Levelling Up Children's Advertising Literacy!

Investigating the Affective, Motivational and Learning Outcomes of Playing a Digital Game for Learning Aimed at Improving Children's Advertising Literacy

Laura Herrewijn, Steffi De Jans, Veroline Cauberghe & Liselot Hudders

This document is an extended abstract of an article that was submitted to an international peer-reviewed journal and forms part of the 'AdLit' (Advertising Literacy) research project. AdLit is a four-year interdisciplinary research project on advertising literacy, which is funded by VLAIO (Flanders Innovation & Entrepreneurship). The main goal of the AdLit project is to investigate how we can empower children and youth to cope with advertising, so that they can grow up to be critical, informed consumers who make their own conscious choices in today's new media environment.

Introduction

Today's children are growing up surrounded by advertising. They are confronted with advertising everywhere: in the street, in stores, during events, at school and in their homes. They are exposed to it when watching television, listening to the radio, flipping through papers and magazines, while browsing the Internet and playing games on their computer and mobile devices. Moreover, in order to effectively reach their target groups in this cluttered and increasingly digital advertising environment, advertisers are continuously searching for new advertising strategies. Nowadays, these advertising strategies often include the use of integrated ad formats such as product placement and sponsored content (e.g. in digital games, in television programs, in online videos), as well as formats that are interactive in nature, encouraging consumers to actively engage with its commercial content such as in advergames, co-creation and viral marketing. It is often impossible to skip the commercial messages in these instances and the interactive character of the experiences makes them more enjoyable and involving as well, causing (especially inexperienced) consumers to be less aware and critical about the commercial messages that are encountered. Consequently, concerns have been voiced that advertising might be persuading children at an unconscious level, which can result in increased pester power and related parent-child conflicts, and in the long-term even increased levels of materialism and unhappiness (Bandyopadhyay, Kindra & Sharp, 2001; Buijzen, van Reijmersdal & Owen, 2010; Macklin, 2003).

It is therefore imperative to empower children with respect to advertising in all its forms by improving their advertising literacy, or their knowledge and skills to cope with advertising (Boush, Friestad & Rose, 1994; Buijzen et al., 2010). The aim of the current study is to contribute to the investigation and improvement of children's advertising literacy by testing the effectiveness of an advertising literacy intervention that was designed by the researchers in function of the AdLit research project (http://www.adlit.be/). Prior research has primarily focused on providing interventions in the form of traditional classroom lessons (e.g. Hudders, Cauberghe & Panic 2016; De Jans, Hudders & Cauberghe,

2017; Nelson, 2016). This study, however, examines the potential of an intervention in the form of a digital game for learning, specifically aimed at improving the advertising literacy of children under 12 years old. The game is available online (http://reclamewijs.ugent.be/kermis/) and consists of a series of mini-games that each focus on teaching a specific skill (e.g. the recognition of brands, the recognition of advertising strategies and formats). Each mini-game first provides instructions on the goal of each game and how to play, and gives immediate feedback on players' performance by means of sounds and visual changes in game scores. The game can be played in a class environment or at home, with one or two players (i.e. children can play the game together with a friend or family if they want). The current study investigates the effectiveness of the intervention in a class environment.

Digital game-based learning

Digital games offer several advantages as a tool for education. First, they have become an integral and popular part of our culture. 2.2 billion people from all socio-demographic backgrounds are now spending more and more of their leisure time playing games (Newzoo, 2017). Importantly, children constitute a considerable part of this game-playing population. In its yearly study on the sales, demographic and usage data of games in the U.S., the Entertainment Software Association (2018) states that 17 percent of male gamers and 11 percent of female gamers are under 18 years old. Moreover, research on media literacy shows that playing games ranks among the most popular everyday media activities for our demographic (Ofcom, 2017). Among 5- to 7-year-olds, 66 percent already play games, for nearly 7.5 hours a week. Among 8- to 11-year-olds, this even increases to 81 percent, for nearly 10 hours a week (Ofcom, 2017). As such, it is clear that games already play a central role in children's lives.

The appeal of digital games furthermore lies in their ability to provoke highly interactive, involving and enjoyable experiences in those playing them (Hamari et al., 2016; Olson, 2010; Papastergiou, 2009; Poels et al., 2007). Gaming is an active undertaking, where a player is cast in the role of protagonist and is often deeply absorbed in a myriad of events and stories, potentially arousing a wide variety of affective experiences such as fun, challenge, competence, flow, immersion, and so on (Poels et al., 2007). These experiences generally lead to players wanting to pay attention to and engage with the material in the game just for the sake of it, and it is these intrinsically motivating features of digital games that have led to optimism that games might provide a useful and attractive new method of learning (Connolly et al., 2012). In particular, young people's interest in traditional educational content taught in a class context is often lacking, as the materials and exercises are seen as tedious and meaningless (Papastergiou, 2009). This means that students are often interacting with the material because they are extrinsically motivated to perform (i.e. their motivation to learn is due to some outside force, such as parental pressure) (Deci & Ryan, 2000; Hanus & Fox, 2015). However, the experience of playing games could be combined with curricular contents, giving rise to the notion of digital game-based learning (Prensky, 2003). Games that include educational content are believed to be able to intrinsically motivate students to learn, making learning more enjoyable and more interesting for them (Papastergiou, 2009; Prensky, 2003). Research furthermore shows that intrinsically motivated students are often more involved, retain information better, and are generally happier (Deci & Ryan, 2000; Hanus & Fox, 2015). Additionally, modern theories on learning suggest that learning is the most effective when it is active, experiential, situated, problem-based and provides immediate feedback (Boyle, Connolly & Hainey, 2011). Games are perfectly suited to offer experiences that have all of these features (Connolly et al., 2012).

Affective, motivational and learning outcomes

Despite all of the benefits games have that should make it a superior medium for effective learning, the empirical evidence to support this assumption is still limited and often contradictory (Boyle et al., 2016;

Connolly et al.,2012; Papastergiou, 2009). This may be because games for learning are still developed, used and studied to purely support knowledge acquisition (Boyle et al., 2016; Connolly et al.,2012). While some studies (across a range of curricular areas) found a positive effect of game-based learning on knowledge acquisition (e.g. Arnab et al., 2014; Beale et al., 2007; Papastergiou, 2009), others found no increase in knowledge between a game playing group, a control group and/or a traditional learning group (e.g. Nishikawa & Jaeger, 2011; Sward et al., 2008), or even negative effects (e.g. McKenzie, 2013; Rondon, Sassi & de Andrade, 2013). However, while most of the studies looking at the impact of game-based learning on knowledge acquisition start by championing games as a highly involving and motivating method for learning, they do not (or only barely) take into account their actual affective and motivational outcomes, let alone a wider variety of effectiveness measures such as skill acquisition outcomes, soft and social skills, and behavior change (Boyle et al., 2016; Connolly et al.,2012).

The current study therefore aims to contribute to the current body of literature on digital game-based learning by investigating different dimensions of the effectiveness of the game for learning that was developed, and comparing them to the effects of providing students with no intervention or a more traditional intervention. The study does not only consider the knowledge that students perceive to gain regarding advertising and advertising literacy by being exposed to the interventions, but also the students' affective experiences during exposure (e.g. enjoyment, involvement), their attitudes towards the intervention, their motivation to interact with it again in the future (e.g. desire to play the game again), as well as their actual advertising literacy skills (e.g. can students actually recognize brands and advertising (strategies, formats) when being shown new material not included in the interventions). This way, we are able to assess the affective, motivational and learning outcomes of playing the game, and investigate whether and how they relate to each other.

Method

To analyze the effectiveness of the digital game for learning that we developed, we carried out a between-subjects experimental study among 113 students (45 male, 68 female) between 9 and 12 years old (M$_{age}$=9.8, SD=.79) from four primary schools located in Flanders, Belgium.

The study compared between four groups, namely a control group receiving no intervention, and three experimental groups: a group in which participants played the game alone (i.e. the 1 Player (1P) game group), a group in which participants played the game together with a classmate (i.e. the 2P game group, to see whether social interaction influences the game's effectiveness), and a group that was exposed to an alternative, more traditional intervention method (specifically, a digital brochure containing the exact same information that was communicated in the game, i.e. the brochure group).

In all four groups, participants filled out a questionnaire after being exposed to the intervention, asking them about their socio-demographical information, user experience during the intervention, attitude towards the intervention and motivation to interact with it in the future, perceived learning and actual advertising literacy skills (e.g. asking students to identify brands and advertising (strategies, formats)).

Results

Regarding the affective outcomes, results show significant differences between the experimental groups for both enjoyment ($F(2,80)=7.60$, $p=.001$) and involvement ($F(2,80)=4.75$, $p=.01$). Specifically, participants in the 2P (M=4.7, SD=.41) and 1P (M=4.43, SD=.69) game groups found the intervention to be significantly more enjoyable than participants in the brochure condition (M=4.02, SD=.79). A similar trend could be observed for involvement: participants in the 2P (M=4.27, SD=.73) and 1P (M=3.99, SD=.75) game groups experienced higher degrees of involvement while being exposed to the

intervention compared to participants in the brochure group (M=3.67, SD=.71), with the significant differences situated between the 2P game group and brochure group.

Results on the motivational outcomes furthermore demonstrate that there were significant differences between the experimental groups concerning attitude towards the intervention ($F_{(2,80)}=13.11$, $p<.001$), as well as motivation to engage with the intervention again ($F_{(2,80)}=9.96$, $p<.001$) in the future. Participants in the 2P (M=4.64, SD=.64) and 1P (M=4.44, SD=.70) game groups had a significantly more positive attitude towards the intervention than participants in the brochure group (M=3.81, SD=.60). The 2P (M=4.76, SD=.52) and 1P (M=4.41, SD=1.08) game groups were also more motivated than the brochure group (M=3.65, SD=1.11) to interact with the intervention again. Mediation analyses were conducted to see if the affective variables were the underlying mechanisms that drove the effects on the motivational outcomes. Results confirmed that the interventions indirectly affected participants' attitudes towards them via enjoyment (a*b=.08, SE=.04, 95%-CI=[.01,.16]) and involvement (a*b=.11, SE=.05, 95%-CI=[.03,.22]), and that the motivation to engage with the intervention in the future was indirectly affected through involvement (a*b=.13, SE=.08, 95%-CI=[.004,.31]).

Regarding the learning outcomes, results showed no significant differences between the experimental groups regarding perceived learning ($F_{(2,80)}=.09$, NS). However, results of the tests that measured participants' actual advertising literacy skills (specifically: recognition of brands ($F_{(3,109)}=2.84$, $p=.04$), recognition of advertising strategies ($F_{(3,109)}=4.88$, $p=.003$) and recognition of advertising formats ($F_{(3,109)}=6.2$, $p=.001$)) demonstrated that participants in the experimental groups did have a significantly improved advertising literacy over participants in the control group, although the differences between the experimental groups themselves remained non-significant. The aforementioned affective and motivational variables did not mediate the effects of the interventions on learning.

Discussion

Active learning methods such as game playing are believed to be able to intrinsically motivate students to learn, making learning more enjoyable and involving for them, ultimately resulting in a better retention of information (Deci & Ryan, 2000; Hanus & Fox, 2015; Papastergiou, 2009; Prensky, 2003). The current study adds to the literature on both advertising literacy and digital game-based learning by showing the potential of using a digital game to teach advertising literacy skills in a classroom environment. Taking a look at the game's effects (both affective, motivational and with regards to learning) among 9- to 12-year olds, results demonstrate that using a game-based intervention is as effective in supporting knowledge and skill acquisition as a more traditional intervention. Importantly, the game was experienced to be significantly more enjoyable and involving, leading to students evaluating it more positively and being more motivated to interact with it again in the future. These effects were even stronger when the game was played together with a classmate, and thus experienced in a context of social interaction and cooperative play. Finally, this increased affective and motivational effectiveness of the game-based intervention could result in more powerful learning effects in the long run as well. Future research should consider taking into account a long-term intervention with a follow-up test to provide more insights into how affective, motivational and learning outcomes are related to each other over time.

References

Arnab, S., Lim, T., Carvalho, M. B., Bellotti, F., de Freitas, S., Louchart, S., et al. (2014). Mapping learning and game mechanics for serious games analysis. *British Journal of Educational Technology*, 46(2), 391-411.

Bandyopadhyay, S., Kindra, G. & Sharp, L. (2001). Is television advertising good for children? Areas of concern and policy implications. *International Journal of Advertising*, 20, 89-116.

Beale, I. L., Kato, P. M., Marin-Bowling, V. M., Guthrie, N., & Cole, S.W. (2007). Improvement in cancer-related knowledge following use of a psychoeducational video game for adolescents and young adults with cancer. *Journal of Adolescent Health*, 41, 263–270.

Boush, D.M., Friestad, M., & Rose, G.M. (1994). Adolescent skepticism toward TV advertising and knowledge of advertiser tactics. *Journal of Consumer Research*, 21(1), 165–175.

Boyle, E., Connolly, T. M., & Hainey, T. (2011). The role of psychology in understanding the impact of computer games. *Entertainment Computing*, 2, 69-74.

Boyle, E. A., Hainey, T., Connolly, T. M., Gray, G., Earp, J., Ott, M., Lim, T., Ninaus, M., Ribeiro, C., Pereira, J. (2016). An update to the systematic literature review of empirical evidence of the impacts and outcomes of computer games and serious games. *Computers & Education*, 94, 178-192.

Buijzen, M., Van Reijmersdal, E. A., & Owen, L. H. (2010). Introducing the PCMC model: An investigative framework for young people's processing of commercial media content. *Communication Theory*, 20, 427-450.

Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., & Boyle, J. M. (2012). A systematic literature review of empirical evidence on computer games and serious games. *Computers & Education*, 59, 661-686.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268.

De Jans, S., Hudders, L., & Cauberghe, V. (2017). Advertising literacy training: The immediate versus delayed effects on children's responses to product placement. *European Journal of Marketing*, 51(11/12), 2156–2174.

Entertainment Software Association (2017). 2018 Sales, Demographic, and Usage Data. Essential Facts about the Computer and Video Game Industry. Available at http://www.theesa.com/wp-content/uploads/2018/05/EF2018_FINAL.pdf.

Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. *Computers in Human Behavior*, 54, 170-179.

Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, 80, 152-161.

Hudders, L., Cauberghe, V., & Panic, K. (2016). How advertising literacy training affect children's responses to television commercials versus advergames. *International Journal of Advertising*, 35(6), 909–931.

Macklin, M. C. (2003): Children: Targets of Advertising. In: *Encyclopedia of Advertising* (pp. 294–298), E. McDonough (Ed.), New York, NY: Fitzroy Dearborn.

McKenzie, K. (2013). A comparison of the effectiveness of a game informed online learning activity and face to face teaching in increasing knowledge about managing aggression in health settings. *Advances in Health Sciences Education*, 18(5), 917-927.

Nelson, M. R. (2016). Developing Persuasion Knowledge by Teaching Advertising Literacy in Primary School. *Journal of Advertising*, 45(2), 169–182.

Newzoo (2017). The Global Games Market Will Reach $108.9 Billion in 2017 with Mobile Taking 42%. Available from https://newzoo.com/insights/articles/the-global-games-market-will-reach-108-9-billion-in-2017-with-mobile-taking-42/.

Nishikawa, K. A., & Jaeger, J. (2011). A computer simulation comparing the incentive structures of dictatorships and democracies. *Journal of Political Science Education*, 7(2), 135-142.

Ofcom (2017). Children and parents: media use and attitudes report 2017. Available at https://www.ofcom.org.uk/research-and-data/media-literacy-research/childrens/children-parents-2017.

Olson, C. K. (2010). Children's Motivations for Video Game Play in the Context of Normal Development. *Review of General Psychology*, 14(2), 180-187.

Papastergiou, M. (2009). Digital Game-Based Learning in high school Computer Science education: Impact on educational effectiveness and student motivation. *Computers & Education*, 52, 1-12.

Prensky, M. (2003). Digital game-based learning. *ACM Computers in Entertainment*, 1(1), 1–4.

Poels, K., de Kort, Y. A. W., & IJsselsteijn, W. A. (2007). "It is always a lot of fun!" Exploring Dimensions of Digital Game Experience using Focus Group Methodology. *Proceedings of Futureplay 2007* (p. 83-89), ACM Digital Library.

Rondon, S., Sassi, F. C., & de Andrade, C. R. F. (2013). Computer game-based and traditional learning method: a comparison regarding students' knowledge retention. *BMC Medical Education*, 13(1), 30.

Sward, K. A., Richardson, S., Kendrick, J., & Maloney, C. (2008). Use of a Web-Based Game to Teach Pediatric Content to Medical Students. *Academic Pediatrics*, 8(6), 354-359.