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The Context Dependency of Four Persuasive Game Design Principles

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Abstract This paper explores the context dependency of four popular persuasive game design principles in order to improve their effective implementation. To prevent the use of badly chosen design principles that can be counterproductive, other authors showed the importance of tailoring persuasive game design principles to various gamer personalities. In this paper we aim to further theoretically explore the context dependency of four popular principles. With the elaboration likelihood model as a framework, we present examples of different scenarios that describe how these four persuasive game design principles can either enhance or reduce the motivation and/or ability of the player to elaborate on the persuasive message of the game. Although we emphasize the theoretical nature of this paper, it may form a starting point for experimental research on persuasive game design principles. Results from this future research will ultimately contribute to the overall effectiveness of persuasive games, whose application is valuable within an active learning context.

Keywords Persuasive game design principles · Context dependency · ELM model

1 Introduction

The main goal of persuasive games is to shape, reinforce or change players' attitudes or behaviour beyond the gaming session [1]. Their design principles can be considered the key drivers of their success [2]. Unfortunately few guidelines exist concerning the effective implementation of these persuasive game design principles [3]. The choice and the suitability of a design principle that contributes to the persuasive message of the game are therefore often based on a designer's own intuition [4].

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To prevent the use of badly chosen persuasive design principles that can be counterproductive, research shows the importance of tailoring [5]. Elaborating on these findings, Orji et al. [4] suggest a design approach for tailoring persuasive game design principles to various gamer personalities.

Apart from players' personalities, we believe there are more context factors that might improve the effective implementation of persuasive game design principles. In this paper we therefore aim to further explore the context dependency of persuasive game design principles and suggest how game designers can take this into account when selecting and implementing these principles.

We assume that in many cases, persuasive game designers want to reach a large and diverse group of gamers with their design. For this exploration we therefore chose to focus on four popular (interrelated) persuasive game design principles with an overall good average effect across gamer types as identified by Orji et al. [4]: *self-monitoring and suggestion* and *competition and comparison*. Next our research question is the following: how does the effectiveness of these four popular persuasive game design principles depend on the context in which they are applied?

To clarify our research method, we first give a brief overview of the origin of the four selected persuasive game design principles of our exploration.

1.1 Origin of Selected Persuasive Game Design Principles

Based on a literature review on persuasive games and the design principles they used, Orji et al. [4] identified ten popular persuasive game design principles that originate from the field of persuasive technology (PT), more specifically from prior research of Fogg [6] and Oinas-Kukkonen and Harjumaa [7].

Fogg holds the most dominant perspective on persuasion through technology (including digital games) [6]. According to his behaviour model for persuasive design [8], behaviour is a product of three factors: motivation, ability and triggers. For a desired behaviour to occur, these three elements must converge at the same moment. When the behaviour does not occur, the model argues that at least one of the elements is missing. Considering the model to be too limited to be applied directly to persuasive system development, Oinas-Kukkonen and Harjumaa [7] elaborated on Fogg's work and developed the Persuasive Systems Design (PSD), suggesting 28 persuasive system design principles.

Limitations As also noted by Kors et al. [3], we believe Fogg's perspective on persuasion seems somewhat limiting. It's main focus seems to lie on simply making the user do what the system requests. How attitudes are actually shaped through the interaction with the system to influence consistent behaviour seems rather overlooked. Kors et al. [3] emphasize that this is surprising since "the substantial attitude-behaviour relationship that is inherent to persuasion seems ignored".

Since the persuasive design principles of Oinas-Kukkonen and Harjumaa [7] are partly based on Fogg's perspective and the selected game design principles of Orji et al. [4] are subsequently build upon their work, we argue that the selected persuasive game design principles *self-monitoring and suggestion* and *competition and comparison* might be limited concerning their persuasive effects.

1.2 Method: The Elaboration Likelihood Model as a Framework for Our Theoretical Exploration

Due to the underexposed role of attitude formation concerning persuasion through technology (including persuasive game design principles), we chose the elaboration likelihood model (ELM) [9] as a framework for our exploration, following Kors et al. [3]. This model of persuasion from the field of social psychology, namely, specifically focuses on the actual formation of attitudes and describes how likely a person would change his/her attitudes based on a persuasive message [9]. The process of generating favourable and unfavourable evaluative reactions to the content of the message is called elaboration.

According to the ELM, the likeliness a person elaborates on a persuasive message is dependent on the level of motivation and ability. To explore how the effectiveness of the persuasive game design principles *self-monitoring and suggestion* and *competition and comparison* depends on the context in which they are applied, we therefore aim to map examples of different scenarios in which the design principles either enhance or reduce the motivation and/or ability of the player to elaborate.

Interestingly motivation and ability each have several sub-variables that subsequently affect the persuasion indirectly [10]. Motivating aspects are *relevance* of the message, *need for cognition* and *responsibility* for the message. The aspects for the ability to elaborate are *knowledge and understanding* of the message, *available time* to elaborate, *distraction* from elaboration and *repetition* of the message [11, 12]. When applied in a persuasive game design context, most of the sub-variables seem to be able to be influenced by the game designer [3]. Our exploration therefore exists of the description of examples of possible theoretical scenarios in which *self-monitoring and suggestion* and *competition and comparison* could influence the motivation and/or ability of the player to elaborate through these sub-variables. We exclude *need for cognition* for this exploration because we believe that is a personal trait that can't be influenced by the game [13].

The ELM proposes two processing modes of persuasion: the central route (in which persuasion is mediated by systematic processing of message arguments and other relevant information) and the peripheral route (which features the influence of peripheral cues and includes a variety of less effortful mechanisms) [10]. Attitude change is considered to be the most resistant and enduring when people process information via the central route [10].

1.3 Purpose of Paper and Outline

Although theoretical and explorative, the presented findings in this paper may form a starting point for future experimental research on the context dependency of persuasive game design principles. We hope to inspire game designers to improve the effectiveness of their designs and game scholars to deepen their knowledge of persuasive game design. Section 2 describes the exploration of the context dependency of *self-monitoring and suggestion* and *competition and comparison* by means of examples of possible theoretical scenarios. In Sect. 3 conclusions and limitations of this paper are discussed, and suggestions are made for future research.

2 Context Dependency of *Self-Monitoring and Suggestion* and *Competition and Comparison*

2.1 Self-Monitoring and Suggestion

The game design principle *self-monitoring* (also *feedback*) allows people to track their own behaviours, providing information on both past and current states [4]. The assumption of this design principle is that it provides players with (self) insights by examining their data and subsequently changing their behaviour based on these insights. Kersten-Van Dijk et al. [14] also call this the self-improvement hypothesis.

Suggestion is a design principle that suggests certain tasks (for achieving favourable outcomes) to players during the game [4]. It is based on the assumption that these suggested tasks motivate players to perform the desired behaviour.

Effects on Motivation Both *self-monitoring* and *suggestion* seem to be able to enhance motivation to elaborate on the persuasive message of a game through influencing the *responsibility* of the player. Through *self-monitoring* the outcome of personal efforts is made visible, and when this is accompanied by cues that emphasize the players' identity (e.g., players' name and picture), this might intensify the experience of *responsibility*. When *suggestion* points out what the possible undesired effects can be when the player does not perform the suggested task, we argue it might positively influence *responsibility* too.

Self-monitoring might also influence the feeling of *relevanc*e of the persuasive message, but we argue that this only arises when the player is able to compare his/her monitored behaviour to some standard or goal. According to Bandura's self-regulation theory [15], individuals proactively motivate and guide their actions by setting challenging goals and making effort to fulfil them. So when a standard or goal is salient, it is more likely that the player is motivated to rectify the deviations from this standard or goal [14]. Interestingly a standard can be made salient when the player can compare his/her performance in the game with that of others through a ranking list, for example.

Effects on Ability *Self-monitoring* and *suggestion* seem to be able to enhance as well as reduce the ability of the player to elaborate on the persuasive message of the game. At first they seem promising principles to provide specific *knowledge and understanding* concerning the desired behaviour. *Suggestion* can inform the player with extra knowledge why a specific task is important to perform or suggest a specific skill that is needed to perform the desired behaviour. Also within *self-monitoring* we believe this might be possible, for example, when providing feedback on current and past states of the player, extra information can be given that explains these states.

But *self-monitoring* and *suggestion* might also reduce the ability of the player to elaborate. A negative side effect of *self-monitoring* can occur when the player experiences that he/she is being observed and evaluated. According to the social facilitation effect [16], the presence of others (regardless of actual presence or via electronic means) increases an individual's level of arousal, which can inhibit the performance of behaviours that are complex or new. This suggests that during the performance of a relatively complex and new task, the player should not experience *distraction* by *self-monitoring*. The game designer can try to avoid this undesired effect by not providing feedback during these new tasks but only afterwards.

Lastly, a possible undesired effect of *suggestion* can be that the player experiences too much pressure to change a certain behaviour. When *repetition* of suggested tasks is applied too much, we argue that this can easily occur. This may have such an impact on the mood of the player that he/she will not be able to process the persuasive message of the game through the desired central route but through the peripheral route [17].

2.2 Competition and Comparison

The design principle *competition* allows the user to compete with other players [4]. *Comparison* provides a means for the player to view and compare his/her performance with the performance of other user(s) [4]. Both are based on the assumption that humans are competitive beings and have a natural drive to compete [7].

Effects on Motivation As earlier suggested *self-monitoring* might influence the player's feeling of *relevance* of the persuasive message in the game when a certain standard or goal is made salient. We argue that through *comparison*, such a standard can be visualized. In that sense *comparison* can enhance the player's motivation to elaborate. This might also happen through the feeling of *responsibility* that can arise when a player compares his/her performance on the desired behaviour with other players. We assume that when it is emphasized that a group of others perform a certain behaviour, this could increase the feeling of *responsibility* to also participate.

How *competition* can enhance the motivation of the player to elaborate seems less evident. At first sight it mostly seems to make the player enjoy the game more [18], but not necessarily increase the chance of elaboration. We believe however that *competition* can positively influence the *relevance* of the persuasive message of the

game when the competitive element is an integral part of the game's narrative (which includes the persuasive message). When implemented in that way, it might be most effective when the player not competes with other players but with characters or objects that are part of the persuasive story. Obviously players can form groups and compete together against a common enemy.

Effects on Ability To enhance the ability of the player to elaborate on the persuasive message of the game, *comparison* might increase the *knowledge and understanding* when it is specifically explained to the player how the other players reached certain goals (concerning the desired behaviour). *Comparison* however might also reduce the ability to elaborate when it will function as a *distraction.* We believe this could happen when the player experiences that through *comparison*, it is emphasized that other players perform much better than he/she. This might result in low self-efficacy [19], which negatively influences the desired performance. To solve this undesired scenario, we suggest that the earlier described design principles of *self-monitoring* and *suggestion* can help the player to increase the self-efficacy of the player; *self-monitoring* can show prior successful performances of the player, and *suggestion* might suggest a certain skill that the player can use to perform better again.

Competition seems to reduce the ability of the player to elaborate in two different situations. We argue that when *competition* is experienced by the player as one of the most important elements of the game, this might function as *distraction* from elaboration. When a game is highly competitive, players get emotionally aroused [20]. This arousal affects processes of perception and produces simplistic thinking [20].

So just as the effect of the earlier described scenario when too many suggestions are made, the mood of the player will likely influence the route to persuasion. Instead of the preferred central route, it is assumed that the peripheral route will be taken by the player in this situation. A second situation when *competition* might reduce the ability of the player to elaborate on the persuasive message is when the player is asked to be competitive the entire game long, without any *available time* which allows the player to take time to reflect on the message. It is therefore recommended to provide the player with sufficient moments of rest after intense moments in the game [3].

3 Conclusions, Limitations and Future Work

3.1 Conclusions and Recommendations

The effectiveness of the popular persuasive game design principles *self-monitoring* and *suggestion* and *competition and comparison* seems to depend on the context in which they are applied. Specifically to what extent these principles enhance or reduce the motivation and/or ability of the player to elaborate on the persuasive message of the game (generating favourable and unfavourable evaluative reactions to the content of the message). With the elaboration likelihood model (ELM) as a

framework for our exploration, we specifically focused on how a persuasive game designer might influence the sub-variables of this motivation (*relevance*, *responsibility*) and ability (*knowledge and understanding*, *available time*, *distraction* and *repetition*) through the implementation of the four selected persuasive game design principles.

Enhancing Motivation and Ability The outcomes of our theoretical exploration show that both principles are able to enhance the motivation and ability of the player to elaborate. With implementing *self-monitoring* and *suggestion*, a game designer might increase the *responsibility* of the player concerning the topic of the game by emphasizing the personal identity of the player and by pointing out what undesired effects might occur when the player does not perform the suggested task. *Knowledge and understanding* can be improved when extra information is provided on current and past states of the player that explains these states and when the player is informed why a certain task is important to perform. *Relevance* can be strengthened when a certain standard or goal is made salient to the player.

For *competition and comparison*, we also found scenarios that might enhance the motivation and ability of the player to elaborate. When a certain standard is made visible through *comparison*, it can contribute to the *relevance* and the *responsibility* of the player. Through *comparison*, *knowledge and understanding* of the matter can be influenced when it is specifically explained to the player how the other players reached certain goals. *Competition* can increase the *relevance* of the persuasive message of the game when the competitive element is an integral part of the game's narrative (which includes the persuasive message).

Reducing Motivation and Ability Both *self-monitoring* and *suggestion* and *competition and comparison* might reduce the motivation and ability of the player to elaborate on the persuasive message of the game as well. First of all we argue that game designers should prevent that a player experiences the feeling of being observed through *self-monitoring* when he/she is performing a difficult or new task in the game, because this might lead to *distraction* to properly elaborate. It should also be avoided that the message of the game is presented too often through *suggestion.* This negative effect of *repetition* can cause that the player feels a certain unpleasant pressure to change a behaviour, which will reduce the ability to elaborate.

When implementing *competition*, a designer should be aware that the competitive element is not the most important one in the game because then it might cause *distraction* from elaboration. Also the designer should prevent that there is no *available time* to elaborate for the player on the message of the game because he/she is asked to be constantly competitive during the game. Finally designers should be aware that *comparison* can cause *distraction* of elaboration when the type of comparison emphasizes too much that other players perform much better than the player.

Differences and Internal Relation Between the Four Persuasive Game Design Principles As a combined design principle, *competition and comparison* seem less strongly connected internally than *self-monitoring and suggestion*. Although they

might indeed complement each other, we believe they could also be implemented separately in a persuasive game. We argue that the implementation of *competition and comparison* might be more risky concerning undesired scenarios. But with awareness of the context dependency, it can be a powerful persuasive game design principle. Interestingly, we found that *self-monitoring and suggestion* and *competition and comparison* might complement each other in certain scenarios.

3.2 Limitations and Future Work

Due to its theoretical and explorative nature, this paper has some limitations. The elaboration likelihood model as a framework for our exploration limited the scope of the context dependency. We specifically focused on the effects of the design principles concerning the persuasive message of the game and left out the engaging aspects of the design principles that might also contribute to the overall persuasive power of the game. Another limitation is that our examples of scenarios focused on digital games, while we realise that persuasive games can be effective in an analogue setting as well.

For this paper we only explored the context dependency of four selected popular persuasive game design principles, but obviously there are many more to further analyse in order to improve their effective implementation. We therefore suggest that future work should first explore the context dependency of a broader set of popular persuasive game design principles. For each design principle, then certain game mechanics can be listed. Next the outcomes of these explorations should be empirically tested in simple experiments and field tests.

With this paper we aim to create awareness of the context dependency of persuasive game design principles amongst game designers and scholars. Finally we believe it may form a starting point for future experimental research in order to improve the effective implementation of persuasive game design principles. Results from this research will ultimately contribute to the overall effectiveness of persuasive games, whose application is valuable within an active learning context.

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