

Virtual Forum Theater – a computer supported collaborative learning environment for underprivileged children

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Abstract. *This is an interdisciplinary research and a work in progress where we are trying to understand, investigate, document and critique how children's learning of expressive arts, argumentation skills, and critical awareness can be augmented or transformed by the use of an on-line Forum Theater environment. The potential of this computer-based educational tool is to provide an open constructionist learning environment, or microworld, in which the learner can safely explore and express his imagination, creativity, language, aesthetics, participatory design, written skills, conflict resolution, role-playing, decision-making, and coordinated teamwork. We are studying the distinctions between learning in a regular drama environment using Theater of the Oppressed (TO) techniques, and an environment that blends drama, TO techniques and the Internet (Virtual Forum Theater learning environment).*

1. Introduction

In this paper we introduce our research in progress on Virtual Forum Theatre (VFT). VFT is an Internet tool that uses drama to enhance expressive fluency, argumentation skill, and critical awareness. In section two, we introduce the theoretical background of the work, based upon Boal's Theatre of the Oppressed (TO) and constructivism [Piaget 1977]. VFT uses virtual computational environments to enable children from different cultural and geographical backgrounds to learn from, work with, and potentially understand each other. Section three presents the research project and its roots. VFT was born out of a prototype written in MacroMedia Director, and retains many of the features of the prototype. Section four describes the technical aspects of VFT. Section five details our evaluation plan, based upon qualitative research techniques. Section six describes related work. Section seven presents a few idealized hypothetical cases of children using VFT; section eight informs about current study of a group of children using the actual VFT prototype, followed by our conclusions in section nine.

2. Internet tool in support of exploring drama in education

We study the design, implementation, effectiveness of Internet tools that support educational experiences – in the classroom and beyond – with a specific emphasis on tools for exploring and creating drama and other forms of personal expression among children. Ours is an active research [Cavallo, 2003] as we study this through the design, implementation and deployment of such tools.

Learning theorists, developmental psychologists and pedagogues such as Piaget (1977), Vygotsky (1971), Papert (1990), Dewey (1938), Freire (1972), Duckworth (1987), Gardner (1973) and others from the open school movement give us insight into how to re-think education, imagine new environments, and put new tools, media, and technologies at the service of the growing child. They remind us that learning, especially today, is much less about acquiring information or submitting to other people's ideas or values, than it is about putting one's own words into the world, finding one's own voice, and exchanging our ideas with others [Ackermann, 2001].

This research is based upon the theoretical framework provided by constructivism and constructionism. Constructivism presumes that learning happens best when it is self-directed and that the learner constructs knowledge afresh every time. "To understand is to invent" [Piaget, 1977]. A teacher's role is to create conditions for invention rather than to provide ready-made knowledge [Papert, 1996]. Constructionists base their work upon constructivism, but also believe that learning happens felicitously in a context where the learner is consciously engaged in constructing a public entity, whether it is a sand castle on the beach or a theory of the universe [Papert, 1990]. Papert's constructionism helps us understand how ideas are formed and transformed when expressed through different media, when actualized in particular contexts, when worked out by individual minds [Ackermann, 2001]. Papert emphasizes digital media and computer-based technologies as objects with which to think, and as extensions of one's construction artifacts.

As Heathcote (1984) has written, to use drama in education is to look for the precise dramatic pressure that will lead to a breakthrough, to a point where the students have to think about a problem in a new way, to fight for language adequate to the tension they

feel. It is to literally bring out what children already know, but do not yet know they know. Heathcote claims that we should use drama to expand children's awareness, to enable them to look at reality through fantasy, to see below the surface of actions to their meaning, and not just to produce plays. Theatre is concerned with communication between actors and audience; drama is concerned with experience by the participants, which means drama is "to practise living", as well as "a way of learning" [Way, 1967].

Bertold Brecht's theory claims that the world is revealed as subject to change, and the change starts in the theater itself; the experience is revealing on a "consciousness" level, but generally not on an "action" level [Brecht, 1964]. The spectacle is a preparation for action [Boal, 1983]. Boal advocates that the spectator should no longer delegate power to the characters either to think or act in his place; he must think and act for himself. Boal (1983) claims that theater should be action and rehearsal for change. Both techniques could be applied to drama in education, and it is my intention to pull the socio-political approaches from their work. The ideas from Freire and Papert have its origins in Dewey's philosophies. Boal's work is based on Freire in a way that the spectators should construct their own actions through theater and become an active audience.

Based on the above educational research, theory, and practices of drama and theater for social change, as well as on the attributes of Internet technology, we are investigating how to enhance self-directed, project-oriented learning in children, and – in particular – how to augment children's natural talents as creators, actors, and storytellers through the use of technological theater. Digital drama can provide a valuable learning environment in both formal and informal settings, as well as potentially helping to empower social transformation. We are investigating how participatory digital theater plays a role in children's learning through creation, expression, simulation, and collaboration; more specifically we are looking into expressive fluency, argumentation skill, and critical awareness. The findings will contribute to the development of progressive and empowering educational software and inform of its relation and impact on cognition and learning.

VFT as an educational software can promote the understanding of differences between cultures. Especially in large countries like Brazil where the regional diversities enrich the culture of the country, but also need to be better understood, respected, celebrated and known by all the children around the country.

3. The research project

In our research, we try to understand, investigate, document and criticize how children's learning of expressive fluency, argumentation skills, and critical awareness can be augmented or transformed by the use of an on-line Forum Theater environment. The potential of this computer-based educational tool is to provide an open constructionist learning environment in which the learner can safely use her or his imagination, creativity, language, aesthetics, and judgment to explore and express ideas about the issues that form the basis of their investigation. Through this interaction among each other they must confront elements of their own understanding, the perspective of others, participatory design, conflict resolution, role-playing, decision-making, and coordinated teamwork.

A concrete example of how we can merge the learning of expressive arts and technology is the Virtual Forum Theater (VFT), a first version of which we designed while at the Harvard Graduate School of Education (HGSE). This was created in the fall semester of 2000 and development continued until August 2001. That first version of VFT provided the ability to construct scenery, characters, props, and “frames” that replace “acts” in a traditional play. Written in Director, this version has no ability to allow online interactions among geographically separated children. To overcome this limitation, we are currently implementing a new version of VFT in Java. As VFT ideas mature, the Java version will incorporate new features, such as web-cam support, and a gallery of stock images for constructing scenes.

VFT is based upon the work of Augusto Boal, a Brazilian theatre director, author, activist, teacher, and politician (who also began as an engineer). Boal developed the Theatre of the Oppressed (TO) [Boal, 1983] based upon Freire’s Pedagogy of the Oppressed [Freire, 1972]. Just as Freire exploited local concerns to help participants develop literacy and to become critical questioners of, and conscious actors upon their environment, Boal (1983) used participatory theatre to develop a similar awareness through modeling real-world situations and role-playing potential solutions.

TO is a form of Theatre by which one can produce plays that explore issues of oppression and inequalities. Forum Theater is a TO technique where the spectator can stop the play when conflict arises and when he or she disagrees with the course of action proposed by the actors. The spectator might go on stage and re-enact the piece or explain to the actor what should be done; TO is a learning environment in the sense that actors and audience learn together in order to create and resolve the dramatic issues. Spectators are encouraged to become *spect-actors*: active participants rehearsing strategies for change [Boal, 1992].

To design a Forum Theater, a group gets together and creates a play around a community or a universal issue. They rehearse their collaborative script and when they think they are ready, they invite people who could be interested in the themes of the play. The goals of the playwrights and actors are usually social change. They hope to open a space for enactment of possible solutions for change. The active audience called spect-actors is invited to watch the play and interrupt it in a moment of crisis where they disagree with the course of actions and want to propose a different resolution. The play is presented once and right afterwards the director/facilitator asks the audience to divide into groups of four in order to reflect and discuss about the play. The spectators should think about how they would like to solve the issue or conflict posed by the script. The play is acted out once more and a member of the audience who stops the play can go on stage and take the place of the protagonist. This same spect-actor, instead of replacing the actor, can give directions to the actor on how to behave, on how to act and solve that situation.

Virtual Forum Theatre maintains these characteristics while adding the ability to interact over distances, to efficiently try out many different scenarios, and to provide channels for discussion about alternative courses of action, characters, and topics. In VFT, learners construct their own plays, including short scenarios or vignettes. We will make available a wide variety of tools for the learners/participants to write, record, edit, animate, provide emotive stances, costumes, and nuance for characters, create the visual scenery, and so on.

Disadvantaged children usually do not have the opportunity to communicate or express themselves freely in many settings, which typically impacts the full development of their argumentation skills and problem solving. They might become shy and apathetic. Virtual Forum Theater can give them a vehicle with which to improve their expressive fluency. In most places, the underprivileged population has access to community technological centers in their neighborhoods. VFT aims to establish an electronic environment of free expression that exploits and builds upon the anonymous characteristics of Internet interactions. Children physically located in widely separated areas can share their experiences with others in the similar situations, can safely elaborate their struggles, can pursue points of view and formulate solutions to the same kind of problems that their peers experience in another part of the town, state or country in which they live. At the same time, they can become more acquainted with the technology that might be essential for their future work life. Some work has been done on this field of digital dramatic plays, but they usually confine the learners into a very specific domain [Machado & all, 2000; Marsella & all, 2000], and do not allow or emphasize internet interactions.

We will apply VFT with underprivileged children and study the impact of the tool on their learning and cognition process and on their interaction with their immediate community. This research itself will encourage discovery in the expressive arts as well as in the technological fluency. Once the children master the process of collaboratively creating their digital drama, they will also have learned some negotiation skills, which might be different from social negotiations, since some of them will not be interacting in the same physical space. The aspects of social psychology will also be researched in the light of the anonymous characteristics of Internet interactions.

4. Technology of Virtual Forum Theater

VFT will allow participants to choose pictures from an existing gallery of characters, props and scenery, to import pictures of props, scenery and characters, to draw digitally or scan hand drawing of props, scenery and characters, to animate characters, or to video tape the whole play using web-cams. In order to propose a new solution to an existing conflict the participant will have to modify existing frames of the actions and dialogs.

VFT is incorporating some WWW free software tools and blend them with our own Java implementation of GUI interfaces in order to create a new paradigm of participatory and collaborative user interfaces applied to learning of expressive arts. This blend of WWW free software and java-implemented interfaces will provide a unique tool directed at facilitating learning and introducing an effective and empowering use of WWW for the children. Virtual Forum Theater will allow role-playing and trials of solutions to children in conflicted and oppressive communities, because it is a safe environment in which to play out different responses. Children will interact with peers on the WWW in order to help validate or invalidate their proposed solution and we will study the extent to which this online validation works in aiding children on the process of expressing themselves. The findings of this study will benefit directly the fields of cognitive science and learning helping to improve the quality of education worldwide.

Emotions are an essential part of dramatic productions and the challenge of

providing effective ways to convey emotions through a web browser is being carefully investigated. At a first level of complexity, we propose to blend voices and dramatic faces as a simple way to express emotion. Children are able to manipulate dramatic faces in order to create expressions and add voices to their faces. The characters can be represented by chosen faces. A set of pre-defined theater emotions masks (icons) will also be provided. One mask at a time would be displayed on the top right corner of the face, or character for the period of time equivalent to the required emotion. Children can choose not to execute the change in action, but to propose the change to the group who is creating the play. In this scenario, they can use the virtual forum chat room.

The pyramid in Figure 1 represents the structure and components of VFT. At the top we introduce the simplest method to create a digital play by creating dramatic faces (Figure 3) who will deliver their speeches (lines) through audio files. This face animation resembles a radio theater, except that visual emotion clues are provided by the dramatic faces. The audio interface and editor has been developed in Java. The video recording and editing tool will also be developed in Java and added in a second phase of the project.

The current animation interface consists of a drag and drop GUI interface where the child can drag each image into a frame, followed by a sound file (character's script) and a text if desired (Figure 2). Once the sequence of the frames and sounds are added to the storyboard, the child defines the time in which the sequence should be played (the system calculates the time between frames) and a Synchronized Multimedia Integration Language (SMIL) file is created.

The base of the pyramid includes some freeware tools such as: Real One Player, to play the SMIL file; WebDwarf, a freeware drawing tool that generates Scalable Vector Graphics (SVG) image files; possibly a freeware video editing tool; and a chat room.

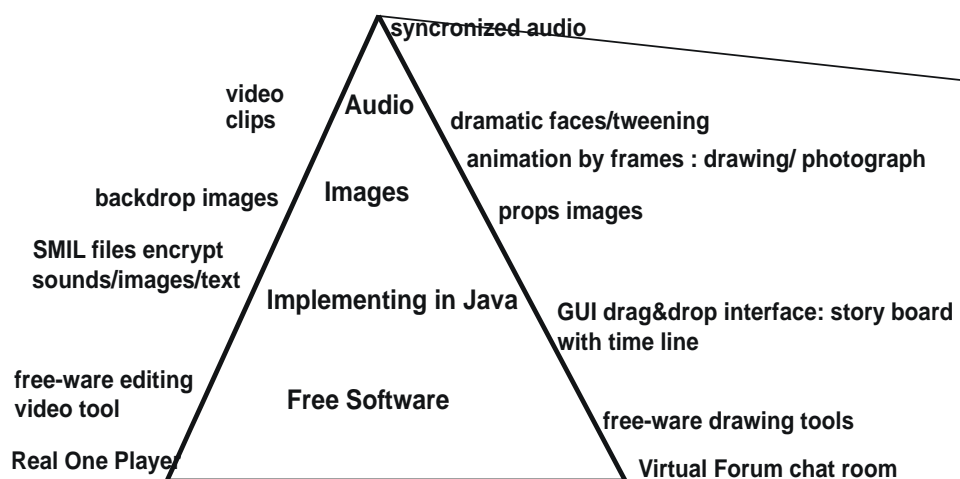


Figure 1. Technical components of VFT



Figure 2. GUI Storyboard Java Interface

5. Qualitative Research

An interactive approach to qualitative research study should be a reflexive process operating through each stage of the project. Decontextualization and recontextualization of commonalities of interaction [Maxwell, 1996] and reflective analysis of the collected experiences as proposed by Duckworth (1978) will guide the qualitative methods to be used in my research. Qualitative research usually contributes to a greater understanding of perceptions, attitudes, and processes [Glesne, 1999].

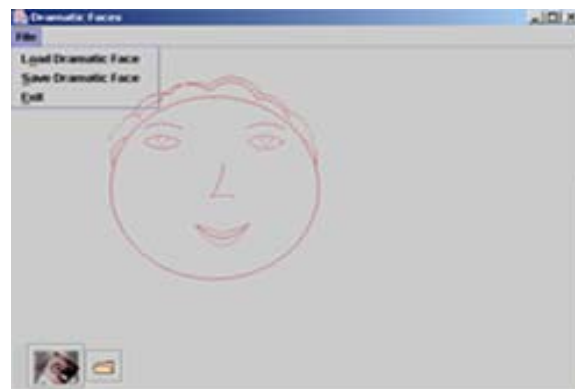


Figure 3. Dramatic Faces Java Interface

We are scheduled to finish the development of VFT in 2005 when we will begin qualitative studies with three groups of children age twelve to fourteen. Most of the children should be from disadvantaged neighborhoods in the greater Boston area such as Somerville, Medford and the South End. We would like to select children who are interested in theater, but are shy and do not feel comfortable to perform in public. We might try to select Brazilian and Spanish speaking immigrant children, as well as Afro-American ones in order to facilitate distance interactions.

We will study the distinctions between learning in a regular drama environment using Theater of the Oppressed (TO) techniques, and an environment that blends drama, TO techniques and the internet (VFT). We intend to answer our first two research questions

by studying those three groups. The goal is not to find out which method is better (real or virtual), since both have their merits, accomplishments, and uses. The assessment on how well VFT provides the proposed learning interactions will answer the fourth research question.

The principal research product will be a detailed qualitative study of the learning effects of this technology. In the context of this study, we will attempt to address the following questions:

- How does learning take place in this technological theater environment?
- Does generating scenarios on topics of personal importance, role-playing, collaborating in playwriting and discussion of the underlying issues of conflict and resolution help these children to become more effective at dealing with issues in their own lives and more understanding of others' points of view?
- What are the distinctions between learning in a virtual, Internet based environment and in a real time, present one? How can the technology help this process?
- How can we design on-line collaborative environments that are sufficiently open and powerful to facilitate constructivist learning interactions?

The initial goals of our qualitative research are to:

- Understand how Internet-based drama learning environments can enhance learning of expressive fluency, argumentation skills and self-confidence in disenfranchised children.
- Work with those children to develop their technological fluency through expressive arts, and at the same time help them to develop a critical awareness and a rehearsal for social change.

The qualitative research requires learning to listen well to students' stories, to interpret and analyze the account. The records we create of the children's work over the course of the project with both Virtual Forum Theater and drama will provide documentation about their progress. We will follow up with the children's parents, teachers, and peers at school through interviews and surveys in order to better assess their immediate learning through our work together. We will videotape the sessions with the children as a way to document participant observation and collect data for later analysis. The children's final play and how they interact over the Internet will be another source of data to be analyzed and interpreted towards understanding their learning progress. We will also conduct questionnaires before, during and after our time together to help highlight how their ideas change, or not, over time and assess their learning of expressive arts through technology.

Data collection and coding can be so overwhelming that one needs to constrain them with a well-defined methodology. Our qualitative research methodology is based on Strauss (1998), which presents techniques and processes for developing theory grounded in data and relevant literature. While grounded theory seems most suitable to the innovative study we are undertaking, we also explore others methodologies and techniques such as the "soft-nosed" positivistic approach [Miles & Huberman, 1994], and ethnographic analyses [Spradley, 1980]. All of those methods have their own techniques for initiating analysis, segmenting its units, coding, looking for patterns, verifying those patterns, integrating and interpreting the data, therefore I am applying

the ones that fit better my case studies.

6. Related work

Computer Supported Collaborative Learning (CSCL) is a paradigm for learning technology built upon the research traditions of anthropology, sociology, linguistics, and communication science resulting in a different view of learning and instruction; a view that brings culture and other aspects of the social setting into the foreground as the central phenomena for study [Koschmann, 1996]. According to Koschmann, the most important socially oriented sciences that influence this paradigm are: Socially Oriented Constructivist Viewpoints [Piaget, Doise & Mugny, 1984; Bauersfeld, 1995; Cobb, 1994; Ernest, 1995], Soviet Sociocultural Theories [Vygotsky, 1978; Forman & Cazden, 1985; Griffin & Cole, 1987; Newman, Griffin, & Cole, 1989], and Theories of Situated Cognition [Suchman, 1987; Brown, Collins, & Duguid, 1989; Greeno, 1989; Lave & Wenger, 1991].

VFT is a CSCL environment and this theoretical framework will also be explored in this research, even though there is an overlap with constructionism. According to some well-established definitions VFT is also a Multi-user Virtual Environment - MUVE, as well as a Computer Virtual Environment - CVE [Mello, 2004].

Our work builds upon the research from other CSCL environment such as Amy Bruckman's *Moose Crossing* and MUVE such as Marina Bers' *Zora*. *Moose Crossing* (1999) provides an environment that encourages children to develop their own spaces composed of rich textual descriptions and compelling programmed interactions. *Zora* (2001) provides an environment where children can create interactive graphical and textual expressions of their sense of their own identities and values.

The work of both Bruckman and Bers contributes significantly to exploring how on-line collaborative environments can provide a better understanding of learning, particularly in fields not necessarily associated with computers and programming (literacy in the case of Bruckman and ethics, values, and identity in the case of Bers). The development of a better understanding and practice of social cooperation in a mediated environment is also key in their work: the participants need to propose, discuss, and decide collectively on how to legislate and regulate the activities within the environments.

VFT propitiates the learning of expressive fluency, argumentation skill, and critical awareness. Expressive fluency is the ability to express oneself through the arts by means of technology without difficulty and in a natural way. In this study the expressive fluency is confined to digital drama, visual arts (computer drawings), and digital literacy. The ability to communicate well and convince or persuade other children and adults is called, in this study, argumentation skill. Critical awareness is the ability to process and question any information received by someone else, as well as the knowledge being incorporated. Children interact by developing, modifying and resolving scenarios on-line based upon interests and issues in their lives and communities.

7. Scenarios: applying VFT

In this section, we explore how VFT can be a part of a learning experience. It is not designed as a standalone experience, but a part of a greater experience in the classroom and beyond. Here are some activities and ideas that can be used to expose children to VFT in constructive and fruitful ways.

During a Theater and Technology after-school club at Somerville Youth Community Center, a group of six children engage in collaborative playwriting sessions. The first session is spent doing some group integration exercises based on Boal's Forum Theater arsenal and talking about the kind of play they want to create. They decide which theme would be explored and come up with an overall idea for the script. They decide to create a piece on bullying in schools. In the next two sessions, they rehearse the idea, develop the play and type in an initial script. They bring some props from home like a ball and a board game. They want to enact their play at the near by school's playground as the plot happens during school recess.

During our fourth session, we get together at the center, perform a quick warm-up and bring the props and cameras to the playground. They enact their play and take turns taking pictures (frame-by-frame) of their productions. Sometimes I take photographs. After one rehearsal they look at the pictures and do not like some of them. Then they enact the piece again and retake some pictures. At our fifth session they create the digital play by uploading the pictures to the computer and creating an animation of them. They record the lines for each group of action (about 3 pictures) when appropriate. They play the digital piece; we talk and reflect about it. I ask them to think about how they could approach the conflict in a different way.

The group consists of three girls and three boys; their scene is about a girl, Susan, who enjoys playing with boys as much as she likes to be around girls. But for this same reason she is picked on and called a Tomboy. One day some girlfriends approach her as she is playing with two boys in the playground and deliver the message:

Angela

Susan, you are such a tomboy!

Lisa

Yeah, like totally!

Christy

Just to let you know, you are so not one of us.

Their first enactment portrays Susan really hurt and she decides to hang out with other girlfriends and not to play with the boys anymore. Their second solution to this issue is to have Susan join the boys and play with them again. Then in the last session the children go out again and take some pictures of Susan hanging out with the boys, communicating with the girls about her decision and at the same time apologizing to the boys.

We return to the center and the children create a second version of the play by editing it and adding the new frames and lines. After enacting and being able to see their production, they are able to come up with a more sophisticated solution, or just another approach to solve the identity crisis and to deal with the bullying. This production is posted on the web and they invite other children from their school, as well

as from South America to see it on the web and propose another alternative to solve the issue.

Another scenario involves a group of ten children ages 12 to 14. These children are Brazilian immigrants working together at a community center in Somerville Massachusetts. I am the facilitator and we work together on the creation of a script. I apply improvisations exercises pulled from the Drama in Education and from Theater of the Oppressed. They create a play through improvisations and at any point when the script is stable and approved by consensus, they make it digital using VFT. During the process of creating the play we discuss how they want to implement it as a digital play. They might want to proceed with the improvisations and the creation of the digital play using VFT as a parallel process what is a perfect combination. We can suppose this group decides to video tape their play. In this case they introduce the moments where they want the virtual audience to intervene by announcing it in their video clip. They wear paper masks made by them when introducing the points of interruption. Once they are finished video taping their play, they post it on our web server at Tufts using VFT. Then they invite some children they know who live in Brazil to watch and modify the original play. The children in Brazil enact their solution to the suggested moments of interruption, but they also change another action of the play where they disagree with the original version. They videotape their rehearsal, edit the original play, cut the modified parts and add their recording. The group in Somerville plays the modified script and decides to chat with the group in Brazil about the changes and feedbacks. They like some of the changes, but disagree with two resolutions. They engage in a forum of discussion on-line and eventually the immigrant children videotape another version, which after another round of interactions becomes the final one.

A third scenario happens in a public school setting. A group of sixth graders are doing a special project for their drama class. They engage in a semester-long project where their drama teacher helps them to create a play through improvisations using all the techniques she knows about. She encourages the students to use the dramatic faces interface from VFT. They are able to create a digital play faster using this interface, because they will be using existing faces and tweening them to create emotions, as well as recording the lines of each character. They introduce the points of interventions by freezing the faces and adding an invitation for feedback. Once they are finished with this first simple version, they invite the sixth grader from a neighbor school to interact with them. The invited group modifies the play in at least one point that was not originally suggested. After a couple of interactions, they have a finished script. The playwrights create a new version by drawing the characters and adding backdrops and scenery to the digital play. Then they use a projector and show the play to the whole school during a community night event.

The interruptions in the virtual arena take places at the proposed moments, but there is the freedom for them to happen at any time. The interactions happen through the modification of the play itself as well as through on-line chat. The way that interventions are proposed is completely free and depends on the creativity of the playwrights. VFT will have a couple of suggestions in its menu just to get children started with the concept of virtual forum theater.

One can imagine children from different states in Brazil creating digital plays and exploring regional differences on how to tackle issues of inequalities, folklore, social behaviors, family cultures, etc through the WWW using VFT.

8. Preliminary Results

We are now entering the third week of a workshop with eight girls age eleven to thirteen in the Somerville Youth Community Center, Massachusetts. They are experimenting with the first prototype of VFT and creating a digital play. This is a mini-study where we are validating the tool in order to improve its development in light of the educational outcomes afforded by it. We are observing how well the children use VFT, if it is appealing to them and if the learning that seems to take place is close to that which we desire. This study will inform the main research to be done by the end of 2005 when VFT will have all the features implemented and ready to be deployed.

We are videotaping all the sessions, we are analyzing and coding the data following the methodology present in this paper. As a first analysis of what has happened so far, we are learning that the Dramatic Faces interface needs to present more choices of diverse faces. The children seem to find it unfair to use only two faces when they have four characters in their play. Therefore they need a repertoire of varied faces to symbolize the diversity of characters. The girls find the faces funny and are interested in synchronizing the face animation with the character's voice. By manipulating the Dramatic Faces, it is being emphasized how emotions are an important aspect of theater and playwriting. They are very interested and engaged in taking the pictures of them enacting their play. They have to concentrate hard on their characters in order to portray well the emotions through the pictures. Considering that we do not have enough time to rehearse the play in order to work on character building and to properly get in character, they are doing a terrific job. Some of the giggling and shyness on interpreting the character is disappearing in order to photograph the play.

In terms of design we find some problems with the prototype. For example when presented with the face, the girls refused to use it because it was bald. We quickly had to implement two different hair styles creating two distinct faces. The GUI storyboard needs to be improved in order to provide a better view of the images, especially the SVG ones and to manipulate better the sound files allowing them to be saved as MP3 format. We find that the girls who wanted to draw their own characters, props and background had difficulties drawing in the computer, one need to have a certain amount of practice to draw using the mouse, thus requiring more time to get acquainted and proficient.

We are extending the workshop by one week because we are having technical problems with old computers and glitches on the prototype. We find that in order to provide a better interaction between children and storyboard, we need to work on Java to enhance speed, image display and handling of sound files.

9. Conclusion

We are developing an open-ended tool that enhances the expressive fluency on children. By developing VFT in Java and incorporating freeware drawing tools, we attempt to

provide an engaging multimedia learning environment for dramatic arts, expression and critical awareness. Children will feel they own a play created solely by them.

We expect our design experiment to show positive and effective results in the learning of expressive arts, argumentation skills and critical awareness through the use of VFT in order to empower them to become active agents of social change in their communities. We wish to play a part in encouraging deeper and wider use of technology and expressive arts in the minority population in the United States as well as in developing countries.

This kind of technology is especially needed in my home country of Brazil, which has a very large population of poor and marginalized children. In Brazil these children cannot even afford public transportation so that their mobility is minimal. Currently the government and the private sector are aggressively implementing programs to provide “electronic” substitutes for that mobility via computers and Internet access. This infrastructure cannot provide that “mobility” without electronic tools such as VFT.

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