Virtual Forum Theater – a CSCL environment for scenario generation and rehearsal for change

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Abstract

Virtual Forum Theater is a web-based participatory and collaborative digital drama designed to enhance expressive fluency, argumentation skills, and critical awareness. The theoretical framework is based on Pedagogy of the Oppressed (Freire, 1972), constructivism (Piaget, 1977), constructionism (Papert, 1980), Computer Supported Collaborative Learning (CSCL) (Koschmann, 1996) as well as Theater of the Oppressed (Boal, 1974) and Brecht's theory on theater (1964). By situating Forum Theatre (FT) on-line I intend to provide an environment that removes the limitations of time and space from FT, and enables collaboration with a wider variety of "spect-actors", generating more scenarios, and simulating more pathways of resolution.

VFT is a safe environment in which to play out different responses to conflict like role-playing and trials of solutions to conflict-inherent and oppressive environments. *VFT* proposes a new solution to an existing conflict, and interacting with peers on the WWW in order to pose and resolve characters' motivations and actions and thus help validate or invalidate the solution.

The Learning Environment

VFT is being designed to provide an environment of scenario generation and rehearsal for change. Children will get together as a group and create a story meaningful to them that portrays an issue they have been experiencing. From the story they develop a play and create an object to think with. They will be taking different roles and enacting possible solutions for the problem suggested by them. They will create a simulation of the issue and through action and dialogues rehearse possible scenarios of change. The children will have to build their own characters, make them believable, make the plot interesting and appealing to others. The process of constructing plot, characters and dramatic action for some story they choose that is important to them, as well as the meta-discussion among each other about characters' behaviors and actions, constitutes the openness and strength of *VFT. VFT* affords them this freedom of learning as well as the construction of knowledge related to theatre, therefore providing a constructionist (Papert, 1990) learning environment.

Research Questions

I want to study how technology can enhance children's learning of expressive arts, problem solving, argumentation skills and critical awareness. The research will be conducted with disenfranchised children age ten to thirteen (Cavallo, 2003). The main research questions are:

- 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?

Research Goals

Digital drama is a multimedia presentation of a dramatic play using digital means, including audio, images, text, and video. Digital dramas are produced through use of computer software and performed using browsers available on the Internet. I am investigating how to augment children's natural talents as creators, actors, and storytellers through the use of digital drama and how it can enhance self-directed, project-oriented learning in children. I am engaged in understanding, documenting and critiquing how participatory digital theater could play a role in children's learning through creation, expression, simulation, and collaboration and how children's learning of expressive arts, argumentation skills, problem solving and critical awareness can be augmented or transformed by the use of an on-line Forum Theater environment. The findings will contribute to the development of progressive and empowering educational software and inform of its relation and impact on cognition and learning.

Primary Constructs

I am interested in researching 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. The data will be collected, organized, sorted and analyzed having in mind these four main constructs.

Rationale

An example of how I can merge the learning of expressive arts and technology is the *Virtual Forum Theater* (VFT), a first version of which I designed while at the Harvard Graduate School of Education (HGSE). *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). The potential of this web-based educational tool is to provide an open constructionist learning environment, in which the learner can safely explore and express his creativity, language, aesthetics, participatory design, written skills, conflict resolution, role-playing, decision-making, and coordinated teamwork. This research is based upon the theoretical framework provided by *Pedagogy of the Oppressed* (Freire, 1972), *constructivism* (Piaget, 1977), *constructionism* (Papert, 1980), *CSCL* (Koschmann, 1996) as well as *Theater of the Oppressed* (Boal, 1974) and Brecht's theory on theater (1964). A play developed with *VFT* is an example of a student-centered and project-oriented learning approach in line with the theories of Freire, Piaget and Papert.

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. Spectators are encouraged to become spect-actors: active participants rehearsing strategies for change (Boal, 1992). *VFT* maintains the characteristics above 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 *Virtual Forum Theater*, learners construct their own plays, including short scenarios or vignettes. *VFT* is a web-based environment that allows simulation of real life scenarios of conflict, enabling self-expression and giving voice to children through the work of art (drawings, photo taking, and video making).

Disadvantaged children in many situations do not have the possibility to communicate or express themselves freely, which might impact the full development of their argumentation skills and problem solving. *Virtual Forum Theater* can give them one vehicle with which to improve their expressive fluency and give them the freedom to try out alternative ways of dealing with complex issues. 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 experience with others in the same situation, 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.

Related work

My work builds upon the research from a Computer Supported Collaborative Learning - CSCL environment, Amy Bruckman's *Moose Crossing* and a Multi-user Virtual Environment - MUVE – Marina Bers's *Zora*. *Moose Crossing* (1998) 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.

In Bruckman's work children create their own rooms filled with objects and characters in a virtual space. It allows users to take fictional roles and pretend they are someone else. Children describe via text the nature of the space, the characters, and the interaction. They write small programs to guide the interaction. Because the children are both hosts of their own space and explorers of the overall space, they can interact with and view the descriptions of their colleagues. In this way they contextualize examples of what was possible, and can improve the depth and beauty of description and interaction of their own construction. They have to write to participate, and they can improve their writing through good examples, practice, and interaction. Another result of Bruckman's (1998) research is that online communities can provide a supportive context that makes new kinds of learning experiences possible and that the learning facilitated by Moose Crossing is strongly tied with the on-line collective peer support.

In Bers's environment children also create their own rooms in a virtual community. The thrust of Bers's work is to explore domains not previously well-supported or studied in on-line environments, concepts of identity and values through the types of objects and descriptions children would choose to use to define themselves to others. She combines children's creation of both visual and textual representations, and facilitates interaction in a shared, on-line social space. Children have to think about how they could best represent their concepts of themselves, their identities, and their values. They then observe and interact with each other's spaces, to better understand themselves and their peers. Bers (1999) concludes that it is extremely important to investigate the role of technology in the development of the self, its personal and moral values, and not only in the learning of the sciences.

Some work has been done on this field of digital dramatic plays like *Teatrix* which explores drama as a form of collaborative make believe for children. Children create storyboards of existing fairy tales. They have some control over existing characters that are intelligent agents, but the environment, the creation and the problem solving capabilities of the tool are limited. It confines the learners to a very specific domain (Machado et al, 2000), and does not allow or emphasize internet interactions. *Teatrix* is part of the Networked Interactive Media in Schools (NIMIS) in Europe and is being used in schools in Germany, England and Portugal (Teatrix, 2003).

Another example of a digital drama is *Carmen's Bright IDEAS* (Marsella et al, 2000) an interactive pedagogical drama where the learners influence how the drama unfolds by controlling the intentions of one or more characters that are avatars. This educational software is stand-alone and single user, but it is relevant to VFT because it explores the influence of drama as an educational tool. It has important considerations related to character believability and the importance of emotions. Their authors take as a premise that they have some goals to achieve in their teaching. Therefore, they have to control the environment to make sure the user will learn the lesson they have planned. *Carmen's Bright IDEAS* has gone into clinical trials at seven cancer research hospitals across the country and is also installed at Children's Hospital in Los Angeles.

The *Oz project* (Bates, 1992) at Carnegie Mellon University uses Disney animation as a metaphor for character building and believability. For them a believable character is one who seems lifelike, whose actions make sense, who allows us to suspend disbelief; believability is not the same thing as realism. This research explores building believable agents using plots in the realm of fantasy. The goal was to explore possible types of interaction between users and believable agents in the context of stories.

SceneMaker (Gebhard et al, 2003) also emphasizes the importance of believability in virtual theater. It explores the use of multiple characters to convey social aspects such as interpersonal relationships between emotional characters and introduces short talk between characters which then become yet another performance or "meta-theater". This performance between groups of avatars binds the attention of passers-by, and gives the agents the authenticity of real human actors, conveying the impression that they are

permanently alive. Using *SceneMaker* one can create CrossTalk that is an interactive installation with animated presentation agents working with plan-based dialogue generation and a number of pre-scripted scenes to be used for advertisement. Currently it is being used for building various industry showcases of sample dialogues and interaction between multiple lifelike characters and human users (VirtualHuman, 2004).

In the educational *Puppet Theatre of the Virtual World* (n.d.) young children can interact and play with life-like virtual playmates in a virtual 3D-world and learn how they can influence the reactions and behaviors of others through playing actions of their own choice. The vision is a range of life-like characters with personalities specified by the child, which can allow full improvisations with emergent behaviors in developing stories (Scaife, 2000). This is a project from the European community on Experimental School Environment (1998); it was tested and deployed in some schools, but it is not being used any more.

The *Oz project*, *Virtual Theater* (Hayes-Roth, 1996) and *Virtual Puppet Theatre* explore AI and theatre and therefore have limitations imposed by the state of the technology. The children cannot control the avatars in totality, as the control is always shared with the machine. Intelligent agents are not like real puppets that can be completely manipulated by the children and have emotions also portrayed by children's voices. *VFT* employs a different metaphor, the one of animation. I want the children to design their own production and have total control over it. My vision on how to accomplish total control is by providing means for children to create their own animation through drawings, or

enacting their own characters. In so doing the children need to go through the experience of building their own characters, making them believable and learning all that is involved in this artistic and cognitive process.

Videogames of the Oppressed is a master's thesis from Gonzalo Frasca (2001) at Georgia Institute of Technology under the advising of Dr. Janet Murray. *Videogames of the Oppressed* was not implemented as a tool, but Gonzalo created several scenario cases exemplifying how the design of SIMS could be changed in order to empower its players to enhance critical thinking and discuss social and personal problems. The theoretical framework of Frasca's research is very similar to mine and his analysis of possible digital simulations (Play My Oppression) is another way to view the several *VFT* interactions on the WWW.

Most of the existing commercial role-playing games on the Internet have an existing plot where the drama takes place. The user can create a character that suits the environment and the story-line. There is not much room for deviation or to create a completely new drama. They are not in an environment of free expression, but of adult pretend play; a place where one can escape the stress of daily life, imagine and pretend that one is living in a medieval time or a paradisiacal island. In that situation one can dress up and give a set of behaviors to an avatar and pretend to live that life through the created character. Since this is a make-believe situation there is not much space to work on daily issues or oppression. Quite the contrary, one wants to forget the real life problems. Examples of such environments are *Second Life (2003), SIMS* (2003), *Asheron's Call* (Turbine, 2004), *Shukuen: The Abduction* (Infinite Realities, 2003). *VFT* on the other hand has the goal to

act out real life problems in a safe environment in order to rehearse and find solutions to them. *VFT* is likewise *FT* a "rehearsal for change" (Boal, 1992). For this investigation, I choose not to use a 3-dimensional representation so that the children can focus on the scenarios and the characters' interactions, rather than on the appearances of the environment that could decrease their capability of reflection upon the story presented.

Methods

This research can be categorized as a design experiment because I attempt to create an innovative learning environment in a real after school setting and at the same time conduct experimental studies of this innovation and of the afforded learning (Brown, 1992). According to the methods I have planned, I consider my design study to be process focused, interventionist, utility oriented and theory driven (Cobb, 2003).

It is process focused as I will map out the children's learning by understanding patterns in their reasoning and the influence of the technology (*VFT*) on that reasoning, thinking and learning. It is interventionist as I will investigate the constructionist and project-oriented learning theories by designing and modifying real-world settings through the use of *VFT*. I aim to improve the effectiveness of technological tools to support the learning of dramatic arts, expressive fluency and critical awareness. Therefore the research is utility oriented. It is theory driven because I will be advancing theory through the design-analysis-redesign of technological tools (Shavelson et al, 2003).

Population Sample

The scope of this evaluation and test of hypothesis includes working with three groups of minority children age ten to thirteen from Somerville (Central and South-Americans),

Medford (Central and South-Americans) and Boston South End (Afro-Americans). I will select disenfranchised children who are interested in theater, but are shy and do not feel comfortable performing in public. The size of each group will be between eight to ten children.

Research Design

I plan to work with those groups in after-school or community center settings. This permits me to work without restrictions on content and time, and allows those mixed-age children to participate voluntarily. We will meet twice a week for four months. The comparison group will be practicing Forum Theater and will be collaboratively constructing a play using regular rehearsal techniques like creative drama and theater group dynamics, without the help of the computer (*VFT*).

I 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 technology (*VFT*). I intend to answer my first three 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.

Description of the Technology

The technology used in this study will be *Virtual Forum Theater* that is a CSCL and MUVE hosted by the computer science server at Tufts. *VFT* can be used in schools, community centers and after school settings. The presence of a drama facilitator could

enhance the learning afforded by *VFT*, but I am designing *VFT* so that any group of children can use it by themselves at any time and any place where they can connect to the WWW. The participants will have the following options to create and produce their digital drama:

- They twist and twine some existing faces (Figure 1) in order to give them emotions, record the lines of each character (face), put them in sequence (animate the frames), introduce points where they want the virtual audience to give feedbacks by creating extra frames.

Figure 1: Java Dramatic Faces

- They produce, enact a play and videotape it. They edit the play, introduce the moments where they would like the virtual spect-actors to intervene.

- They draw the backdrops, props and characters using a free-ware computer drawing tool. They draw frame by frame, put them in sequence (Figure 2), synchronize them with the recorded line for each character or use bubbles of text. They can introduce extra frames with calls for feedback.

- They hand draw the frames, scan them into the computer, put them in sequence, record the lines for each character, and possibly introduce extra frames with calls for interruptions and feedback.

- They take pictures of the play they enact, frame by frame, put them in sequence (Figure 2), and synchronize with the recorded lines of their characters.
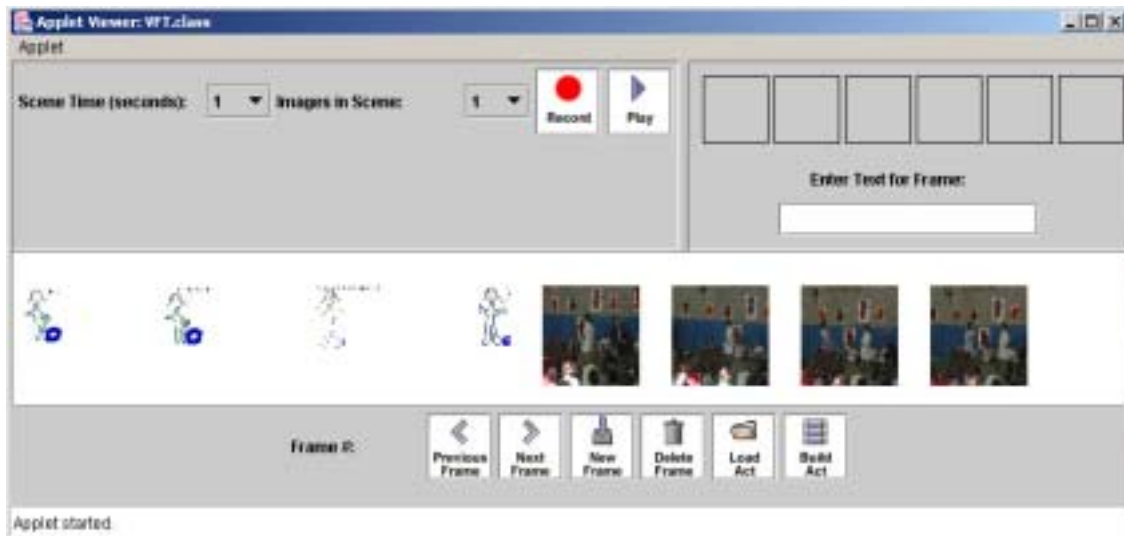
Figure 2: Java GUI storyboard interface

Once they are finished creating the play, they post it on the web-server. Then they invite through e-mail some friends from another town to exchange ideas about this theme and to learn if they have the same problem in their school. They will collaborate on-line and use this virtual play as an object to think with and reflect upon. The invitees are required to intervene, think about an alternative solution, enact it themselves or let the others know how they would enact it by web chatting.

In terms of technology, VFT is breaking ground by using the very recent technology of Synchronized Multimedia Integration Language - SMIL file, and Scalable Vector Graphics - SVG image files (Mello, 2004). It allows children to put together a digital drama that does not require a high end of computer resources, or a fast internet connection as it will be dealing mainly with Extensible Markup Language - XML files. Therefore VFT will have no cost for the learner making it possible to be used by disadvantaged children.

Data Collection

The data I will collect for my qualitative study will be reinforced by some quantitative ones:

- Pre and post questionnaires (quantitative)

- Computer generated logs (quantitative and qualitative)

- Audio tape of interviews with the parents and teachers of participants children

- Questionnaires containing sample scenarios of conflict (pre, during and post)

- Videotaping of all the sessions together

I will measure changes in target behaviors such as children's abilities to identify, recognize and respect others' points of view, children's ability to express themselves through drama and technology, solve personal and community conflicts, and identify oppression (awareness) as it occurs. Some of these behaviors will lead to the study of the main constructs, critical awareness, expressive fluency and argumentation skill. In order to assess improvements on these abilities, logs will be created through the children's work with *Virtual Forum Theater*. These computerized logs contain: 1) their interactions and collaborative work through the WWW, 2) each approach they utilize to solve a dramatic issue and 3) their final play. I will videotape the sessions with the children as a way to document participant observation, their immediate reactions to problems raised by on-line interactions, their engagement and to collect data for later analysis. I 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. I will also conduct questionnaires based on sample scenarios before, during, and after our time together to help highlight and assess their progress in understanding different points

of view, critical thinking and awareness about their reality, their creative abilities on imagining solutions, as well as their communication skills.

I will apply pre and post questionnaires in order to help me validate the data collected through videotaping, interviews and computer logs. I believe the children have the right to practice self-assessment as well. These questionnaires will also provide some quantitative data that will be used to support the quantitative data generated by the computer logs and reinforce my qualitative data analysis. Appendix A is an example of a first draft of such a questionnaire.

Data Analysis

Notes will be generated from the videotapes, interviews, questionnaires and computer logs. The notes will be compiled in order to break them into categories and patterns. Coding will be applied to these notes as well as to the quantitative data that need to be broken down in categories as well. I will analyze the patterns of the activities with which students engage, on the way they interact between themselves, as well as on the meaning of what they say about the learning process and the creation of the play. I will analyze the logs, interviews, questionnaires and video footage during the process of data collection in order to be attentive to any data gap or to test any new hypothesis that might emerge; therefore, I will adopt the method of early analysis (interweaving data collection and analysis). Clustering is also another way to organize the data in order to analyze it. Creating matrixes is an efficient way to organize and present the analyzed data.

Data collection, coding and analysis can be so overwhelming that one needs to constrain them with a well-defined methodology. I plan to base my qualitative research methodology 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 I am undertaking, I will also explore other methodologies and techniques such as the "soft-nosed" positivistic approach (Miles & Huberman, 1994), and ethnographic analyses (Spradley, 1980) as needed. 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 will be applying the ones that best fit my case studies.

Deliverables

I will be publishing papers presenting the process and results of my research in order to inform scholars and elementary teachers on the potentiality of technology to enhance expressive fluency and awareness of personal and social issues. I will also provide *VFT* (as long as I have an institution hosting the application on its server) for interested children and schools to use.

Scenario of *VFT* being used in this research

During a Theater and Technology after school club at Somerville Youth Community Center, a group of six children engage on 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 the pictures frame by frame of their productions. Sometimes I take the pictures. After one rehearsal they look at the pictures and do not like some of them. Then they enact the piece again and re-take some pictures. At our fifth session they create the digital play by uploading the pictures to the computer and creating the animation. 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.

Conclusion

I am developing an open-ended tool that enhances the expressive fluency on children. By developing *VFT* in Java and incorporating free-ware drawing tools like WebDwarf, players like Real One or Flash, it will provide an engaging multimedia learning tool for the learning of dramatic arts and critical awareness. Children will feel they own a play created solely by them.

I expect my 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. I wish to play a part in encouraging deeper and wider use of technology and expressive arts in the minority population in this country as well as in developing countries.

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Appendix A

Prior to the workshop (first day):

What is your experience with personal computers?
On a scale of 1 to 5:

1	2	3	4	5

How many hours per day do you use it? What for?
Have you done any theater in school? If yes, which plays have you enacted?
Have you done theater outside of your school? If yes, for how long?
Is it easy for you to visualize solutions to personal struggles? Do you use these imagined
solutions in your real problem?
On a scale of 1 to 5:

1	2	3	4	5

Are you aware of the problems you have?
On a scale of 1 to 5:

1	2	3	4	5

Do you know how to solve them?
On a scale of 1 to 5:

1	2	3	4	5

Are you aware of the issues that exist in your community?
On a scale of 1 to 5:

1	2	3	4	5

Do you know how to solve them?
On a scale of 1 to 5:

1	2	3	4	5

At the last day of the workshop:
Have you gained more experience working on the web or on the computer?
Web on a scale of 1 to 5:

1	2	3	4	5

Computer on a scale of 1 to 5:

1	2	3	4	5

Have you learned anything new about drama?

On a scale of 1 to 5:

1	2	3	4	5

How much have you learned about creating a play?
On a scale of 1 to 5:

1	2	3	4	5

Have you learned any new insights about working collaboratively?
On a scale of 1 to 5:

1	2	3	4	5

Does it make sense to create a digital play? Why?
On a scale of 1 to 5:

1	2	3	4	5

Does it make sense to perform a play on a virtual stage? Why?
On a scale of 1 to 5:

1	2	3	4	5

How is it different from putting a play together and performing on a real stage?
How easy was to work with VFT?
On a scale of 1 to 5:

1	2	3	4	5

Have you discovered how to solve your personal problems?
On a scale of 1 to 5:

1	2	3	4

Have you improved your ability to resolve community issues?
On a scale of 1 to 5:

1	2	3	4

Have you felt any difference in your communication skills? Do you think you can express yourself better now than before this workshop? Why or why not?
On a scale of 1 to 5:

1	2	3	4

What difficulties did you have with the tool? Please describe.
Was it an enjoyable experience? Why?
On a scale of 1 to 5:

1	2	3	4	5