GAME CAREERGUIDE

PRINT

Prom Week: How A Game Can Simulate Real-World Relationships

By Aaron Reed, Ben Samuel, Mike Treanor and Josh McCoy [08.30.12]

[*A group of PhD students from the University of California, Santa Cruz look back on Prom Week, an experimental game that aims to simulate real-world relationships*.]

Prom Week is an ambitious simulation game that makes use of a "social physics" engine to offer challenging social puzzles with emergent solutions. The team leveraged advanced research in artificial intelligence at the Expressive Intelligence Studio (EIS), a lab in UC Santa Cruz's Center for Games and Playable Media directed by Michael Mateas (co-creator of 2006 experimental social game *Façade*, which in some ways is the intellectual parent of *Prom Week*) and Noah Wardrip-Fruin (author of Expressive Processing).

The original goal was to spend a year focusing on building a short playable experience that used the social simulation theories of EIS Ph.D. student (and core team member) Josh McCoy. Two and a half years later, we found we had a completely new and more ambitious social simulation technology as well as a game that was much larger in scope than initially envisioned. It was the biggest project anyone on the core team had undertaken, and we're proud to have achieved successes in the forms of an IGF nomination for technical excellence, a place at the IndieCade E3 showcase, as well as invites to speak at some of the largest international video game conferences.

In Prom Week, players select between a variety of campaigns, each with its own social goals. Additional campaigns are unlocked as more goals are met.

So here's what *Prom Week* is. *Prom Week* is a social simulation game about the dramatic week leading up to a high school prom. Players sculpt the social landscape by having characters engage in social exchanges with each other. The results of these social exchanges are many and varied-ranging from mild changes in sentiment toward each other to characters professing their eternal love-and these interactions are informed by over 5,000 social considerations managed by the artificial intelligence system.

Through shifting the interpersonal relationships and learning the personal intricacies of the characters, the player can solve a series of "social puzzles"; such as making the class nerd *Prom Week* king, or bringing peace between feuding jocks and preppies.

Each level's goal has innumerable solutions that all work to maintain character believability. For example, if the player is trying to make Zack prom king, the player could have Zack bond with a popular character over a shared interest to build a relationship grounded on friendship, as Zack being friends with someone popular will increase his own notoriety. Alternatively, the player could exploit a popular character's trait of "competitive" and have Zack flirt with someone who the popular character is jealous of. This could lead to the popular character getting angry and losing their cool, and consequently doing or saying something which might lower their social standing amongst their classmates, reducing Zack's competition for the crown.

When players get to the prom, they get to see unique endings that relate to the social state they have built and what level goals they have met. For example, the Prom King story might end happily with Zack successfully becoming prom king if all of the level objectives were satisfied. But, if the player had Zack abandon his geeky best friend in an attempt to become popular, that former friend may attempt to humiliate Zack during Prom King's climax. Zack may not even become prom king at all, but will finally muster the courage to express his feelings to the girl of his dreams (assuming, of course, that the social state contains a girl that fits the criteria).

Prom Week was a really ambitious game to make. We wanted to tell coherent stories where all player choices genuinely mattered. We think that's a bit of a holy grail for interactive storytelling. The following descriptions of our successes and failures offer insights ranging from what might be interesting to apply to other games, to some of the pros and cons of creating games in an academic context. We hope you enjoy it, and perhaps learn something along the way.

What Went Right

1. We explored new territory.

A research game has many luxuries denied to a commercial or even an indie game. One of these is the ability to explore new areas of design space that aren't guaranteed to contain profitable, fun, or even functional games. When we set out to create *Prom Week*, we wanted to create an experience that made social interaction playable in the same sense that physics is playable in a game like *Angry Birds*. But since this type of play experience is so novel, we weren't certain what we'd end up with. That risk is hard to swallow when dollars are on the line; but buffered by a university system, we could go out on a limb and really pursue the experiment to a playable conclusion, successful or not.

Happily, our final product turned out to be something we're all excited by and proud of, combining the dynamism of something like *The Sims* with the stronger narratives usually associated with story-driven game genres like RPGs. We were able to get there because we had the freedom to pursue these risky ideas as a first-order feature of our project, not a supplemental or optional feature that we could cut if it wasn't immediately working out. Getting the social interactions in *Prom Week* right took a lot of time, tuning, and experimentation, and it was only through having the space to pursue these ideas that we were able to make them playable. Centering the game around playable social models let us focus on the really novel part of what we were doing, rather than the more practical concerns that most game makers have to contend with to make a polished, sellable product.

The cast of the first level of Doug's campaign. It's the player's responsibility to shake up the social lives of the characters.

2. Retargeting social performances

One design choice that we made out of necessity, but that turned out to be a big win, was our decision to retarget social performances. Before we dive into what we mean by that, let's take a brief aside to go on a quick *Prom Week* vocabulary lesson.

In *Prom Week,* players manipulate the social state by selecting pairs of characters, and then choosing a *social exchange* for them to play with each other. The player is then presented with a short scene, or *instantiation*, wherein the characters speak with fully realized English dialogue, accompanied by animations and choreography. The instantiation that gets selected is the one that is deemed to be the most dramatically interesting based on the current social state. *Prom Week* has about 40 social exchanges, each of which has approximately 20 instantiations apiece, all of them averaging on about 6 lines of dialogue. That's roughly 4,800 lines of dialogue, and although that number pales in comparison to those found in the *Mass Effect*s and *Dragon Age*s of the world, any given line in *Prom Week* could conceivably be spoken by any of the game's 18 characters. This is what we mean by "retargeting social performances"-any social performance, as written, needs to be able to work regardless of who the targets are (i.e., the speakers).

This was a tall order-it meant that any given line of dialogue had to be written generically enough so that it would make sense for any character to speak it, but we also had to find ways to spice them up so that they A.) Weren't boring, and B.) Still *felt* like they would be something that the character would say, even if they were not written with that character specifically in mind.

We accomplished this in a few ways. One way was to make use of templated dialogue inside of our instantiations-instead of hard-writing the word "sweetie" into a line of dialogue, we would instead write a special token %sweetie%, which would then be replaced with a character specific way of saying something, based on who was saying the line of dialogue (for example, the sweet Simon calls his sweetie "beautiful," while the arrogantly nerdy Zack refers to his darling as his "gigababe"). We also have a concept of objects in the world that characters are aware of: if the instantiation calls for Buzz asking about something that Gunter has, it can specifically pull out `Japanese Swords' and use that in dialogue, whereas it might have selected `Glass Roses' had he been talking to a different, sword-less character. Perhaps the most satisfying use of templated text of all, however, is the fact that characters can explicitly reference their shared history with each other, which we'll cover in more depth later.

Another implementation decision that was a big help in retargeting social performances was the fact that instantiations had specific preconditions that were separate from the social exchange itself. Therefore, even though the social exchange "Txt Msg. Breakup" has the precondition that both parties are currently dating each other, any given instantiation can have an arbitrary amount of preconditions (e.g., this instantiation will only play if the initiator of the game has a high romance value towards the person they are playing the game with, and they have the trait self destructive). This means that, though still conceivably any character could play this game, we know for sure that only characters with that romance

network and that trait are only going to be involved in this specific instantiation, which allowed us to author instantiations accordingly.

The results were remarkably satisfying. We'll watch instantiations and chuckle to ourselves "that's *so* Monica," and forget that she was speaking dialogue that wasn't specifically tailored for her at all. Having to author with this new mindset was a challenge, but the game couldn't have been made without it. We really believe that this approach can be directly applied to enrich the characters in AAA games, and we hope that industry takes note.

3. Social History

One of the aspects of *Prom Week* that we are proudest of is the concept of an ever expanding social history between the characters. Every social exchange the player selects gets placed into a social history. Entries in the social history are then reasoned over in determining what characters want to do with each other (e.g., "if this person has done several nice things to me lately, I'll be more inclined to do something nice to them"). Additionally, social history references can be realized in dialogue as well.

This means that characters can reference specific events that transpired in the past, which adds weight to every single choice the player makes. The player is not only playing a game to increase affinity between two characters -- they are creating a moment in time between those two characters that they'll remember forever (well, at least for the rest of the week), and will influence how they behave around each other, and how they'll interact with the entire student body. In a game as dynamic and procedural as *Prom Week*, seeing concrete references to player actions was supremely satisfying and validating.

There are various goals the player can shoot for during gameplay. Here we see one goal is to get Doug a new relationship. The social mini-map at the bottom reveals some mutual romance between him and Chloe, which hints at a good starting place for the goal.

4. Making a game from within a university

Besides leveraging the university structure to create a not necessarily commercially viable game in the first place, we were also able to leverage the university system in other ways that helped the project. The game's team represented a wide variety of both talented and multidisciplinary people: even from just the core team, our non-game backgrounds included sociology, professional acting and writing, and a number of other skills that all proved useful in different ways.

While *Prom Week* was partially funded by research grants, many of the team members were working on the project not for a paycheck, but because they really believed in the idea and wanted to see the game succeed.

An ancillary benefit was that we were able to make creating the game a teaching experience, both for the undergraduates who worked on various parts of the project for class credit, and the graduate students who managed, planned, and executed the game design and construction.

5. People cared in industry, press, and academia

One thing that we were flattered and humbled by is that *Prom Week* seems to have made an impact in spheres that are important to us, namely the game industry, press, and academia.

On the industry front, we're proud to say that *Prom Week* was a finalist in the category of Technical Excellence at the 2012 Independent Games Festival, and was selected to be featured during IndieCade's E3 showcase in June 2012. We presented the game to several industry veterans who visited UCSC and who walked away impressed. We were also asked to give a talk at both the AI Game Dev Summit in France, 2011, and again at the Game Developers Conference 2012.

In the world of academia, we've been mentioned in other talks (such as Emily Short and Richard Evans' GDC presentation of Cotillion) in the same breath as Facade as a seminal achievement in Interactive Storytelling. Perhaps more importantly, our research has been, and is being, used as a component in other research projects. This includes other research being done at the Expressive Intelligence Studio, such as Anne Sullivan's GrailGM project, which takes *Prom Week's* social simulation technology and uses it to power a socially driven RPG, as well as other projects outside of UC Santa Cruz too. One such project is using *Prom Week's* simulation technology to help teach conflict resolution, and another is incorporating it into a deployment simulator of sorts, training soldiers about cultural idiosyncrasies of situations that they are likely unfamiliar with.

We're also very pleased with the amount of attention *Prom Week* has received in the press. This ranges from written reviews and impressions of the game done by members of the press, to articles and interviews that we've given for members of the press, to this very post mortem that you're reading right now! *Prom Week* can be a difficult game to wrap one's head around, but we are happy with the number of people who seem to "get" it.

Character actions and emotions are conveyed with fully realized English dialogue. Here, Doug tried attempting a pick up line on Chloe, but because he has traits that identify him as an introvert (namely he is both shy and timid), his pick up line was not particularly smooth.

What Went Wrong

1. We explored new territory

Fairly early in the process, we set ourselves the goal of making a game in which players could strategically manipulate social relationships in the service of creating their own stories. The story based play was meant to show how our social

simulation technology can achieve a level of realism and believability that might be inspirational for other game developers. The strategy-based play was meant to serve as a new type of experimental game as well as to bring the focus of gameplay to understanding the social simulation itself. In other words, *Prom Week* tackles the story/gameplay conflict head on and, as might be expected, we encountered problems. In fact, in moments of weakness our endless ambition gave way to doubt that what we were attempting to accomplish might be possible!

The story-based gameplay demanded that player actions be intuitive. This contributed to the simple interaction model: players simply choose what social actions characters take with one another and then they get to watch a scene play out. Early prototypes showed that people loved to just command characters to engage in more or less random social actions with one another. The great thing about stories is that players love to embellish them so whether our system was doing something awesome or not, testers seemed to be satisfied.

However, it was important to us that we made a game where the social simulation really mattered. We wanted to lead players around the system so they understood why what was happening was different than dialogue trees. So we did our best to not interfere with players who just wanted to randomly poke characters, but also give players a way to play that encouraged them to engage with the logic of the simulation. And this is where we ran into some problems.

First of all, the simulation is incredibly complicated and presenting a digestible visualization of the AI for players was *really* difficult! Even determining which elements of the simulation were important to show was incredibly difficult. Part of the problem is that what we were making was a moving target and what we thought was going to be important may not have mattered all that much in the end. For a particular example, much time and energy was spent creating the list of social considerations that influenced why a character wanted to take some action or respond in some way. This was going to be necessary for solving some of the more difficult puzzles. However, as described below, we never implemented said puzzles. In the end, this interface element isn't used by most people and probably made some players feel overwhelmed.

Another major challenge we faced is that we couldn't pull an existing interface/gameplay convention off the shelf for players to immediately tap into. For example, a game like *Braid* is really an (awesome) incremental innovation of the 2D platformer and when new players encounter it, they get to bring in a lot of prior experience. The closest game to *Prom Week* is *The Sims,* and what we made doesn't actually share that much in common with it. In the end, we did borrow some from *The Sims* and some Ville games, but we still had to teach the players a lot before they could play.

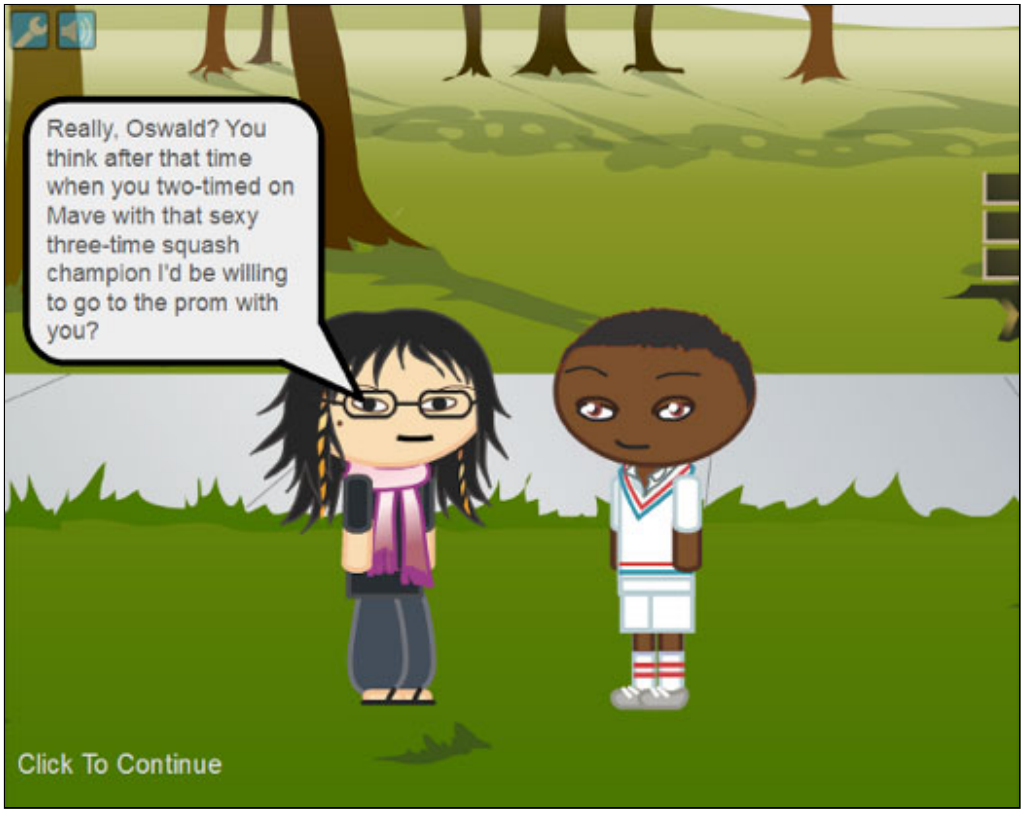
This is the case with any large project, but now that *Prom Week* is finished, we *just now* have some idea about how to design better gameplay and interface that could accomplish our ambitious goals.

Fortunately for Doug, Chloe already had strong enough feelings for him that she wanted to date him in spite of his flawed pick up line. Success! Doug and Chloe are now in a relationship.

2. Tutorials lose players

Because of the complexity of our core system, we knew from the beginning that explaining it clearly and quickly to players was going to be a serious problem. We went through several redesigns of our beginning tutorial, starting with an exhausting set of skill-based lessons and ending up with a much shorter "learn-as-you-go" system integrated into playing the first few levels (while introducing the characters at the same time). The final shipping tutorial is much shorter than what we started with, and in fact leaves out useful knowledge about how to effectively play the game in the interests of not bogging things down. But somewhat predictably, even this shorter tutorial proved to be too much for a lot of players to wade through: our metrics indicate that only about half of the people who started playing made it through the tutorial to the main game.

The difficulty came not just from needing to introduce a whole new style of gameplay and interface, but because the malleable social state meant that the player could quickly move the characters in unexpected directions if we didn't restrict them to an on-rails, move-by-move walkthrough. To make sure cool opportunities would arise to demonstrate the player's ability to "trick shot" the social simulation, we needed to carefully stage-manage what happened during the tutorial: but ironically, the on-rails feeling that resulted was the exact opposite of the open-ended gameplay that *Prom Week* is all about (and that we should have tried to get that other half of players experiencing right away). By removing the player's agency and creative expression in the tutorial, we probably shot ourselves in the foot as far as effectively communicating what the gameplay is actually about. In hindsight, we should have seen from day one that teaching the game was going to be a major challenge, and spent more time thinking about how to educate the player right in the design phase, rather than patching on a tutorial near the end of the project.



Characters have backstories that can be referenced in dialogue; these backstories expand to include every single player action. Here Oswald's past is keeping him from sweeping Chloe off her feet (not to mention she is also now already dating Doug, which the characters have also taken into account).

3. Story Goals

In *Prom Week*, you first select a character who will be the "main character" of that play through the week. That you don't actually take the perspective of the character you select, and instead have the ability to have any two characters engage in social actions together, is often a point of confusion with players. The idea is that all the "Story Goals" that the player attempts to satisfy and the ending at prom night are about that character.

Story goals were designed to lead the player through interesting challenges that show off just how much the system can simulate. We had dreams of players concocting elaborate social situations and triggering massive drama with the perfectly planned awkward social move. However, this is not exactly what we ended up with. Partly because many players have a hard time understanding the details of what they are doing, and also partly because authoring these "puzzles" turned out to take much more time and testing than we anticipated, the goals ended up being pretty simple. For example, rather than having a goal enact an entire *Saved by the Bell*-like plot where a character (Zack) leaves his less than cool friend (Screech) in the dust for a girl (Kelly), and then learns a lesson when she stands him up, goals are mostly about trying to get a character to have a certain number of friends, or some other relationship. The *Saved by the Bell*-like drama may still happen while pursuing the simpler goals, but we weren't able to ensure that players get to see this.

In addition to not having enough time to author and tune the more complicated puzzles, we found that players sometimes have a hard time achieving even the simple goals. Part of the problem was that players didn't really know how to think strategically in a game like *Prom Week*. Admittedly, we could have better taught players through short levels that teach simple lessons through gameplay. Instead, we introduced "social influence points", a resource earned through play that lets players change character behavior. The social influence points were necessary, as players often need them to progress, but they also added more complexity to what must be learned to play. This is not to say that social influence points are a mistake; the (at times stereotypical) personalities of the characters are so strongly modeled, it is often difficult to get the characters to alter their behavior towards each other without the use of social influence points. For example, if two characters are enemies and had traits that made them naturally antagonistic towards each other, say one was "brainy" and the other a "jock," it could be a real challenge to get them to make up. Social influence points enabled us to give players a way to break the characters out of these stereotypes, which is needed for both gameplay and story reasons. That said, we would have preferred if players could break the characters out of their stereotypes without having to relying heavily on the points, as focusing on them, at least in part, de-emphasized the social strategy (which was the whole point of our gameplay model!).

Also, we are shortly releasing a patch that will have different difficulty adjustments which should make accomplishing goals a little easier.

4. AI-Based Games are Hard to Schedule and Test

With a game that was so intimately related to the AI, it was really hard to incrementally test. *Prom Week's* social simulation has so many interrelated moving parts that anytime we would encounter something that would seem like a problem, it was really easy to say, "Well, when component X is in there this won't be a problem." And this was often true! However, after an initial prototyping phase, we never really got the chance to take a serious look at the complete system and evaluate the design.

Part of the problem is that the usual design, prototype, test loop took a very, very long time to get through. We probably could have been more creative with small prototype design throughout the process, but we also didn't have the resources to give someone weeks toward something that wasn't going to make the game closer to completion. Having a member on the team whose job was exclusively to prototype, test and critique the design would have made the game much better.

What made this even worse is that we spent the last year and a half of the project constantly thinking we were three months away from launching. This may be part of the nature of making an experimental research game (there was nothing to compare to!). However, constantly thinking the release of your game is imminent is a really bad thing, because you are never willing or able to step back and make big changes.

At the prom, the player's completed goals--and the choices they made to get there--determine the ending to the campaign.

5. We Worked Like We Were in a University

Working within a University setting came with a set of challenges as well. One of the biggest hurdles we had to face was that we lacked a "reliable" team size. Many students would join the project as undergraduate researchers for a quarter (or two, if we were lucky), and would then not have time to fit *Prom Week* into their schedule the following quarter. Although this would be an issue in any University setting, Santa Cruz's 10-week quarter system combined with the particularly steep learning curve of authoring for *Prom Week* meant that the undergraduates would often have less than two months of working with us before moving on. Moreover, it meant that we tended to not give them tasks that required deep knowledge of the AI system, and instead opted to give them relatively self-contained responsibilities that were off the critical path, such as authoring content.

As discussed above, the undergraduates were extremely helpful, and generated an impressive amount of content. However, since we had a steady stream of newcomers, there was near constant pressure on the part of the core team to put aside working on *Prom Week* directly, and instead spend time getting the undergraduates spun up. There were times when it was unclear whether or not spending time training the undergrads was a better use of time than working on the game directly. Also, much of the content that the undergraduates generated had to go through a tone pass administered by the game's Lead Author. Although editing someone else's work is less time consuming than creating something new, checking for tone was still a substantial time commitment, and limited the amount of time he had to write content of his own.

Regrettably, the undergraduates weren't the only ones with non-*Prom Week* responsibilities--all of the core members of the team had other obligations as well. During *Prom Week's* two and a half year development cycle, there was but a single summer where there was a member of the core team who was working on the game full time (and it was *exactly* one member). Most of us had classes of our own that we had to contend with; either classes that we were enrolled in, TAing, or in one case teaching. There were certain academic milestones and responsibilities that were expected of us; our lead AI designer had to take some time advancing to candidacy, and our Lead Author had to write a thesis and create an award winning project to complete his MFA. And perhaps the greatest challenge of all, *Prom Week* was just one research project of many that the core members of the team were affiliated with.

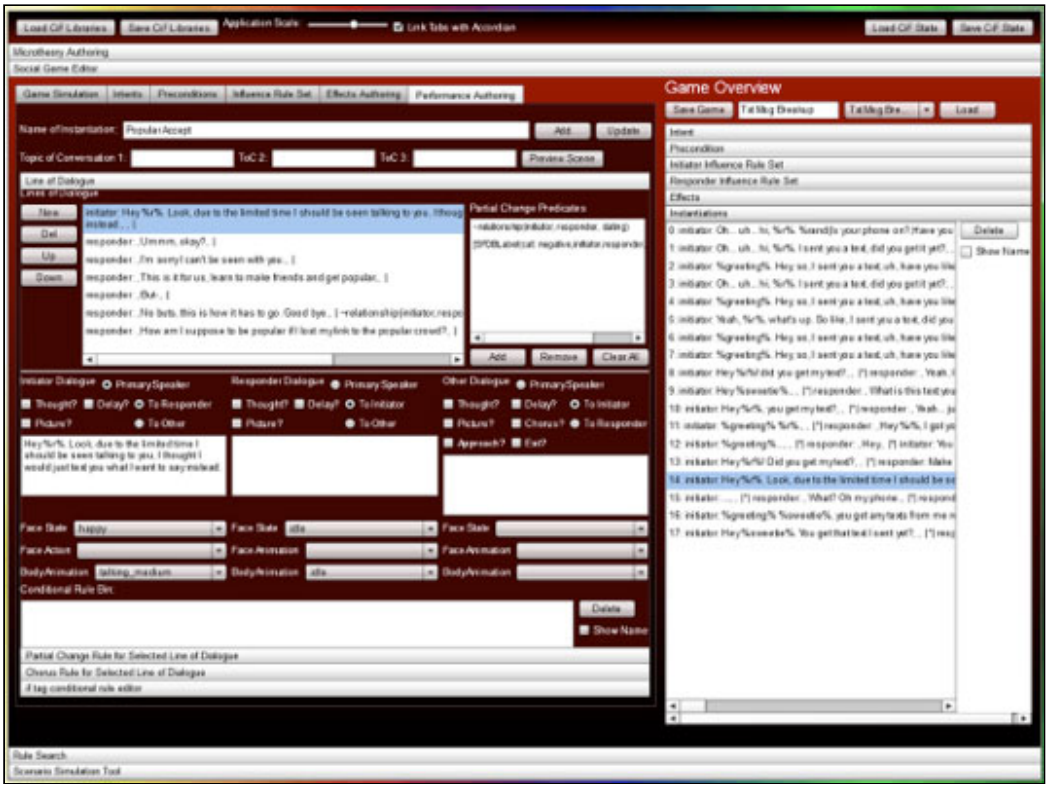
These other research projects were certainly very fascinating, and we don't mean to speak disparagingly of any of these non-*Prom Week* pursuits. *SpyFeet*, which half of the core team was working on, was an experiment in making a narrative based mobile augmented reality game that would encourage adolescent girls to engage in more physical activity. *Game-O-Matic*, which one *Prom Week* member was a lead on, is a system that allows non-game-designers to create op-ed games with custom nouns, images, and verbs in a matter of seconds. The last core *Prom Week* member was working on *Holodeck*, an experiment which imbued non-player-character avatars in *Second Life* with behaviors that made them near indistinguishable from human players. The faculty members on *Prom Week* were overseeing all of these projects, plus many more projects and students besides.

Because no one person was really *ever* full time on the project, there were times when we would feel blocked when we otherwise wouldn't have. For example, there were moments when the three of us who had time to work on *Prom Week* couldn't move forward until the fourth finished their commit, but they couldn't finish their commit until they had successfully taken their midterm in their graduate course, and then grade 300 midterms for the undergraduate course they were TAing. Because of this, there were times when progress would only inch along, while if we had all been in the same room working together five days a week, we would have been able to address these issues in hours, rather than days.

Many of these external commitments are natural expectations of graduate students. Others, however, boil down to matters of funding. It's difficult to fund a game in an academic setting, and the way that graduate students get paid is either by working on funded research (hence *SpyFeet*, *Game-O-Matic*, *Holodeck*), or by being a Teaching Assistant. Although there was a little bit of funding for developing *Prom Week*, it wasn't enough to cover the expenses of the number of team members that we had, for the amount of time that we needed.

Another challenge of the University setting was a lack of a dedicated meeting space. Although all of the graduate students had personal cubicles, any undergraduates who came into the lab to work would be lacking a desk. Although the Expressive Intelligence Studio is fortunate enough to have an auxiliary lab that would accommodate our small army of undergrads, we had to share the space with other research groups in the studio (and indeed, most other research groups would agree that we probably got access to it more than our fair share as it is!)

The University provided us with some excellent resources, but the challenges it brought were ones we were combating throughout the entire development process.



A glimpse of our in-house design tool, used to author the 5000+ rules for social behavior and all character dialogue.

Conclusion

With all of the good and bad considered, we are left with a very positive view about *Prom Week*. Given the myriad ways this project could have failed, the end result was a successful game that explores a new area of game design where the player has access to a new depth of interactivity with a game world. We accomplished our research goal of creating an experimental game based on a playable model of social interaction. We also accomplished our personal goal of making an interesting and fun gameplay experience that was enjoyed by thousands of people. Being successful in venues like the IGF surpassed any of our goals or expectations we considered at the start of the project.

In this discussion of "what went right" and "what went wrong," there were many things that happened that were either neutral or a mix of both. One such aspect of *Prom Week* was the puzzle style of the game. We committed to this constraint fairly early in *Prom Week's* development and have built a game around that choice. Though including puzzles helped us develop and frame the game, we had little chance to explore alternative design decisions. Another early commitment was having a flat hierarchy in the core team. Everyone equally owned and was responsible for *Prom Week*. Without running a similar project with the same team, it is hard to determine if the motivational benefits of group ownership outweighed the potential loss of not having a single creative lead.

We believe that there is so much more than can be done with the tech in *Prom Week* alone, and that AI based games are a promising direction for further experimentation. We hope that our innovations in dialogue and social simulation will inspire and influence future games. In the meantime, we hope you enjoy *Prom Week*!

[*Author Information: Josh McCoy, Mike Treanor, Ben Samuel, and Aaron Reed are PhD students in the Expressive Intelligence Studio, part of the Center for Games and Playable Media at the University of California, Santa Cruz*.]

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