UNIVERSITI TEKNOLOGI MARA

# EXTENDED PARTICIPATORY DESIGN APPROACH TO DEVELOP LEARNING GAME FOR CHILDREN WITH AUTISM TO ADDRESS MULTI CUE RESPONDING

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# ABSTRACT

Game-based learning is about adopting certain gaming principles and applying those principles to real life settings, so as to engage users. In this approach, learning goals and users' contribution were involved, in order to engage the users with learning materials. One of the effective methods to design a game-based learning is through users' contributions. However, the current studies in game-based learning are lacking in applying users' contributions, especially, when it comes to users with special needs to address the stimuli that can engage the user in the multi cue responding game. Another important problem is that usually user`s contribution methods are based on the unbalanced design activities. When it comes to learning approach for children with ASD there is a need to extend one of the available methods based on their daily routine activities. The aim of this research is to devise a means to design a game-based learning, by extending the Bluebell method in Participatory Design (PD) approach to develop an application game for children with Autism Spectrum Disorder (ASD). As the first step of problem identification, two preliminary studies were conducted to identify the factors that affect the engagement rate in children with ASD and get a better understanding of the main challenges with participants. Results of the preliminary studies were used to propose the design to identify social and non-social stimulus related to High Autism Interest (HAI) and Low Autism Interest (LAI) for the participants. The design approach was started by involving all the 15 participants from Khaneye_Mehre_Autism in Tehran, Iran. The participants were involved in design activities in order to facilitate the extended design process and understanding between the HAI and LAI. By comparing the result of participatory design, the stimuli were categorized and combined with traditional learning methods, as a learning purpose, and developed on touch screen devices to address multi cues response. After the final product called T-PART was designed and developed, it was well astoundingly embraced by the psychologists. Next was the evaluation phase, the reaction evaluations were in two categories, engagement and learning improvement evaluation were conducted. 15 participants were involved in this phase, all their reactions and number of correct answers were analysed. The result of this research demonstrates that the proposed game can promote, multi cue responding in children with autism, when it comes to using HAI stimuli. The analysis of the final product shows that the game was engaging for participants and the content of the game, that came from extended PD sessions was fully engaging for participants. The use of extended participatory design method was appropriate to understand suitable stimuli in a game-based technology with learning purpose and elicit the children's contribution. This research has presented the T-PART learning game which benefits the users, other researchers and teachers. T-PART has been designed based on the list of engaging stimuli and game elements for users with ASD to address multi cue responding. This research also aims to extend one of the available user contribution methods for children with ASD by providing them learning based activities and design materials. Finally, empirical findings from the study act as the proof-of-engagement of this research.

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