Village Voices: An Adaptive Game for Conflict Resolution

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ABSTRACT

In this paper, we describe the design and technology of *Village Voices*, an adaptive serious game designed to support children in learning about conflict resolution. Relying on *experiential learning* as an underlying learning philosophy, *Village Voices* puts players in the role of interdependent villagers who need to work through the various conflicts that arise in the game world. To gradually earn *guru* status, players must successfully complete various personalised quests, which require cooperation between players. The personalisation technology behind *Village Voices* relies upon an accurate player model that drives the adjustment and selection of quests for each player.

1. GAME-BASED LEARNING OF CONFLICT RESOLUTION

Our project explores how digital games can foster learning about conflict resolution for children between the ages of $9 - 11$ in the classroom. Based on Kolb's *experiential learning* [5] and inspired by roleplay-based conflict resolution workshops [3], we designed a multiplayer game that triggers conflicts between players and requires them to resolve their conflicts with one another as a condition of success.

The model of conflict resolution we designed our game around is an adaptation of Bodine and Crawford's six-phase model of resolving conflict [2]. The game creates situations in which players develop their *perceptual skills*, that is, they learn to see an issue from different perspectives, as the game triggers conflicts of different types and intensities based on player relationships and conflict experiences within the game, and requires players to present conflict solutions for one another. The game encourages awareness of *emotional skills*, namely, recognising the distortion role that strong emotions play during conflict, as it requires players to regularly update their feelings towards other characters. The game makes player develop their *communication skills*, by requiring them to express their perspectives, feelings, and strategies for conflict to other players and also to a teacher acting as a game facilitator. The game invites practice of *creative-thinking skills*, as there are no "correct" ways to resolve specific conflicts triggered within the game world, and players must piece together their own potential conflict resolution strategies given the resources and networks they have within the game. Finally, the game invites players to hone their *critical thinking skills*, in judging between options. Conflicts are only deemed constructively resolved once both parties feel sufficiently at ease with the conflict outcome, thus an appropriate conflict resolution approach is very much contingent on context, requiring application of critical thinking.

2. VILLAGE VOICES: DESIGN

Village Voices is a multiplayer open world game that takes place in an imaginary village, designed to be played in a classroom under teacher supervision (see Figure 1). On the surface, the game is about survival and prosperity in the village. On closer inspection, however, the game is about friendship and reputation management in the village, and mastery of conflict resolution. When the game begins, each player is assigned a particular character to play (e.g. the alchemist, the blacksmith or the innkeeper), who is retained for the entire duration of the player's experience with *Village Voices*. As part of daily life in the village, players will be required to undertake various actions related to maintenance of their characters' livelihoods, and responsibilities within the village. As all the characters are interdependent, situations often arise that lead to conflicts, with the players responsible for determining how to manage them. For example, the alchemist of the village may wish to obtain a plant from the innkeeper to complete a quest requiring a health potion, but a longstanding history of prior conflict between them may mean that the innkeeper is reluctant to engage in trade with the innkeeper. Importantly, the player characters will have ongoing relationships with other game characters, including other player characters, and non player characters (NPCs), and the heart of the gameplay revolves around management of these relationships.

In keeping with conflict resolution concepts of mutual gain and collaboration [2], the objectives of the game shared by all players are to keep the village healthy and flourishing, in terms of development and growth, and to minimise negative aspects associated with life in the village, including a drop in quality of life, and number of NPC inhabitants who move out. Each player also has individual survival and prosperity objectives, measured in terms of livelihood, social rep-

Figure 1: Snapshot of the Village Voices game.

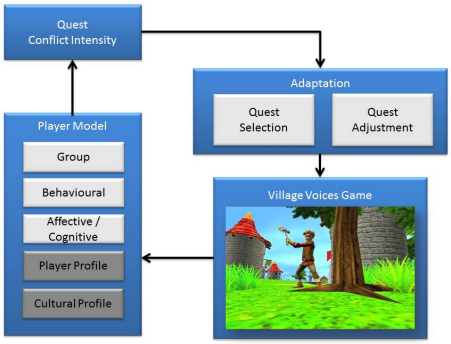

Figure 2: The personalisation technology of the *Village Voices* game comprising a *player model* and an *adaptation* component. Behavioral, reported and contextual data from the player and the game are mapped to a machine learned conflict intensity predictor for each quest. The predictor drives the selection and adjustment of the next quest for the player.

utation, health and wellbeing. But the central objective of *Village Voices*, related to learning about conflict resolution, is for players to achieve guru status. This is attained once a player has experienced and resolved a subset of potential possible conflicts, demonstrated a nuanced understanding of different conflict perspectives, demonstrated the ability to creatively come up with suitable conflict resolution strategies in a range of different contexts within the village, and participated in counselling other players in terms of how to resolve conflicts in a constructive, positive manner.

3. VILLAGE VOICES: TECHNOLOGY

Game-based learning is fostered when learning is tailored to the needs, beliefs and skills of each player [4]. As such, *Village Voices* adopts high-end game adaptation technologies for the personalisation of game experience. In particular, the game relies on an interwoven *player model* and *adaptation* component which yield personalised conflict scenarios for each player. The player model (PM) component (see Figure 2) is synthesized from two static and three dynamic modules. The *player profile* module includes static information such as player demographics and conflict strategy approaches from player self-reports. The *cultural profile* contains static information about the cultural background of each player which impacts on how conflict is dealt with. The three dynamic modules of PM include the *affective/cognitive*, the *behavioural* and the *group* modules. The first incorporates predictors of player affective states relevant to conflict such as frustration and satisfaction as well as predicted cognitive states of the player such as attention which are inferred from the player's facial expressions and head pose. The second concerns the identification of typical patterns of playing behavior. Finally, the *group* model infers player groups existent in the game based on liking or disliking annotations provided by the players during the game. The output of the model is the predicted level of conflict on each game quest for each player. The player model is derived from a data-driven, *model-free* modeling approach [6] in which data from students is crowdsourced in classrooms and conflict intensity is annotated via in-game questionnaires [1].

The adaptation component consists of two key modules: the *quest adjustment* and the *quest selection* module (see Figure 2). The PM drives quest adjustment as the conflict intensity is tailored to each player. In particular, the game generates events that yield increased conflict within a quest if the predicted conflict (i.e. output of the PM) is too low for a player. Such events include natural disasters e.g. storms or sudden illnesses requiring specific cures, that force trade between players not on good terms with one another. If the conflict is higher than a threshold — which is determined by teachers — conflict deescalating events are generated to lower the conflict intensity. These may include the emergence of shared enemies in the village, such as rats, and discoveries of alternative resources. In the *quest selection* module, the adaptation mechanism picks the next quest to be given to a player once the previous quest is completed. The quest selector picks quests that will likely yield levels of conflict intensity at the borders of the player's comfort level i.e. quest types that the player has not yet mastered.

4. ACKNOWLEDGMENTS

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