Game Design Journeys in Primary Schools: How to

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Interest in early game design approaches, that include children's ideas into the game design process, is increasing. This paper outlines emerging trends in participatory game design, then presents thematic guidelines for practitioners, teachers and researchers, willing to conduct participatory early game design with primary school children.

1. Introduction

Children have unconventional viewpoints concerning all matters, especially interaction design solutions for them, such as games. Different design approaches have been devised for eliciting children's ideas concerning games. Participatory design, in particular, has been used for involving children in different game design (GD) tasks and promoting problem-solving skills as in computational thinking (e.g., [Adams, 2013, Moser, 2013]). According to the chosen participatory design approach, designers and non-designers work together using diverse generative toolkits or probes, with different aims as well as roles and degrees of participation [Vaajakallio and Mattelmäki, 2014, Sanders and Stappers, 2014]. Lately, practitioners and researchers alike have also explored gamification of game design tasks to playfully engage children so as to elicit their true ideas about novel design solutions [Andres et al., 2015, Dodero et al, 2014a, 2014b].

This paper presents thematic guidelines for conducting participatory game design experiences in primary schools so as to playfully engage all children. They are meant for 8–11 year olds; according to [Piaget, 1952], such children belong to the concrete operational stage, when intelligence starts to be logical but still refers to concrete things.

Guidelines are the result of a long iterative learning process in which feedback, rethinking, and revising were embraced as valued activities. The main steps undertaken were: (1) a review of participatory design and game design studies, focusing on studies with children [Melonio, 2013]. (2) an investigation of participatory game design contexts. For gaining a deep understanding of such contexts, we conducted exploratory field research studies with children in different settings, at first in children laboratories at university and at summer schools, and in parallel we also did brainstorming meetings and inquiries with domain experts of educational psychology and

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pedagogy, interaction design in general, and game design in particular. Field studies conducted in 2013 in primary and middle schools enabled us to test game design material. (3) repeated-measure studies with schools, done in 2014 and 2015, the latter capitalizing on results from the 2014 study. Both studies aimed at engaging children in a participatory game design journey spanning across several school days. (4) finally, building on the experiences matured in all previous steps, we distilled a final set of guidelines for conducting participatory game design with children, considering how to manage it when it is fragmented over time, and what tasks in game design can be engaging or demanding for primary-school children.

2. Experience Based Guidelines

The following guidelines focus on how teachers, researchers or practitioners can conduct a participatory GD process with primary-school children so as to sustain their engagement, especially when GD tasks are more demanding, according to the evidence gathered in the reported case studies and in previous field-experience by authors of these paper, briefly summarized in the introduction.

Guidelines are divided into three macro themes: concerning the organization of the overall GD process; concerning specific GD tasks; concerning GD material for children.

2.1 Game Design

1. The GD process should be split into progressive missions with progressive challenges.
2. Each mission or challenge should be organized with its own clear GD goal, and such goal should be valuable for GD participants.
3. Each challenge should have a specific GD task—ideation task, conceptualization task or prototyping task.
4. Missions should interleave challenges with conceptualization or ideation tasks with challenges with prototyping tasks, so as to require and train different skills, thereby fostering the participation of all children and the promotion of alternative design ideas.
5. Each mission should start with a recap of previous missions' GD products, so as to orientate children in the GD process, creating links across missions and promoting coherence in GD products.
6. GD missions should provide multiple feedback opportunities from GD experts, mainly through scaffolding dialogues at the end of challenges/GD tasks.
7. Children should have different opportunities to share, also at the class level, their early game design results, in the form of high-level concept

documents, chore mechanics documents or prototypes, so as to evaluate them and improve them through peer feedback.

8. When GD is split in missions taking different days of work, and hence it is fragmented in time, gamified probes can be designed so as to visibly and tangibly sustain children's engagement and, specifically, to: convey a sense of progression across missions and challenges and help in orienteering children in the GD process or tasks; support relatedness needs in group and cooperation; sustain a sense of control over their GD work, in particular, symbolic rewards should be customizable, contingent and perceived valuable for children's GD work, e.g., rewards might be objects useful for customizing GD prototypes.

2.2 Game Design Tasks

9. The first mission should have tasks easy to take up by all children, so as to create a positive relaxing atmosphere, promote group work and mutual trust, and train children to the design work.

10. In the first missions, children can ideate and conceptualize the game storyline and use it to conceptualize their GD ideas.

11. The conceptualization of the game idea requires specific scaffolding by the GD expert, as the game-idea conceptualization seems to be a cognitively demanding task at least for 8–11 olds.

12. In subsequent missions, according to the length of the GD activity, each group of children can work on a single game level.

2.3 Game Design Material

13. GD material and tools should be distinguished per mission goal and challenges/tasks, and designed so as to be usable by the involved children; e.g., it should be designed by GD experts and education experts and revised with teachers/adults familiar with the participant children.

14. GD documents should be provided as forms to fill in for children, using a language for scaffolding children's ideas and a visual layout adequate to their age and skills.

15. The GD document should be divided into smaller units (e.g., game idea, chore mechanics, progression), each one cast as a form usable for the participant children.

16. GD prototype material should also be usable for the participant children: it should give children prototyping elements and it should use a scaffolding structure; e.g., it can use reference frames for clarifying the device under consideration, it can use balloons of different colors for placing and distinguishing different feedback elements, such as winning conditions or losing conditions.

3. Conclusions

This short-paper presented participatory game design guidelines for conducting game design experiences with groups of children in primary schools so as to engage all and include everybody's ideas.

Steps leading to the development of these guidelines have been extensively reported in a PhD thesis [Melonio, 2016] where interested readers will find further details on the experience and on the progressive development of the above guidelines. We welcome feedback from teachers who would consider applying these guidelines in their own school.

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