers in Entertainment (CIE) - Theoretical and Practical Computer Applications in Entertainment*, vol. 1(1), 2002.
9. M. Csikszentmihalyi, *The flow experience and its significance for human psychology*. Cambridge University Press, Cambridge, UK, 1998, ch. In: Optimal experience: psychological studies of flow in consciousness, pp. 15–35.
10. B. Witmer and M. Singer, "Measuring presence in virtual environments: A presence questionnaire," *Presence*, vol. 7, no. 3, pp. 225–240, 1998.
11. P. Sweetser and P. Wyeth, "Gameflow: A model for evaluating player enjoyment in games," *ACM Computers in Entertainment*, vol. 3 (3), 2005.
12. R. M. Ryan, C. S. Rigby, and A. Przybylski, "The motivational pull of video games: A self-determination theory approach," *Motivation and Emotion*, vol. 30, no. 4, pp. 344–360, 2006.
13. Y. de Kort, W. IJsselsteijn, and K. Poels, "Digital games as social presence technology: Development of the social presence in gaming questionnaire (spgq)," in *Proceedings of PRESENCE 2007: The 10th International Workshop on Presence*, 2007, pp. 195–203.
14. A. Cox, P. Cairns, P. Shah, and M. Carroll, "Not doing but thinking: the role of challenge in the gaming experience," in *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems*. ACM, 2012, pp. 79–88.
15. M. Thompson, A. Nordin, and P. Cairns, "Effect of touch-screen size on game immersion," *BCS HCI 2012*, 2012.
16. T. Sanders and P. Cairns, "Time perception, immersion and music in videogames," in *Proceedings of the 24th BCS Interaction Specialist Group Conference*. British Computer Society, 2010, pp. 160–167.

17. P. Cairns, "A commentary on short questionnaires for assessing usability," *Interacting with Computers*, p. iwt019, 2013.