

On a Design Approach for Collaborative Decision Making Games: A Preliminary Validation Study

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INTRODUCTION

Complex decision making skills are essential in numerous domains (e.g., emergency response, military, business), where stakeholders often need to make strategic or tactical decisions on tasks that may be ambiguous, ill-defined, time constrained, and have high stakes. Often such tasks need to be solved by groups of people with complementary skills. The group works together, or collaborates, to make decisions and achieve a shared, common goal. Collaboration Engineering (CE) (Briggs et al, 2006) is an established discipline that explores how to improve collaborative decision making processes in groupware, simulations, design patterns (Zarate, 2013). The potential value of using games to support learning complex decision making skills is substantial (Hulst et al, 2014); however, little is available in the literature to support their systematic design. An approach in (Azadegan et al, 2015) specifically addresses the design of Collaborative Decision Making Games (CDMGs), where collaboration and consensus building happen *during* the gameplay process at the *conscious cognitive level*. The players, either co-located or distributed, work together to achieve a common goal. The approach is based on the principles of CE, aiming to provide guidance as well as building blocks for the design of CDMGs. Being developed based on the concept of patterns in CE, the design approach can be applied by users with different levels of expertise in CDMG design. The design approach is an iterative, five step process that integrates fundamental concepts from the game design, software design, and CE communities. The steps are: 1) Capturing Game Activities 2) Consideration of Collaboration Patterns 3) Creation of Game Elements 4) Allocation of Game Mechanics 5) Validation of Game Activities.

A preliminary exploratory study is used to evaluate the design approach in practice. Two groups of four, undergraduate Computing/Game Technology students (3rd year) volunteered to attend a two-hour workshop. Neither of the groups had previously encountered complex decision-making topics in CE or designed CDMGs. The

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participants were given a training presentation as well as an informative booklet once commencing the workshop. They were also given the case scenario, Ultra League Football, and were asked to design a collaborative game in which players form a management team with a common goal: Create the “best” football team possible and compete against other management teams for prizes. Suitability, understandability, ease of use, efficiency, effectiveness, completeness, analyzability, adoptability. *b)* Learnability for different types of users: Novice users, general users, hard-core game players and expert designers *c)* Information provided on how to apply the design approach e.g. usefulness, comprehensiveness, exemplification, effectiveness. The questionnaire had 17 Likert Scale and one open question on the helpfulness of the approach.

The results on applying the design approach ranked *analyzability* the highest, helping the participants to systematically decompose the game objectives, mechanics and elements. Moreover, they believed that the approach is highly *adoptable* and can be applied to similar collaborative game design problems. The next significant characteristic of the design approach is its *effectiveness* in terms of providing game designers with a systematic approach to make design decisions. With respect to learnability, the participants reported that the design approach is the most difficult for novice users to apply. The difficulty in the application of the design approach tends to be less significant for hard-core game players or expert designers. With respect to the results for the information provided, the participants reported the material was comprehensive and useful. For the open question addressing the helpfulness of the approach, the majority of the participants reported positively, with comments indicating they believed the approach is most helpful for: compartmental design or level design rather than overall game design; developing and justifying mechanics; and breaking down the goal of the game into manageable blocks of focused objectives. They also reported the approach could help them to design games faster, therefore increasing their game design efficiency. Qualitative notes were taken on the participants’ discussions, decisions, progress, and obstacles they encountered. Game development experience appears to play a significant role in the ability of the participants to learn and apply the design approach in a short amount of time. This observation aligns with the self-reported data from the participants. Although at similar stages in their academic programs, one of the groups had more game development experience from creating games on their own. This group proposed a preliminary design for the Ultra League Football game that was truly collaborative in nature. The results of the exploratory observational study on the design approach for CDMGs are encouraging. Overall, the workshop participants reported the design approach has desirable characteristics including: strong support for the analysis of the game objectives, elements, and mechanics; adoptability to a range of CDMGs; and effectively guiding the systematic decomposition of a design problem. The information provided to apply the design approach was comprehensive and useful. As the study has significant limitations, including a small number of self-selecting subjects, observational studies with larger groups (senior undergraduates, graduate students and game development professionals) are planned.

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