Zora: a Graphical Multi-user Environment to Share Stories about the Self

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Abstract: Zora is a narrative-based graphical multi-user environment purposefully design to help people understand and affect the ways in which identity and values are actively constructed by both an individual and a community. Zora engages young people in building artifacts as representations of their complex self and creating communities in which values and attitudes are put to the test. It supports 1) creation of a virtual city with its different spaces, objects and interactive characters, 2) communication between the users, and 3) introspection about role models, personal and community values. This paper describes the theoretical framework that conceives identity as dynamically constructed by putting together diverse and conflicting elements and values. Based on this framework, Zora's design principles are presented, as well as preliminary results from a pilot experience in which young people used Zora to learn about identity and values in a hands-on, constructionist way.

Keywords: multi-user virtual environments, design framework, psychology, narrative

Introduction

There is a growing amount of research on virtual environments which concentrates on characteristics, both from a technical and social perspective, that foster the development of community (Donath, 1996). The work presented in this paper also looks at virtual environments but focuses on issues of personal identity and values. The goal is to develop an approach, both in terms of theory and design principles, to help people learn about their own identity in the real world and the values they live by or consider important. Since identity and values do not develop in a vacuum but in constant relationship with others, a community is needed for this type of learning to happen; therefore the choice of a multi-user virtual environment as the technological infrastructure.

Sherry Turkle proposes MUDs and other examples of computer mediated communication on the Internet to have "become a significant social laboratory for experimenting with the constructions and re-constructions of self that characterize postmodern life" (Turkle, 1995). Despite the growing body of analytical and descriptive research on identity in cyberspace (Suller, 1996), the challenge still is in how to design environments and social contexts to purposefully support exploration of identity and values, and not only their expression, in a constructionist and hands-on way (Bers, 1998).

Math and science educators recognized the computer's potential to make this type of active learning possible in their fields and have been working on the design of computational learning environments for a long time. But people interested in the inner world have yet to discover how to design their own computational tools to influence new ways of thinking. I strongly believe that what computers were in the 80's to revolutionize the ways of thinking, learning and teaching about math and sciences, today they can be to the realm of identity and values. However, there are still many more questions than answers and research in this area is needed.

This paper is intended to highlight the need for approaches that use new technologies to address learning about identity and values in a "learn by doing" way, and to map out a new area of application for virtual worlds. Zora is an example of a narrative-based graphical virtual world, particularly designed to help people understand and affect the ways in which identity and values are constructed.

In the design world, the term affordance refers to the attributes of *the thing* that determine how *the thing* could possibly be used (Norman, 1988). When *the thing* is a technological learning environment, like Zora, "affordance" not only refers to usability but also to content to be learned. In my opinion, these environments raise three questions. First, how can we use *the thing* to learn? Second, which is the theoretical framework upon which *the thing* organizes its content? Third, what specific content does *the thing* afford to learn?

In this paper I will answer the above three questions for the case of Zora. The first question refers to methodological issues about how can use Zora to learn in a constructionist way and will be addressed in section 2.2. The second question refers to the theoretical foundation that conceives identity as a complex dynamic construction resulting from integrating different aspects and values. This framework, upon which Zora is designed, will be presented in section 3.The third question refers to the content about identity and values that Zora's design affords to explore and will be looked at in section 5. Preliminary results from empirical work using Zora with a multi-cultural population of pre-teens and teens will be reported by highlighting the powerful ideas about identity and values that were explored.

What is Zora?

> "This city is like a honeycomb in whose cells each of us can place the things we want to remember: names of famous men and women, virtues, numbers, vegetable and mineral classifications, dates of battles...So the world's most wise people are those who know Zora. "
>
> (Italo Calvino, "Invisible Cities", 1972)

Zora is a 3-D multi-user environment particularly designed to help people explore the powerful idea that identity is constructed by diverse and conflicting aspects and values. People can build artifacts and characters as representations that make a complex self, as well as communities in which personal values are realized and put to test. Users are graphically represented by avatars with the owners' picture. They can navigate around

the virtual city, converse with others in real-time and construct the city's private and public spaces: personal homes, community centers and temples. Temples are shared public spaces that represent cultural traditions or interests (see fig. 1). Users can populate these spaces with objects and interactive characters, role models and anti role models, who can be programmed to engage in storytelling interactions with visitors.

Fig. 1: The Zora Jewish temple built by a teenager. On the left, the values dictionary.

In the same spirit as other constructionist virtual worlds such as the text-based MOOSE Crossing (Bruckman, 1994) and Pueblo (Bobrow et al, 1995) and the graphical Pet Park (DeBonte, 1996), kids can communicate with each other as well as populate the world with their own interactive creations. Similar to SAGE (Bers & Cassell, 1998), they can program their characters to engage in storytelling conversations with other users. For example, they can describe the underlying turn-taking rules between user and character as well as define the stories to be told in response to certain inputs.

Zora is an object-oriented environment, meaning that users can make new objects by cloning existing ones. Every object in the world has six content-based attributes and two administration attributes that structure a way of thinking about them. The content-based attributes are: 1) *graphical appearance*, 2) *textual description*, 3) *stories*, 4) *values*, 5) *conversations*, and 6) *motion*. The administration attributes are *ownership*, which determines who owns the object and therefore can edit it, and *permissions*, which sets if the object can be cloned. Zora is being implemented using Microsoft's Virtual Worlds research platform, a software development kit for building distributed multi-user environments (Vellon et al).

Zora is designed to support exploration of identity and values in a constructionist way. Constructionism is a philosophy of education, based on Piaget's constructivism, says that we learn better when we are engaged in building an external artifact that we can reflect upon and share with others in a community (Papert, 1980). By constructing an external object to reflect upon, we also construct internal knowledge. What would it be like to purposefully construct an artifact that represents who we are? What kind of knowledge about values and aspects of the self will we be constructing? My hypothesis is that environments like Zora, particularly designed to respond to these questions, can enable

people to integrate the different aspects of the self and to reflect upon conflicting values while putting them to test in a learning community.

Learners using Zora engage in three types of activities: creation, communication and introspection. Creation happens in different ways. First, users create the world by designing new spaces and objects. Second, they write stories and values for their objects. Eventually they will also be able to create computer programs for their objects to engage in storytelling conversations. Communication takes both synchronous (real-time) and asynchronous (stored) form. On the one hand, users can converse with other users through their avatars or can engage in interactions with characters with already programmed conversations. On the other hand, they can read and write stories stored in their creations. Introspection, both individually and as a group, happens throughout the experience with Zora. In this sense, Zora serves one of the functions that has been attributed to the idea of the Sabbath: a time for reflection (Heschel, 1951). A time for stopping the work and looking back at who we are, how we are feeling and how we are building a caring, just and responsible community.

The theoretical framework

In this section I present the theoretical framework upon which Zora is designed. This framework has three fundamental pillars: 1) Identity is dynamically constructed by integrating diverse and conflicting aspects of the self, culture and society; 2) Personal values are important aspects of identity, therefore they need to be explored in relationship to it; 3) Both identity and values are narrative constructions.

The first pillar has foundations in theories of Artificial Intelligence and postmodern theories of identity that look at identity as composed by different conflicting elements. For example, the society of mind theory proposes a mind as a collection of many smaller processes, called agents, which can only do very simple things. Yet when they join in societies it leads to intelligence and complex behavior (Minsky, 1987). Postmodern theories of identity suggest that each individual is a "multiple populated self" containing a multiplicity of voices that may not harmonize with each other (Gergen,1991; Glass, 1993). Both AI and postmodern psychological theories deny the existence of an intentional unique center. In contrast, my approach, despite its emphasis on multiple aspects, recognizes that a core sense of self is critical to live a healthy life. I conceive identity as a dynamic construction in which different fragments are integrated by an ego capable of unifying an individual's experience and action in an adaptive manner. This pillar informs Zora's design by providing a structure for people to create: 1) a virtual home populated by different objects, which represents the complex evolving self; and 2) a unique and never-changing avatar that represents the core intentional ego in charge of picking and choosing the different aspects to take into the virtual home.

The second pillar of the theoretical framework states that personal values are important aspects of identity and need to be understood in its context. Personal values might include family, cultural and religious values as well as moral values, universal and structured by underlying concepts of justice, rights and welfare, and social values, arbitrary, context

dependent and determined by agreement about the social system. Personal values are externalized through actions that impact both self and society. This theoretical pillar becomes concrete by two of Zora's design features. First, when creating an object, users attach to it one or more values and their definitions. The relationship between identity and values becomes explicit by instantiating the values in concrete objects that represent aspects of the self. The second design feature is the collaborative values dictionary which displays all the values, and their multiple definitions, held by the Zora community. In this case, values are associated not only with personal identity but also with the identity of the community.

The third pillar highlights the role that narrative plays in the construction of identity and the organization of its aspects and values in a coherent way (Polkinghorne, 1988). Identity, neither values, are a stamp put on our forehead by our ancestors. By telling the story of who we are, we construct our sense of self; by telling the story of what or how do we want to become, we construct our sense of personal values. This pillar becomes explicit throughout all Zora's design. Users write their biography, stories for their objects and values definitions. Storytelling is the main way in which they express themselves and find coherence between their different aspects. In Zora narrative is not only a communication genre, but also a cognitive tool.

These three fundamental pillars outline the theoretical framework of the research presented in this paper. The constructionist methodology applied to this framework enables the design of computational tools that provoke thinking about our own psychology (Turkle, 1984), and support the construction of artifacts that represent our own complex identity. These artifacts might serve the same function of transitional objects by enabling the passage between who we are and who we want to become, both individually and as a community.

Zora workshops

A preliminary experience was held with students from a public high school in Boston. During this pilot I did not use the Zora virtual environment, but cardboard mock-ups. The goal was to engage in a participatory design experience by testing the concept and receiving feedback from students and teacher before final implementation. Details can be found at http://www.media.mit.edu/~marinau/Zora/.

Feedback from this experience allowed me to refine Zora's design. During August 1999 I conducted an intensive three-week pilot workshop with a multi-cultural group of eleven kids between 11 and 15 years old who used the Zora multi-user environment. Eight kids came to the Media Lab and three worked remotely from their homes and met face-to-face only on the first and last days of the workshop. Participants were recruited through mailing lists and through a program that helps inner city kids enter into private schools. An older child, a senior in high school who had previous experience with Zora, served as a mentor. An undergraduate research assistant helped with the programming and the technical aspects. All participants had e-mail and were subscribed to the workshop mailing list. Parents were also subscribed to a parent's mailing list and were invited to an

open house to see their kid's work. Engaging parents is very important in any learning process, but particularly needed when the content to be learned has to do with values and identity.

The methodology used for the study was based on an ethnographic approach. I did observations of on-line and face-to-face children's interaction, analysis of system logs that recorded, with date and time, everything they said or did on-line, videotaping and extended personal interviews. The data collected is still under analysis.

Design principles that facilitate powerful ideas

Powerful ideas are content worth learning while approaching new domains, either by evolving personal intuitions or by acquiring and refining concepts already existing in society. Below I present some of the powerful ideas about identity and values that the young people participating in the workshop explored. This exploration was facilitated by the structure set by Zora's design. I introduce each powerful idea with a short explanation of its underlying theoretical foundation followed by Zora's design feature that enabled people to access and experiment with it.

Identity as a complex dynamic construction.

The self is composed by a plurality of co-existent and conflicting aspects and values, thus becomes a complex construction. These aspects are constructed by identifying with people and objects in the surrounding culture. Zora's design affordances made the psychological process of identification into a concrete experience. People created their own homes and temples populated with collections of objects and characters, heroes (role models) and villains (anti role models) representing different personal aspects.

For example, thirteen-year old Pablo built a virtual house with objects displaying pictures from his family and pets, flags from his homeland, a gold chain given by his grandmother, and other personal items. Pablo paid special attention to put only objects that represented the different aspects of his identity. Other kids chose to express the different aspects of their identity by building many different temples and cloning into their homes, objects from each of them. For example, Martin built the Britney Spears temple, in honor of his favorite pop singer, the Sports Arena, and his own home with objects from different temples built by himself and others. Most of the virtual homes built by the workshop participants became a complex evolving representation of a constructed self composed by meaningful elements from the surrounding cultures or temples.

Relationship between "I", "we" and "them".

Identity is a dynamic process resulting from the constant tension between the identification with a community and the differentiation from it. As Erik Erikson points out, "no ego can develop outside of social processes that offer workable prototypes and roles" (Erikson ,1950). Virtual communities such as Zora are ideal for playing out these kind of social processes.

The Zora City Hall is a space designed to discuss issues that have to do with the relationship between "I", "we" and "them". Kids dropped *cases*, objects representing events or circumstances that need to be discussed among the community members. Most of the cases were about things left in the wrong places or invitations to add heroes or villains to some of the temples. However, during the second week of the workshop, a different case was dropped. Elisa, who built the virtual Jewish temple, placed in the City Hall a web link to the shooting in the Jewish Community Center in L.A that had happened the day before. This case was not about the life of the Zora community, but about the life in society at large. A meeting was called to discuss the news. Elisa started the meeting by clarifying the facts and asking people to check the web site she had attached to the case _to which she also added and defined the value tolerance.

During the hour and a half that lasted the meeting, the conversation evolved in the following way, with almost no intervention on my part: **1) concern** [Janet says: why would people be so prejudice? I thought this kind of thing was over] [Pablo says: there isn't anything we can do about it]; **2) discussing punishment and death penalty** [Nino says: this guy should be dragged out of his cell and flayed alive. You take a life, you give your own life as punishment.] [Sheila says: I think by killing him we show that we have given up and the only way to solve things is to kill somebody, and I know that is not right]; **3) the role of education and family** [Pablo says: the only prevention is at home. People need to be brought up knowing that discrimination is wrong] [Sheila says: I think we can't do that much for adults, but I know we can do a lot for the kids in school.]; **4) the lack of talk about these issues in a meaningful way at school** [Janet says: no one talks about it in my school. It first came an issue when we heard about the Colorado shootings. They don't want to make it a big deal] [Pablo says: my school holds forums to talk about these issues but usually they don't really care and it's just PC mambo jumbo]; **5) sharing personal experiences** [Janet says: I go to a predominantly white school and things like this might embarrass me. One mentioning of black people, I feel people starring] [Pablo says: same thing with me, but I bring attention to the fact I'm Latino. In no way does it handicaps me]; **6) ignorance about other cultures or religions** [Elisa says: To tell you the truth, I had a few classic misconceptions that were a little prejudiced, that were all because of ignorance] [Janet says: knowing things about other cultures and races is good for everyone and should be happening more often.]; **7) deciding to build more temples in the Zora city** [Sheila says: I really don't know, but we just need a way to get familiar with each other] [Elisa says: People should build the other temples and check out the ones already built. the temples will help us learn more about other cultures].

Although the conversation excerpts shown above are very short, they highlight the role of Zora's City Hall in providing a space where to think, individually and with others, about the relationships between "I", "we' and "them". Personal identity and values evolve in the constant process of differentiating from others and integrating into a group, Zora provided an opportunity to experiment with this.

The role of participatory democracy in the development of identity and values.

Extensive research suggests that social institutions, group decision-making and self-government are critical in shaping individual's moral development (Kohlberg, 1982). The establishment of a participatory democracy in the learning environment serves as a model of the larger political community in which the child would participate as an adult. In Zora, the virtual community centers, like the City Hall, engage children in the creation of social institutions and tools to regulate the community.

For example, during the second day of the workshop kids discovered the need to create laws to make living in Zora easier. In the first City Hall virtual meeting a boy was elected as the mayor and took charge of coordinating the writing of the rules of Zora on a wall of the City Hall. Kids experimented with different on-line voting systems to decide on the laws, such as "press 1 if you agree" or "stand on the left side of the room if you disagree" but had a very hard time organizing themselves so everyone was heard and consensus was reached. However, once they agreed on nine basic rules, such as "no putting things in people's personal rooms", "no warping people or their things", "set the properties of the objects placed in public spaces so others can clon them", "fess up to what you do", and "there will be no jail", they carefully respected them.

In the same spirit as Kholberg's just community approach, the virtual community centers provided public forums for participatory democracy and decision-making about authentic dilemmas. The community centers are spaces where the values of the Zora community develop and individual's values are put to the test.

Narrative serves a cognitive, emotional and communicative function.

There is abundant research that asserts that narrative is a fundamental mode of understanding. From a cognitive perspective, stories are the fundamental constituents of human memory (Schank & Abelson, 1995). From a psychological point of view, as Charlotte Linde (1993) has shown, stories serve to put together different fragments of experiences into a coherent life story. From a cultural perspective, stories serve to give cohesion to share beliefs and transmit values (Campbell, 1988).

In Zora kids experienced the diverse functions of stories by writing narratives for each of their objects and characters. For example, Sheila wrote the following story an attached it to an object representing her friend: *"Ayan is my best friend from Somalia. She came here to escape the war there. She lives with her 23 years old sister, her husband and their two children, one a couple of months, and the other around three years old. Ayan has to take care of them both! Her older brother in high school also lives with them. Her father lives in Canada, because he doesn't want to live with the rest of the family"*. The story not only served Sheila to communicate to others in the Zora community who her best friend was, but also to understand what is it like to have a different life, like the one Ayan has. Other kids also chose to write stories about themselves and placed them in their avatar's biography. For example, this is what sixth-grader Kay wrote. *"I was born here in Massachusetts. I came to West Roxbury when I got older. I am going to an all girls private school. I'm very athletic and my favorite sports are basketball and soccer. I have*

six sisters and out of the seven I'm the last one (the youngest). My favorite team is the San Antonio Spurs and my favorite player is Tim Duncan."

In Zora narrative also serves to think about the meaning of values by having to define them. For example, the values dictionary created by the Zora community of kids, has 39 values , such as fun, entertainment, connection with the past, modernization and communication, with multiple definitions entered by the different participants. For example, the value "equality" has the following definitions: "Kay says that equality is being treated the same as everyone else black, white, Hispanic." "Nino says that every person is equal and has the same number of basic rights." "Elisa says that equality is because we are all made in God's image and therefore, we have an inherent equivalence". As shown above, the diverse ways in which storytelling is used in Zora allowed kids to express diverse aspects of their identity by serving communicative, emotional and cognitive functions.

Role taking as a mechanism for gaining multiple points of view.

Role taking, or seeing the world as others do, understanding their motivations and actions, is a fundamental mechanism for broadening one's perspective and recognizing that events can be understood through multiple points of view. In Zora this type of experience is facilitated by the programming language that enables kids to program storytelling interactions for their objects and characters to engage in with visitors. As shown in previous work done with SAGE (Bers & Cassell, 1998) designing interactions allows children to decenter and move out of the phase of egocentrism where one cannot differentiate somebody else's point of view from one's own. This opens up the possibility of engaging in playful role-taking. The user maintains its sameness and inner stability, represented by the avatar, but takes different roles and points of view by programming and talking through different characters. Since the programming language has not being fully implemented in a way that makes it simple for kids to access, no examples can be presented yet.

Objects as collective repositories of meaning.

The object-oriented programming metaphor says that objects have characteristics or properties that define its identity. Furthermore, a child-object can inherit some or all of the properties of the parent-object. The properties of objects set the structure that define the object as well as the frame of mind with which the object is thought upon. In Zora, objects have properties that have to do not only with their shape and functionality, but also with the meaning or values that we assign to them. For example, Elisa assigned the value "love" to a picture of ketubah, a Jewish marriage contract: "The ketuba symbolizes the union that the couple is willing to join because of their love and mutual devotion." She was not only thinking about the concrete attributes of the ketubah but also about the meaning that it carries. When other kids cloned the object, they cloned its meaning (stored in its associated stories and values) and added new meanings, thus converting objects into collective repositories of meaning. In Zora this constant process of re-appropriation and negotiation of meaning is made concrete by allowing people to re-create the object in their own way through cloning them within an object-oriented

paradigm. Most of the kids pointed out that before using Zora they never thought about objects as carriers of both personal and collective values.

Conclusions

The core contribution of this paper is the presentation of how a theoretical framework can inform the design of a multi-user environment that affords exploration of powerful ideas about identity and values in a constructionist way. As the pilot workshop experience shows, Zora is a powerful tool to explore identity as a complex construction composed by diverse aspects and values. Asking and responding to questions such as who am I? What are the values I hold and cherish? What are my roots? Which is my place in the world? Where am I going? helps to develop a type of knowledge that Howard Gardner calls personal intelligence (Gardner, 1983). According to Gardner this type of intelligence involves two forms of knowledge that are intimately intermingled: intrapersonal, which involves looking inward to develop a sense of self-knowledge and self-awareness, and interpersonal, which looks outward at the other individuals and the community.

This type of personal knowledge is very hard to assess and evaluate in traditional ways. However, when missing, it is easily identifiable. At a personal level, experimenting with a multiplicity of aspects and values by integrating them into a core grounded self or virtual home, provides an alternative to monolithic ways of thinking about identity that do not take into consideration the personal struggles of living in multi-cultural societies. At a social level, making these ideas accessible for children serves a double educational function: preventing hate crimes based on the fundamentalist belief that there is only one "right" way of being, and consolidating democratic societies.

Future Work

Diverse populations might profit from an environment that supports creation of a new envisioned self and community, communication to facilitate collaboration and learning, and introspection to reflect about existential issues. One of these populations is young patients at children's hospitals. A study in the Hemodialysis Unit of Boston's Children's Hospital is currently starting in collaboration with professionals in the Department of Psychiatry. To introduce a fun, self exploratory and community-building computer activity might have several positive benefits. Children could use their extensive time in dialysis in a creative way interacting with other young patients in similar situation. They could develop new ways of thinking about aspects of their identity and values as well as learn about computational technologies thus gaining confidence in themselves as learners, and acquiring useful skills in today's world.

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