

Script Development and Interactive Performance for the Latina Project
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ABSTRACT

This paper documents the process whereby Jeff Wirth and a group of interactive performers worked with Anne Norris to design and test an interactive experience in order to create a health-related learning opportunity for Hispanic girls. The paper is intended to evolve as the project continues. *This current draft describes the process from 1 June through 1 November 2010.*

INTRODUCTION

The following press release appeared in the public relations website "UCF Today" of the University of Central Florida, on 26 July 2010.

The University of Central Florida was awarded a \$434,800 National Institutes of Health grant that will allow researchers there to develop a game using life-size avatars and real-life scenarios to promote sexual abstinence among Latina middle schoolers.

Anne Norris, a UCF nursing professor, and Charles Hughes, a UCF computer science professor, will work together with UCF's Institute for Simulation & Training during the next two years on the project. The game is intended to be played in after-school and youth outreach programs run by trained teachers and counselors. It will be designed to improve girls' skills in responding to peer pressure to engage in sexual behavior.

To develop the game characters, Norris and her team are collecting data from focus groups of Latina students participating in the city of Orlando After-School All-Stars program based at Stonewall Jackson Middle School. In April, two groups of girls each came to UCF twice to participate in games and other activities supervised by Jeff Wirth, director of the Interactive Performance Lab at UCF's Institute for Simulation & Training.

"Our ultimate goal is to reduce pregnancy and sexually transmitted disease among the young Latina population," Norris said.

After the game is developed, it will be tested on a small group of Latina girls. Their progress will be studied three, six and nine months after they start playing the game.

If the game is successful for the Latina girls, Norris plans to develop a similar game for boys and girls of other ethnicities.

Interactive Performance (IP) is an emerging discipline in which trained *inter-actors* work with an untrained *spect-actor* ('spect') to improvise a story. Jeff Wirth has developed a body of theory and practice and has trained inter-actors who are working on this project (Wirth 2010a).

In IP, there is no traditional script. The inter-actors must be free to respond as the situation develops. However, the team needs to be able to structure the story experience and plan their actions and reactions. Wirth has developed a prototype notation for the scripting of interactive experiences, which is documented in a separate paper.(Wirth 2010b).

The Latina Project's core idea is to develop an interactive training system that uses one or more inter-actors to play the roles of peers of the teenage girls who are the intended beneficiaries of the learning experience. The inter-actors will control cartoon-line characters on a computer screen. A story-driven dialog with several scenes will lead the subject to experience peer pressure, and provide a conceptual framework for how to resist the pressure.

A score will be given after each session, to indicate the trainee's degree of success in that run-through of the scenario. In addition, a continuously changing on-screen graphic display will give feedback to the trainee about whether her 'strength' and 'coolness' are increasing or decreasing. These two dimensions need to remain in balance. If they become too unbalanced, the ball on top of the crossbar falls off and the scenario ends.

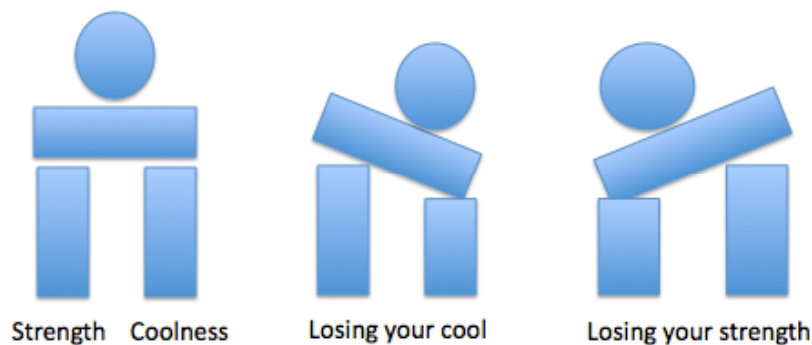


Figure 1: The Coolness and Strength Indicator

One of the actors characterized this feedback device as a "visual conscience".

What's a game? A game is a structured, rule-based activity in which players seek to overcome arbitrary challenges to achieve an objective. Games are distinguished from work by the fact that the challenges have no intrinsic economic significance; games are normally intended for entertainment. When games are designed for learning, the

objectives often relate to desirable changes in the skills and future behavior of the players.

By this definition, the Latina Project is developing a game whose objective is to achieve a balance of strength and coolness. The higher level objective of the game's designers are to enhance the players' abilities to understand how peer pressure can lead to unwise decisions, and to increase their skill at resisting such pressures.

DEVELOPMENT

The development process. Jeff Wirth was engaged to develop the content of the game. The overall strategy was as follows:

1. recruit a team of interactors and develop a plan
2. use Powerpoint to produce simple visuals for the characters and situations in the story
3. use a video projector to test the story with a few typical latina teenagers.
4. document the results and provide guidance to Hughes and the programming and art team, so as to construct an avatar-based system for formal experiments.
5. With Norris, design and conduct experiments to measure the system's effectiveness.

In May 2010, Wirth recruited three women with prior inter-actor or theatrical experience, and provided additional training to them. Rebekah (Becky) Lane, Heather Leonardi and Morgan Russell met with Wirth for ten design sessions of approximately four hours each, during June and July.

Two focus groups, each involving approximately ten Hispanic middle school girls, were held. Morgan Russell served as the coordinator. After warmup exercises, the team used role playing to explore issues of peer pressure. The girls were asked to 'direct' Jeff and Morgan in playing through some scenarios, and then progressively involved in role playing some interactions themselves. Anne, Jeff and Morgan asked the girls questions about their life in middle school. Becky, watching the video of one of the focus groups, observed that social status seemed extremely important to these girls. This was consistent with her memories of being that age herself.

The scenario evolved through several sessions. Jeff provided archetype characters, whom the group then named and described. The protagonist (the trainee) would be allowed to select her own name within the game (or to use her own name.) The guest has no on-screen representation. Rather, the guest is looking at, and being seen by, the on-screen characters. This mixture of real and virtual presence has been termed *mixed reality* (Milgram 1994).

The trainee/player is playing the role of a sixth grader. All the other characters except Javier are also in the sixth grade.

The game's characters:

Vicki - a friend and companion to the guest, also a sixth grader.

Julissa - the coolest girl in the class; physically the most mature; an antagonist and source of temptation

Margarita - younger, less developed. The 'goat' of the group.

Javier - the coolest boy in the seventh grade

Zack - the slightly younger and smaller sidekick to Javier

Live Storyboarding. Wirth constructed a Powerpoint presentation built around simple flat cartoon-like pictures of the five characters listed above. The three actors, a group of observers and two Hispanic teen-agers then engaged in a pilot testing process. We describe this process as "live storyboarding", because the Powerpoint scenes serve a role similar to that of storyboards in planning a movie. They allow experimentation with the layout of scenery, positioning of the characters in scenes, and their respective entrances, interactions and exits.

In order to describe the testing process, it would be helpful to begin with the scenario.

The Latina Scenario. The following is an approximation of the flow of the "mainstream" narrative - that is, the default course of events. In an interactive performance, the inter-actors must always be ready to respond and follow the flow wherever it goes, while still pursuing the scenario's objectives.

The game begins with a screen displaying a caption:

"Dramarama: A game of friends, fun and drama".

A narrator asks the guest what name she would like to use while playing. If the guest hesitates, the narrator says "it's OK to use your own name." The player provides a name, and is addressed by this name throughout the scenario. We'll use the stand-in name "Carmen" in this description, to protect the privacy of the players.

From the outset it was intended that the story should begin with some kind of a shaping experience. The team decided to have Vicki initially greet the player, and explain that they have been assigned to develop a skit for next week's assembly. The skit is intended to act out a scenario based on the REAL model for resisting peer pressure.

R: Refuse what is offered

E: Explain why you are refusing

A: Avoid further interaction

L: Leave the place where the temptation is happening

Vicki explains the rules, which are also provided on a piece of paper that was left on the table for the player to find. She then suggests a brief rehearsal. "I'll offer you something, and you refuse it, OK?" "So .. we're at my house and my parents are away. There is some beer in the fridge. Let's have a beer! (Now, you refuse.)"

After the girls have worked through the steps of REAL, Vicki says "bye" and takes her leave. The scene shifts to a room at school. Vicki is chatting with the player; her friend Margarita comes up and is introduced. Then Julissa comes up, full of attitude. "Oohh... who's the new girl?" Vicki: "This is Carmen. She just moved into town." Julissa: "Oh. Hi." No real warmth or welcome is shown.

Zack arrives and is introduced. "Oh, Hi - Vicki told me about you. She said you were very good at the assembly!"

Javier arrives. "Hi girls." and is introduced to the player. He greets her, then talks to Julissa. "Listen ... I'm having a party on Saturday, and I'd like for you to come." She replies loftily "Well ... that would be nice, but my high school boyfriend and I may have other plans..."

Julissa moves closer to Margarita and continues: "Margarita, you need to get me another hall pass."

Margarita (speaking in a small-child, nasal voice): "But I got in trouble when I got you one last week." Julissa; "You won't get in trouble this time. I need that pass, so you just get it, OK?" She exudes confidence and condescension, while leaving the scene.

Javier: "Man, she's something, isn't she?" (ambiguously) "Anyway, you're all invited - it'll be a lot of fun. Do you think you can come?"

Vicki: "Wow, that would be a lot of fun. Carmen, do you think we should go?"

In the early design discussions, Norris thought that this would be the point at which a successful player would refuse the offer. However, the design team felt that the party offered a rich set of opportunities for interaction, and Norris agreed.

If Carmen accepts the offer, the scene shifts to the party. If she refuses the offer, an alternative story line is introduced involving Vicki's mom taking the girls somewhere and needing to drop them off. The intention is that, one way or the other, the kids (except Julissa) get to the party.

At the party, a game of "truth or dare" is proposed by Zack. Vicki strongly urges Carmen to play, and this provides another opportunity to resist an offer. If she accepts, the 'dare' is to go into the kitchen alone with Javier for five minutes. If she goes, then Javier comes and sits down next to Carmen, and attempts to convince her to go up to his bedroom.

If she accepts, the narrator says "they went up to Javier's room, and had a wonderful time." The story immediately shifts to the next day. The girls discuss what happened.

The game concludes with a reported numeric score. "You scored 475 points. The highest score so far was 525 points". During this storyboarding phase, these are entirely fictional numbers, intended just to demonstrate the idea of receiving a score.

The scenario is deliberately designed to be ambiguous about what happened in Javier's room. The reasons for this are obvious: anything explicit would be politically explosive; and in fact, for good storytelling, the player should make up their own story.

The main hazard would seem to be that in the denouement scene, when Vicki is talking with Carmen after the party, Carmen might describe a fantasy story that involved sexual contact.

TRIAL RUNS

Physical Setup. A conference room at the Institute for Simulation and Training, approximately 20 feet wide and 40 feet long, has an airwall that divides it into two rooms. In one of these rooms is set up a rear projection screen. Between this screen and the far wall is a table and chair, observed by a video camera on a tripod. The airwall is partially closed. On a table sitting in the gap in the airwall is a projector, which illuminates the back of the rear projection screen. The subject sits at the table facing the screen.

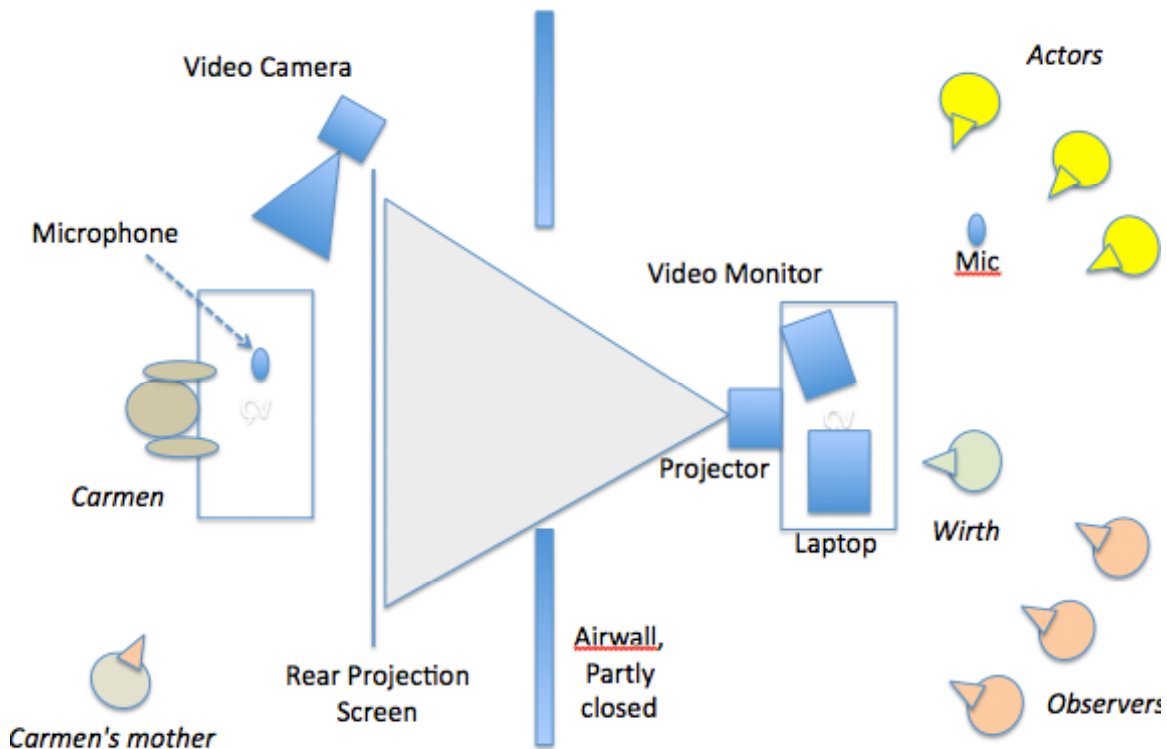


Figure 2: Setup for the Storyboard Tests

In the other room, sitting on a table is a control console which contains a video monitor (displaying an image of the seated subject), and an audio mixer (not shown in diagram). This system is set up so that Jeff Wirth is sitting at the table, facing through the gap in the airwall, and watching the back side of the rear projection screen. To his right are three

actors, gathered around a microphone. They can see the subject's video image and the cartoon characters on the screen of the laptop. They can also see the rear projected imagery, but neither they nor Jeff can directly see the subject.

The actors speak into a shared microphone; the sound is reproduced by speakers in the subject's room, but she can also hear the actors' voices through the open airwall door. Likewise, the subject can hear the actors' voices partially through the airwall. There is no delay or other impediment to the audio 'boost' system, as there is no Skype or other digitization of the audio being done.

Observers - Mike Moshell, Si-Jun Kim and his wife, are seated behind and to Jeff's left. Natalia Villegas, a nurse/midwife from Miami who is working on her Ph.D in nursing at the University of Miami, is also observing. Her research topic is HIV prevention in latinias in Chile and Miami, under the supervision of Dr. Pragalos.

A Trial Run. The subject, "Carmen", and her mother, arrive in the IST lobby. Carmen appears to be about 13 or 14 years old. They are both seated in the experiment room, with mom off-camera but clearly present and observing her daughter's actions.

Jeff initiates the Powerpoint "storyboard" visuals for the experiment. The first screen's text announces the game, "Dramarama - a game of friends, fun and drama." There ensues an interactive story, populated by two dimensional cartoon characters that were constructed by Jeff with the aid of Wii software (the characters are called "Mii".) They are large-eyed and somewhat juvenile in appearance. << Include images here.>>

On-screen appears the first female character - Vicki. One actor provides a narrator voice to briefly explain the game; another voices Vicki. The narrator asks Carmen what name she would like to use to play the game; Carmen does not respond. The narrator asks "Can we call you Carmen?" Carmen replies with a low "yes".

The "friend" character Vicki is introduced. Vicki observes Carmen's bracelet and says "I love the bracelet you're wearing." This produces a perceptible shock from Carmen.

The story then plays through. Carmen refuses to go to Javier's room with him.

In general, the first subject was quite shy and inhibited. After she left, Norris offered the opinion that the presence of the girl's mother had a substantial inhibiting effect on her. It seemed as though she were trying to provide the "correct" answer, rather than the one that the social situation might have actually invoked.

Another Trial Run. In another run (reproduced via YouTube for a conference call and review), the player, a high school student, was considerably more aggressive than the first. Her mother was not present. In this run, the girl accepted all offers including the offer to go to Javier's bedroom. Later she encounters Vicki kissing Javier, and a "betrayed friend" scene plays out, as each character had believed that Javier was especially interested in her.

Morgan Russell reports that the actors felt that this subject was willing to play. However, in the after-action review, the subject did not indicate much interest in similar activities, or faith in their usefulness.

DESIGNING THE 3D CHARACTERS

After two live sessions with the storyboards and one "surrogate" session (in which a nursing graduate student stood in for the player), the team turned to the task of specifying the characters' appearance and animated actions.

Wirth led the team through the development of a specific list of emotions that the faces of the characters need to convey. These included:

- confused
- interested
- excited/flirty
- pleased/happy
- concerned
- disgusted
- 'whatever'
- displeased/hurt

Moshell asked why feelings such as fear were omitted. Wirth replied that within the story line, there is no expectation that the onscreen characters will need to express fear. The player may well experience that emotion or others, but the onscreen characters don't need to express them.

Wirth had the acting team produce these facial expressions and then develop consensus as to which expression best reflected what they wanted on the characters. He then took digital photos of these faces and provided them to Eric <<last name>> and <<assistant>>, artists assigned to the project.

The design of a control system to communicate the interactors' intended emotions to the animation system is the subject of a separate paper (Moshell 2011a).

Eric met with the team and showed some conceptual sketches, including two or more for each of the five characters. He had previously been told that the visual style of the characters was to resemble those in "Kim Possible", a Saturday morning Disney cartoon series about high school students.

The actors offered their opinions. Anne Norris selected features from each of the suggested figures.

Poses (and a few animation sequences) needed by each of the characters were previously developed and itemized by the team. These were listed by Wirth. Actors posed each figure, and these photos and descriptions were provided to Eric. An example:

Vicki's poses:

- * two fingers held by the other hand
- * hand on hip
- * hand holding hair
- * chin on hand, arm on table
- * stand up straight, chest open
- * hands on lap

Vick's Animation:

- * Jaz hands, back to lap

Eric wanted to know how many scenes were anticipated in the story. Wirth indicated that there are four dramatic scenes, which take place in three locations. These take place in the school library; in the kitchen of Javier's house (two scenes) and the porch of Javier's house.

INTERACTIVE PERFORMANCE ISSUES

Although three actors are involved in prototyping and testing the five on-screen characters (plus occasional narrator), it is Wirth's intention and expectation that one trained inter-actor will be able to control the system and deliver effective learning. Narration will be provided by pre-recorded audio tracks that can be selected as needed. The actors seem confident that they can manage this task.

The process of providing feedback by controlling the "visual conscience" icon and ultimately of awarding numeric scores to the participants was originally envisaged by Wirth as being controlled by the actors. As of 1 September, Norris is thinking of controlling this feedback herself, for two reasons. She is concerned that if several actors are involved in different iterations of the experiment, there will be challenges in dealing with variability in scoring methods. She is also concerned that the interactors will be very busy, and may not have enough attention left over to reliably provide this feedback. One of the actors also raised the question of "which third hand" would they use to provide that feedback?

Despite Norris' misgivings, the actors have expressed confidence that they will be able to provide this feedback. Becky mentioned that inter-actors have extensive experience in reading the body language and emotional state of the people with whom they are playing.

A DEMONSTRATION FOR ORANGE COUNTY PUBLIC SCHOOLS

Changes to the Team. After the storyboard trials were completed, Wirth left the project and recommended Ken Ingraham as his replacement in the capacity of performance director. Katie Ingraham was also part of the conversation, as she is developing ideas for a Ph.D dissertation project concerning interactive performance. It was decided that Katie will play a research role during the Latina project, whereas Ken would have operational responsibility for coordinating the interactors' work.

Ken worked with the interactors and Norris to review the 3d avatars as they were modeled and rigged, on the basis of the 2d concept art that had been approved by Norris and the interactors.

Moving the System Forward. Dan Mapes introduced a new control paradigm for desktop puppetry (see Moshell 2011a). This control system will be submitted for patent protection by UCF. In addition, postdoctoral student Arjan <<lastname?>> developed a minicamera-based lip sync system that uses a small camera on a headset-mounted boom, and four reflective markers attached to the interactor's lips (with honey!)

The key issues of concern during this interval were:

- * how many avatars could be rigged and ready for action by the upcoming demonstration for Orange County Public Schools on 12 October;
- * how much time would the interactors have to experiment with and learn how to control the desktop puppeteering system;
- * how well would the lip-sync device work, and how quickly would the interactors adapt to it?

Norris felt that it was of vital importance to demonstrate as much of the system's capability as possible, in order to assure OCPS that the system had promise. Darin Hughes took on the role of project director so as to manage liaison between Norris and the technical team. Charles Hughes and Dan Mapes decided to allocate a majority of the remaining technical funding to a full-press effort to build as many assets as possible during this time period.

Partial prototypes of the system were tested by the interactors during the weeks before the demonstration (using an Iraqi avatar from the summer's Avatar Project) . The interactors expressed confidence that they would be able to control the avatars for the story's purposes.

Setup for the Demonstration. The day before the demonstration, the system was set up in the new Media Convergence Lab in the Partnership III building. The actual OCPS trials will be conducted with the player at the Stonewall Jackson Middle School and the interactor at UCF, but this demonstration took place at the IST lab. The setup was as illustrated in the following diagram.

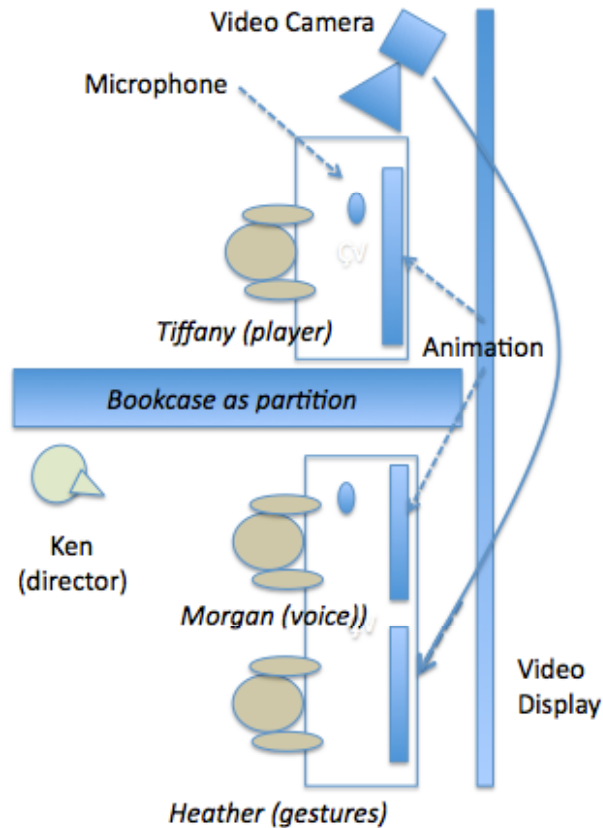


Figure 3: Setup for the OCPS Demonstration

A graduate nursing student played the Latina, during three run-throughs of the scenario. She prefers anonymity, and so we will refer to her as 'Angela' in this document.

(Angela reports that she has a goddaughter who is 12 years old, and that according to her experience, the interactors' characterization of the pre-teen personalities is quite realistic.)

Tactical Decisions. On the morning of the demo, Ken and the interactors evaluated the system and made two tactical decisions. First, they decided to use two interactors rather than one - Morgan for voice and head tracking, and Heather for gesture control. This decision was based on the relative unfamiliarity of the gesture interface. However, both interactors remained confident that the system would be controllable by a single interactor once they gain more experience.

Second, the decision was made to not attempt the use of the lip motion camera detector, due to its novelty and some issues with calibration. Instead, a keypad was controlled by Morgan to 'twiddle' the currently controlled character's lips, and to cause characters to enter or leave the scene. This keypad also selected among six facial expressions for the currently active character.

All five 3d avatars were modeled in time for demonstration in this presentation. Three of them (Javier, Zack and Vicki) were animated. Two scenes, the kitchen and the porch, were enacted as part of the demo.

Gestural control. A major focus of the current work is the development of means to control the gestures of the characters without requiring a body suit, hat, and a large tracking volume. Mapes has designed a desktop avatar control system; the OCPS demonstration represented the prototype's first sustained use by interactors.

Mapes' 3d avatar control system could, in fact, be described as a "five dimensional" system. A pair of infrared motion tracking cameras are mounted above the work table surface. On the table surface, a two dimensional grid of circles is organized as shown in the following diagram. A single retro-reflecting ball about 1 cm in diameter is mounted on a short pedestal, resembling a chess pawn.

When the operator (Heather, in this demo) slides the ball left and right, she moves the locus of control from one character to another. When she slides the ball toward herself, she selects one of the pose groups for that character. However, no immediate effect is seen on the screen.

When she lifts the marker off of the tabletop, the selected character becomes animated. Each gesture group has up to four gestures that can be generated, by moving away from the neutral spot (directly above the dot) in N, E, S and W directions.

For instance, the dot at Javier: Kitchen controls four gestures. Moving the marker away ("north") causes Javier to lean forward on the kitchen table. Moving to the east (right) generates a "chest bump" - an assertive thrusting outward of Javier's chest. Moving south causes Javier to cross his arms. Further movement southward produces an opening of the arms, in a palms-up gesture. (Heather remarked that she found it difficult to control this "stacked gesture" and would have preferred that the south direction simply controlled a continuous tightening of the crossed-arms gesture.

Movement westward caused Javier to rotate toward his right, and to look "flirty"; i. e. downward, with eyes upward. <<It was not clear to me how this animation sequence related to the head motion under Morgan's control.>>

The interface can be described as "five dimensional", inasmuch as the two tabletop dimensions are used to select a character and a gesture group; then three dimensions are used to select and modulate gestures within that group.



Figure 4: The partial map used in the OCPS demonstration

Scenario-Specific Gestures. When seeing this interface in operation for the first time, Moshell formed two impressions:

- (1) The system is built around the gestures required in a particular scenario, and a good deal of animation effort was required to prepare them. Unlike a motion capture suit, no unplanned gestures can be produced.
- (2) For a full suite of five characters and four scenes, there may be more than 20 of these gesture groups. In the current demo there were six, and Heather reported no difficulty in mastering them. However the time required to learn the spatial locations of as many as 80 to 100 gestures could be a significant challenge.

The principal mitigating factors would seem to be (a) the interactors' intimate familiarity with the scenario, and (b) the logic of the 2d tabletop grid, with its labels. Once you see that you are controlling Javier on the porch, you can quickly recall the gestures by moving slightly off-center. Small 'false starts' toward a gesture seem to be enough to remind the interactor of what lies in that direction, while the avatar's movements just seem to be part of the natural fidgeting that living humans exhibit.

The Demo. At 12:30, in the new Media Convergence Lab in Partnership III, a group of guests assembled. These included

(Please correct these names if you know correct names:)

Ruth Bruce, senior administrator for curricular services, OCPS

Brenda ---- (title?)

Ray ---- (Stonewall Jackson Middle School)

Lisa Murano, Planned Parenthood, who teaches sex education classes for OCPS

B. J. Starr, a feminist and writer for Ms. Magazine, invited by Ann Norris

Jose Maunez-Cuadra, Director of Latin American Studies Program (UCF)

M. C. Santana, Professor of Digital Media (UCF)

The scenario was enacted three times, with the guest deliberately varying her degree of aggressiveness. The audience reacted quite positively to the experience, and asked a number of questions in the after-action discussion.

This document will be continued in 2011 as the Latina Project moves into the experimental phase.

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References

Milgram, P. and Kishino, A. F., Taxonomy of Mixed Reality Visual Displays. *IEICE Transactions on Information and Systems*, E77-D(12), pp. 1321-1329, 1994.

Moshell, Mapes, Wirth 2011a. A forthcoming paper that describes the process of designing the puppeteering interface through a convergent (if somewhat stressful) process that revealed interesting aspects of the collision of cultures that makes up Digital Media.

Wirth 2011. A forthcoming paper that describes the origins and principles of IP as it exists today. (To be written; may in fact be a chapter from Wirth's upcoming book)

Wirth, Moshell 2011b. This forthcoming paper describes the notation process for iP, based on Wirth's notation document for the latina project.