Abstract

Mobile game addiction is a significant aspect of consideration as there has been notable growth in mobile game usage. However, game developers face numerous obstacles with respect to educational mobile games in terms of engagement, commitment, likeability and usage. This study proposes an approach to understanding the contributors to addiction in mobile games, with the intent of designing educational games that overcome the aforementioned obstacles. These contributors were extrapolated upon analysis of the most popular games as seen from an accordingly curated questionnaire. A general user flow framework was proposed to leverage the underlying mechanisms of addiction in mobile games to make educational games more effective. Furthermore, this study expands on the general guidelines for designing addictive educational mobile games.

References

1. Gough, C. (2018, February 20). Number of mobile gamers worldwide 2014-2021, Statista,
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Retrieved from https://www.statista.com/statistics/748089/number-mobile-gamers-world-platform/

2. Green, A. (2019, December 30). Mobile Gaming Generated 60% of the Global Video Games Revenue in 2019, Golden Casino News, Retrieved from https://goldencasinonews.com/blog/2019/12/30/mobile-gaming-generated-60-of-the-global-video-games-revenue-in-2019/

3. RealityMine, MYTH BUSTING: MOBILE GAMING DEMOGRAPHICS, MMA, Retrieved from https://www.mmaglobal.com/research/myth-busting-mobile-gaming-demographics#:~:text=With %20a%20mobile%20device%20always,so%20are%20mobile%20gaming%20demographics/

4. Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (Eds.). (1992). Optimal experience: Psychological studies of flow in consciousness. Cambridge university press.

5. Seah, M. L., & Cairns, P. (2008). From immersion to addiction in videogames. People and Computers XXII Culture, Creativity, Interaction 22, 55-63.

6. Hafeez, Maria & Idrees, Dawood & Kim, Jung-Yong. (2017). Game Addiction: A Brief Review. International Journal of Scientific Engineering and Research (IJSER). 5. 99-104.

7. Chou, T. J., and Ting, C. C. (2003). The role of flow experience in cyber-game addiction. CyberPsychology and Behavior, 6(6), 663-675

8. Sun, Y., Zhao, Y., Jia, S. Q., & Zheng, D. Y. (2015). Understanding the Antecedents of Mobile Game Addiction: The Roles of Perceived Visibility, Perceived Enjoyment and Flow. In PACIS (p. 141).

9. Asadi, A. R., & Hemadi, R. (2018, November). Understanding Virtual Currencies in Video Games: A Review. In 2018 2nd National and 1st International Digital Games Research Conference: Trends, Technologies, and Applications (DGRC) (pp. 109-117). IEEE.

10. Hoffmann, G., Martin, R., & Weinhardt, C. (2019, September). Perfectionism in Games-Analyzing Playing Behaviors in an Educational Game. In 2019 11th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games) (pp. 1-4). IEEE. (1.5)

11. Sweetser, P., & Wyeth, P. (2005). GameFlow: a model for evaluating player enjoyment in games. Computers in Entertainment (CIE), 3(3), 3-3. (3.3)3

12. Griffiths, Mark. (2010). Does video game addiction really exist?. Education Today: Quarterly Journal of the College of Teachers. 60. 28-32.

13. Wang, H., & Sun, C. T. (2011, September). Game reward systems: Gaming experiences and social meanings. In DiGRA conference (Vol. 114)

14. Flunger, R., Mladenow, A., & Strauss, C. (2017, December). The free-to-play business model. In Proceedings of the 19th International Conference on Information Integration and Web-based Applications & Services (pp. 373-379). (1.12)

15. Artificial Scarcity, Wikipedia, Retrieved From https://en.wikipedia.org/wiki/Artificial_scarcity

16. Hamari, Juho, and Vili Lehdonvirta. "Game design as marketing: How game mechanics create demand for virtual goods." International Journal of Business Science & Applied Management 5.1 (2010): 14-29.

17. Sun, E., Jones, B., Traca, S., & Bos, M. W. (2015, April). Leaderboard position psychology: counterfactual thinking. In Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems (pp. 1217-1222).

18. Hodent, C. The gamer's brain.
19. Lin, L., Parmar, D., Babu, S. V., Leonard, A. E., Daily, S. B., & Jörg, S. (2017, September). How character customization affects learning in computational thinking. In Proceedings of the ACM Symposium on Applied Perception (pp. 1-8).

20. Turkay, S., & Kinzer, C. K. (2014). The effects of avatar-based customization on player identification. International Journal of Gaming and Computer-Mediated Simulations (IJGCM), 6(1), 1-25.

21. De Lope, R. P., Medina-Medina, N., Soldado, R. M., García, A. M., & Gutiérrez-Vela, F. L. (2017, September). Designing educational games: Key elements and methodological approach. In 2017 9th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games) (pp. 63-70). IEEE.

22. Longstreet, C. S., & Cooper, K. (2014, July). Curriculum design factors for constructing serious educational game: A learning objective centric approach. In 2014 Computer Games: AI, Animation, Mobile, Multimedia, Educational and Serious Games (CGAMES) (pp. 1-5). IEEE.

23. Papadimitriou, S., Chrysafiadi, K., & Virvou, M. (2019, August). Evaluating the use of fuzzy logic in an educational game for offering adaptation. In 2019 International Conference on Computer, Information and Telecommunication Systems (CITS) (pp. 1-5). IEEE.

24. De Lope, R. P., & Medina-Medina, N. (2016, September). Using UML to Model Educational Games. In 2016 8th International Conference on Games and Virtual Worlds for Serious Applications (VS-GAMES) (pp. 1-4). IEEE.

**Index Terms**

Computer Science          Information Sciences

**Keywords**

Mobile Game Addiction, Educational Games, Flow, Game Mechanics