

Constructing Self–Discovery Learning Spaces Online: Scaffolding and Decision Making Technologies

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Chapter 3

The LiveAbility House: A Collaborative Adventure in Discovery Learning

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ABSTRACT

This chapter follows efforts of an online community of practice whose mission is to make individual educational experiences for family caregivers widely available. The case study illustrates the collaborative learning and creative processes of the community of practice as it worked to construct and transform informal educational content into engaging, interactive, and immersive educational tools for its intended audience. As part of its efforts, the CoP created The LiveAbility House, a virtual demonstration home, constructed in Second Life®. This virtual home is designed to teach individuals about real life universal design principles and assistive technology devices that may increase their ability to remain living at home despite physical or cognitive challenges they may encounter due to aging, illness, or disability. In addition to the creation of a virtual learning experience, the chapter also addresses plans to then take that experience out of the virtual world and apply and demonstrate learning principles in a real world setting.

INTRODUCTION

In this chapter, we detail the development of a specific project, The LiveAbility House (TLH), constructed within the virtual world of Second Life®. The LiveAbility House is a virtual home,

built to educate individuals about universal design principles and assistive technology devices. Specifically, the goal of TLH is to raise public awareness of design features and assistive technology that can make it possible to remain in a home with physical or cognitive challenges due to aging, illness, or disability.

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This project was formulated and implemented within the structure of a national community of practice with a mission to create informal educational materials for family caregivers. We discuss the importance of the community of practice as a foundation for the project, the partnerships that were formed as a result of the community's work over several years, the expansion of the community into immersive learning environments, and the current status of the project. We will emphasize the challenges that we faced as subject-matter experts exploring the use of an innovative technological platform for informal education. Finally, we discuss the limitations and projected next steps for the project.

BACKGROUND: LAYING THE FOUNDATION

In order to fully understand the developmental process that took place in developing TLH, we will discuss the context of our work. A holistic, historic, and long-range view of our mission is necessary, we believe, to understand TLH as a progression of innovative educational outreach that has existed for 100 years. The land-grant university and Cooperative Extension systems and the eXtension initiative and corresponding communities of practice provided the foundation for the project's inception; the setting was crucial for its development.

The Land-Grant University and Cooperative Extension Systems

Land-grant universities were established by the Morrill Act (1862), which provided funds from the sale of public lands to establish colleges concentrating in agricultural and mechanical arts for the "liberal and practical education of the industrial classes on the several pursuits and professions in life." In 1890 a second Morrill Act established sixteen land-grant universities to address the needs

of the African-American population, again with a focus on agriculture and mechanical arts. These institutions are often referred to as historically-black colleges and universities.

The Cooperative Extension System (CES) was initially established through the Smith-Lever Act of 1914 and extends the educational mission of land-grant universities to include informal education, outreach, and engagement. CES utilizes the research of academicians at the land-grant university to develop, implement, and evaluate evidence-based educational programs to help citizens improve the quality of their lives.

The Cooperative Extension System and Adult Learners

Early on, Cooperative Extension targeted the education of adult learners through concrete, hands-on learning application. The Smith-Lever Act specifically mentions the development of practical applications of research knowledge and the provision of instruction and applied demonstrations of existing or improved practices or technologies in agriculture (National Institute of Food and Agriculture [NIFA], 2010a). The Extension Workers' Creed (Lloyd, 1922) is reflective of a philosophy that centers the acquisition of knowledge and application with the learner. The Creed begins with the following statements:

I Believe in people and their hopes, their aspirations, and their faith; in their right to make their own plans and arrive at their own decisions; in their ability and power to enlarge their lives and plan for the happiness of those they love.

I Believe that education, of which Extension is an essential part, is basic in stimulating individual initiative, self-determination, and leadership; that these are the keys to democracy and that people when given facts they understand, will act not only in their self-interest, but also in the interest of society.

Encouraging adult learning principles therefore has a long history within Cooperative Extension and forms the bedrock of Cooperative Extension educational programming today. Dialogue and discussion about adult learning theory and application is often found within *The Journal of Extension*, which “expands and updates the research and knowledge base for U.S. Extension professionals and other outreach educators to improve their effectiveness....(it) also serves as a forum for emerging and contemporary issues affecting U.S. Cooperative Extension education (n.d.).” A search conducted in the summer of 2010 in *The Journal of Extension* for “Knowles,” (Malcolm Knowles, widely thought of as the father of adult education theory) resulted in 49 citations; “adult learning” garnered more than 110. Recent examples within the journal include discussions about transformative education (Franz, Garst, Baughman, Smith, & Peters, 2009) and dialogue education (Driscoll, 2009). “As the largest adult education institution in America, Cooperative Extension should ground organizational operations in adult education theory” (Franz, 2007).

The Cooperative Extension System Network

CES is truly a nationwide system for the dissemination of education, as each state and U.S. territory has a Cooperative Extension office at its land-grant university and a network of regional as well as local offices (NIFA, 2010b). This network is supported by a variety of partnerships, including the United States Department of Agriculture (USDA), part of the executive branch of the Federal Government, and county governments. USDA supports CES through the National Institute of Food and Agriculture (NIFA), formerly known as the Cooperative State Research, Education, and Extension Service (CSREES), and provides federal funding to the system. NIFA’s mission is “to advance knowledge for agriculture, the environment, human health and well-being, and com-

munities by supporting research, education, and extension programs in the Land-Grant University System and other partner organizations” (2009).

As part of this mission, NIFA offers programs within the discipline of Family Science. These programs work to strengthen families and improve the quality of life of individuals through national collaborations. An outcome of these programs includes an increase in understanding of the overall well-being of families in American society (NIFA, Family Science, 2010). Through program leadership, NIFA helps the system identify and address current issues and problems on a national level.

These issues and problems have changed since 1914. Initially, Cooperative Extension was important for rural areas and focused on issues in agriculture and home economics. Traditionally, Cooperative Extension relied on face-to-face teaching, field visits, and postal mailings to communicate with clients and to reach its clientele with important educational information. Now, issues within urban and suburban communities must be addressed, and they often represent different needs. In addition, the digital age has changed communication and education. Cooperative Extension, with its 100-year history of providing services, is a well-established national dissemination system for research and evidence-based, non-formal education that is relevant for today’s families. However, the Cooperative Extension System (CES) is aware of the need to engage traditional and emerging clients in non-traditional ways. One strategy recently implemented consists of the creation of the eXtension initiative.

eXtension and Communities of Practice

One national initiative of the Cooperative Extension System is eXtension. It “provides objective and research and evidence-based information and learning opportunities that help people improve their lives” (eXtension, 2010) and is reflective of the CES’s historical mission. Meeting the need for

credible, accurate real-time learning that is relevant and effective for traditional and non-traditional clients, eXtension is innovative and has created a national presence for the system. The web site for eXtension, <http://www.extension.org>, is designed as an educational environment that is both interactive and customer-centered (eXtension, 2008). Informational articles, in-depth learning lessons, podcasts, frequently asked questions, decision-making tools, and the opportunity to “ask an expert” an individual question are all methods used to provide educational content to a clientele that may be unaware of Cooperative Extension offices in their states or counties.

The initiative works through partnerships among the land-grant universities and collaborative relationships among their educators. These partnerships and relationships are formalized by eXtension through a community of practice (CoP) structure. Communities of practice are “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly” (Wenger, 2006). Communities of practice also “collaborate over an extended period of time, sharing ideas and strategies, determine solutions, and build innovations” (Learning Theories, 2008). With eXtension support, faculty from many different land-grant universities come together to address critical issues within this community of practice structure.

Collaboration as a strategy for content development is receiving more attention as a viable method of completing needed work within the Cooperative Extension System. Two National Program Leaders within the National Institute of Food and Agriculture advocated for the importance of partnerships (Gerrior & Crocoll, 2008):

Partnerships between state and community agencies, as well as with private partners, facilitate coordination and expansion of nutrition, health, and housing information and supportive services...the need for these services and for education, and outreach at the state, regional,

and community level will continue to grow as the vast Baby Boomer generation ages over the coming decades.

There are other reasons to establish partnerships to help ensure successful educational programs. While audiences are growing, they are also becoming more diverse, and resources continue to shrink or disappear. Partnerships between Cooperative Extension and other service and state agencies are a possible strategy for leveraging resources (Boone, Sleichter, Miller, & Breiner, 2007).

Faculty members from across the nation join a CoP for various reasons. For some, it is a voluntary activity with perceived benefits of increased collaboration, extension of resources, an opportunity to engage in critical and creative thinking, and an ability to reach a larger audience of citizens for programmatic efforts (eXtension, 2010). Others join because of an interest or need to address a specific topic. Some of the current subjects addressed through eXtension include agrosecurity and floods, home energy, beef cattle, science, imported fire ants, and family caregiving.

The Family Caregiving Community of Practice

The Family Caregiving Community of Practice (FC/CoP) was formed in 2006 and was created in order to provide a national “one-stop shop” for educational resources created by the Cooperative Extension System. Prior to the development of the FC/CoP, faculty members working in different states could, and did, duplicate each other’s programmatic endeavors. The FC/CoP drew faculty members from a variety of disciplines including health, gerontology, family economics, and housing, all of whom shared a common interest in helping family caregivers. Their varied background and expertise brought richness and multi-faceted perspectives to the community: “having others who share your overall view of the domain and

yet bring their individual perspectives on any given problem creates a social learning system that goes beyond the sum of its parts” (Wenger, McDermott & Snyder, 2002, p. 34).

Over time, the community began to emerge as a “... group of people who interact, learn together, build relationships, and in the process develop a sense of belonging and mutual commitment (Wenger, McDermott & Snyder, 2002, p. 34). Members worked together to create the overall vision for the CoP, develop educational resources related to their own expertise and provide peer review for other members. Through this process, members often discovered complementary and crossover areas that encouraged natural collaborations (chronic health and dietary concerns; employed family caregivers and family finances). Although we were faculty members from two separate institutions, North Carolina State University and Kansas State University, and two distinctive disciplines, housing and adult development and aging, we discovered a natural collaboration in the area of universal design and assistive technology.

This possible pairing of our subject matter areas encouraged us to consider the integration of key concepts that could significantly impact the lives of family caregivers and individuals who were aging or living with a disability. We explored the possibility of working together in a partnership positioned within the FC/CoP that would allow us to pool resources and efforts to reach the intended audience (Sellers, Crocker, Nichols, Kirby, & Brintnall-Peterson, 2009).

INTEGRATING SUBJECT MATTER CONTENT

Family Caregiving

One of the important concepts for the partnership to be successful was to integrate the disciplines represented by both faculty members within the

context of family caregiving. The number of older persons with disabilities living in the community has increased in the past two decades (Redfoot & Houser, 2010), and the provision of assistance to older adults to promote their ability to function safely and independently in their homes is a public health issue (Gitlin, Earland, Piersol, & Shaw, 2010). The caregiving population is estimated at 65.7 million people (National Alliance on Caregiving and AARP, 2009), and represents a natural audience for education regarding the creation of living environments that assist caregivers in providing care, and that help care receivers maintain independence. There is a need to promote the usefulness of these types of adaptations (Cooke, Yearn, & Martin, 2005).

Most caregivers are female and are, on average, 48 years old. Care recipients are also largely female, with an average age of 61 (National Alliance on Caregiving and AARP, 2009). One of the main issues faced by these care partners is chronic disease, which is more prevalent as a person ages (Agency for Healthcare Research and Quality, 2002), and is detrimental to an individual’s ability to live independently within her own home and community (Tilly, 2010). Common diagnoses for care recipients include Alzheimer’s disease, mental/emotional illness, cancer, heart disease, and stroke, and related physical and cognitive limitations often result in a need for caregivers to assist with bathing, feeding, housework, meal preparation and dressing (National Alliance on Caregiving and AARP, 2009).

Other issues are contextual to the home: more than half (55 percent) of care receivers live in their own homes, while twenty-four percent live in the homes of their caregivers (National Alliance on Caregiving & AARP, 2009). However, “most homes were not designed and built for the needs of aging residents or caregiving” (MetLife Mature Market Institute, 2010).

Universal Design and Home Modifications

Home modifications are those retrofits or changes made to a home that help reduce hazards and provide support for independence (National Resource Center on Supportive Housing and Home Modifications, 2003). Universal design is “the design of all products and environments to be as usable as possible by as many people as possible regardless of age, ability, or situation” (Universal Design Education, 2009). Universal design features include roll-in showers, wider doorways, appliances with front mounted controls, and lever handled door hardware that helps individuals master their environment by supporting and enhancing physical and mental abilities. The home environment can not only provide safety and support for those receiving care, but can also help support and protect the strengths and abilities of those providing care (Olsen, Ehrenkrantz, & Hutchings, 1993). Modifying a home to include universal design features can assist greatly with caregiving. Home modifications may aid healthy outcomes by reducing risks of home injuries, increasing the home’s accessibility, and maintaining independence for the home’s residents (Oswald & Wahl, 2004).

Assistive Technology

Assistive technology may bring to mind images of complicated computer systems. There are many definitions of assistive technology, but here we will use the phrase as “a generic or umbrella term that covers technologies, equipment, devices, apparatus, services, systems, processes and environmental modifications used by disabled and/or elderly people to overcome the social, infrastructural and other barriers to independence, full participation in society and carrying out activities safely and easily” (Hersh & Johnson, 2008). Examples of assistive technology include low-cost, low-tech items such as a cane used to aid in mobility or

high-cost, high-tech items such as adapted vans. Providing education on this topic is an emerging need as the use of assistive technology appears to be increasing in recent years (Freedman, Agree, Martin, & Cornman, 2005; Houser, Gibson, & Redfoot, 2010) and caregivers may be an instrumental force for assistive technology use, although more research to establish this link is needed (Pressler & Ferraro, 2010).

The Integration of Family Caregiving, Universal Design, and Assistive Technology

As our first entry into this partnership, we initially operated as a pair to create educational resources that would complement each other’s work within the areas of universal design and assistive technology. Utilizing resources provided by the eXtension community of practice, we wrote articles and questions and linked to each other’s content. As the work progressed, we began to discuss if and how our complementary disciplines could be more fully integrated and explored whether we could create educational resources together that would not be possible as individuals within our own states. We discussed this concept with other community of practice members and were encouraged by the feedback we received. One of the possibilities presented to us was the use of Second Life®.

Investigating an Immersive Learning Environment as a Strategy for Integrated Content Development

Faculty members find opportunities through eXtension to engage in new and innovative ways of thinking and creating content, and are encouraged to try innovative outreach methods to audiences as well. Social media was promoted by eXtension as a way to connect with traditional and non-traditional audiences (eXtension, 2009). Examples introduced to community of practice

members included Facebook, Twitter, YouTube, and Flickr. In addition, eXtension started to experiment with the possible use of virtual worlds as an educational method. The first eXtension island in Second Life® (SL) was purchased on May 4, 2007 (K. Gamble, personal communication September 20, 2010). Neither of us were familiar with social media, and we had little understanding of its capabilities, reach, or meaning.

We were first fully introduced to Second Life® in February 2008. Second Life® is a free, Internet-based virtual world, but it is not a game. Global users, called residents, interact with each other in a variety of different environments. Some residents choose to build their own environments and items, while others simply visit established places and events. Residents independently choose where to go within the virtual world and also choose what to experience; the choices are extensive, and include social activities such as parties, recreational pursuits such as golfing, educational opportunities, such as attending lectures, and a myriad of other possible activities. Search functions, similar to those on the web, provide SL residents with the opportunity of finding social, recreational, and educational places and events of interest to explore.

Immediately, we viewed SL as a viable strategy for packaging our content in a truly integrated, and innovative, manner. The concept of a virtual home was a natural development in our thinking as our content areas pose specific challenges for adult learners. Effective education for adults includes opportunities to visualize concepts and manipulate products to see how they work. To this end, demonstration homes have been used by a number of universities to display universal design construction, energy efficient building design, and other related principles (Beitz, Brewer & Kirby, 1993; Deitz, Mulford & Case, 2009; LSU Ag Center, 2010; Utah State University, 2010). Many individuals with disabilities are not familiar with assistive technology as a means of providing possible support, and education to raise aware-

ness is needed (Kaye, Yeager, & Reed, 2008). In Kansas, an educational program complemented by an assistive technology device kit has been effective for demonstrating assistive technology and its benefits (Sellers, 2010) and a universal design gadget kit has been used in Iowa (Yeans, 2004). However, demonstration homes and item kits are restricted by their geographical location, limited distribution, need for financial support, and at times, a lack of local expertise.

The idea of The LiveAbility House was grounded in our belief that we could create an environment that would simulate these real-life efforts, as Second Life® is a place “that immerse(s) the participant in a setting that includes sound and visual cues, rich textures and realistic perspective” (Johnson & Levine, 2009, pg. 1). Others have found that SL environments can be used to demonstrate real life principles in similar content areas in a virtual world (Beard, Wilson, Morra, & Keelan, 2009; Boulos, Hetherington, & Wheeler, 2007), and that they are able to “provide a bridge for users that enable them to envision real-life possibilities” (Toth-Cohen & Gallagher, 2009, p. 11).

As well, other sites within SL provide education with similar subject matter. One such example is Health Info Island, from the National Library of Medicine’s Special Information Services. This island houses a medical library and a consumer health library (Greater Midwest Region of the National Network/National Library of Medicine, 2010). Other relevant organizations with a presence in SL include The American Cancer Society and the Centers for Disease Control and Prevention (American Cancer Society, 2009; Centers for Disease Control, n.d.). The Centers for Disease Control writes that “Using social media tools has become an effective way to expand reach, foster engagement, and increase access to credible, science-based health messages” (Centers for Disease Control, 2010, p. 1).

Older adults do utilize Internet based resources for information on aging. Those using websites also indicated that they use other social media sites

including Facebook, Twitter and YouTube, (Brossoie, Roberto, Willis-Walton, Reynolds, 2010). In addition, SL provides opportunities to reach our targeted population. Virtual Ability Island was built for SL residents with disabilities and utilizes Knowles' theory of adult education in the framework for its development (Zielke, Roome, & Krueger, 2009). Older adults have shown the ability to navigate in virtual worlds (Foreman, Stanton-Fraser, Wilson, Duffy, & Parnell, 2005). Caregiver support also exists in SL (personal communication, C. Perryman, February 19, 2009).

The LiveAbility House project crystallized after discussion with eXtension administrators and staffers regarding the feasibility of this idea from a technical perspective. We decided to pursue TLH within Second Life® as a project that would allow us to:

- Participate in the continuing transformation of Cooperative Extension;
- Provide leadership for other faculty within Cooperative Extension interested in exploring the use of technology for educational programming efforts;
- Leverage the resources found within eXtension and the FC/CoP;
- Support the content development efforts of the FC/CoP
- Establish new partnerships for the FC/CoP;
- Integrate two complementary fields into one shared educational resource;
- Modify, eliminate and add elements with minimal effort and little to no cost;
- Apply adult learning principles in a new, innovative medium;
- Develop, implement, and evaluate a unique educational opportunity for a global audience that would not be possible individually or in a real life setting.

CONSTRUCTING THE LIVEABILITY HOUSE

Expanding the Community of Practice to Include Members with Knowledge of Content Delivery through Immersive Worlds

As faculty members, we were subject matter specialists with expertise in housing, gerontology, and adult development, but had no workable knowledge of Second Life® or the use of innovative and emerging technologies for educational dissemination. Although we were enthused by the possibilities and eager to explore the use of a pioneering technological platform for informal education, we were well aware that we were likely to fail as we lacked technical competency and needed to develop skills in this area (Sobrero, 2008). We needed experts in technology to support and engage us, as well as assist with the necessary tasks we needed to complete in order to build TLH (Riel & Polin, 2004). The structure of the FC/CoP, housed as it was within the eXtension initiative, allowed us to explore and develop partnerships that answered this need.

We assembled a team of individuals who joined the project voluntarily because of their own interests. These additional partners included an administrator from eXtension; a staff member from eXtension; and two staff members from Kansas State University Agricultural Experiment Station and Cooperative Extension Service. All of the new members had extensive expertise in SL. The eXtension administrator answered questions regarding financial and other resources at our disposal for the developmental process. He also managed our project as one aspect of the entire eXtension initiative within SL. The eXtension project coordinator supervised the actual endeavor within the SL environment. She queried us as subject-matter experts, and we shared our knowledge and expertise in universal design and assistive

technology. She then translated this knowledge into a workable plan within the SL environment. She recruited several volunteers who joined the project as builders. Staff members from Kansas State University Agricultural Experiment Station and Cooperative Extension Service participated in the planning discussions, provided important perspectives about the inner workings of SL, helped with building the project, and provided individual instruction. This instruction was crucial to developing a level of comfort with immersive worlds that enabled the project to move forward.

Developing Comfort with Immersive Worlds as a Method of Educational Delivery

Johnson and Levine (2009) use Maslow's Hierarchy of Needs (1943) to discuss the learning behaviors of new members in virtual worlds, and we believe that our experiences with instruction and learning reflect this pattern. Maslow's Hierarchy includes five levels of needs. In order for the individual to move to higher levels, the lower levels must first be met. Maslow's five levels, beginning with the lowest, are: physiological, safety and security, love/belonging, self-esteem, and self actualization. Although physiological needs aren't truly evident within SL (beyond clothing and styling of the avatar), there is a need for safety (level 2) that most new residents desire. According to the researchers, safety involves being watchful for possible dangers or situations that should be avoided and warding off potential embarrassments that may arise as a result of being new. Inexperienced residents want to feel safe in their interactions with other individuals.

Early instruction centered on understanding the language of this new world; only then could we take on the next step of visiting SL. Our new community of practice members embraced the daunting task of helping us navigate our way through the world of avatars, islands, landmarks, builds, and sims. The opportunity to visit with

a mentor was invaluable, and provided us with the opportunity to begin to comprehend the vast potential for the development of the project. Just within the eXtension site, there were a number of exhibits that we were able to tour, including a virtual state fair. Within our real-life world context, the exhibits were relevant to us.

We were able to pursue this exploration with a "safety net" that prevented us from becoming overly frustrated, placed in a situation where we could be ridiculed by others, and abandoning SL. This is not to say that we did not experience a steep learning curve. Just understanding the commands and attaining the skills necessary to operate our avatars took concentrated time and effort. We needed to design our avatars, including the configuration of a body shape, selection of facial features, and the attachment of hair, jewelry, and clothing. While it seemed to us that this should be a simple and fun task, we did have quite a few mishaps. One of us spent an entire training session without hair due to an accidental detachment and inability to relocate the item in the inventory folder. Fortunately, this incident and other similar types occurred under the safe and watchful eye of our experienced members and we were able to make mistakes and learn new skills with a minimum of embarrassment. The importance of this safety net should not be underestimated in terms of the foundation it supplied for the successful progression of the overall project.

The next two levels are love/belonging and self-esteem. According to Johnson and Levine (2009), these stages reflect the desire of the new resident to seek out friends, while the fourth level may be found through an increase in interaction and exploration in the virtual world. In virtual worlds, learning often happens through experiences and interactions within a social network of friends. At first, we had little interest in interacting with other avatars as we were overwhelmed with learning basic navigational skills. One of us actively avoided interactions by ignoring communications or logging out of SL whenever approached or

when another avatar was present. As our skill level increased, we found that we wanted to learn to communicate and engage others.

In our case, we relied heavily on our technical experts to help us develop skills used to communicate within the SL world. Our guides helped us learn and practice communication through chat, with an eventual move to audio interactions. As we toured SL over time with them, we were able to draw upon their expertise, ask questions, and were often introduced to their friends, contacts, groups, and preferred locations and events. From these, we were able to begin to develop our own social network and began to feel more competent in our ability to navigate this new world.

Finally, Johnson and Levine note that eventually the learner becomes more capable and that the learner no longer thinks of him/herself as being new to the virtual world. At this stage the individual moves from “competent” to “expert.” As one example, we encountered an issue where another individual appeared to use our intellectual property and we were forced to investigate and resolve possible violation of the DMCA (Digital Millennium Copyright Act) law. This was an unexpected and interesting situation for us and required us to explore not only the copyright foundation involved in virtual worlds, but also how to solve potential conflicts in this new technology. Johnson and Levine write that only at this expert level can one begin to “visualize learning applications that are truly reflective of the potential of the space” (p. 5). Although we do not profess to have achieved self-actualization as represented by this level, we do believe that because of the expansion of the community of practice, our comfort level has significantly increased and we feel with further learning we can fully embrace the potential of this current project.

Original Vision

As we developed comfort in-world, we were very much aware that this was a new endeavor for us,

and for Cooperative Extension. We recognized that our thought processes and decisions were likely to change. In order to capture the developmental course in real-time, one of our first acts was to establish a blog in order to track our progress (<http://extensionfamilycaregivingslp.blogspot.com>).

Through this blog, we have a historical record of the project as it evolved, and TLH has changed significantly over time. However, even as the project matured, the original goal of raising public awareness of universal design features and assistive technology that can make it possible to remain in the home with physical or cognitive challenges due to aging, illness, or disability has remained constant.

Our original vision was focused on designing a model template home that featured universal design and assistive technology as an illustration of what could be created within SL. Our next planned step was to hold a design competition for builders. The goal of this contest was to collect different homes that featured universal design as demonstrated in the template model. As contest sponsors, we would provide guidelines to the builders to help them incorporate essential features, but builders would have creative freedom in the overall design of their home. We would review all entries and then place the homes on eXtension’s Morrill Island. Residents of Second Life® would be invited to visit all of the contest homes and vote for their favorite. We also planned to invite experts in universal design to critique the homes and to select the home with the best design. Both the resident and expert choices would be considered and a winner would be determined. The winner and runner-up would receive a monetary award for their efforts.

After the winning home had been chosen, our plan was to then overlay assistive technology into the contest houses. Each house would highlight different assistive technology items, dependent upon the needs of particular populations: the needs of individuals with traumatic brain injury,

The LiveAbility House

as an example, are generally different from those who have rheumatoid arthritis. We would create a neighborhood of houses that would represent some possible choices for people with differing diagnoses or disabilities.

Changes in the Vision

As the project progressed, we found ourselves revisiting time and time again the original concept of the contest. The members of our community of practice that had experience in SL created a template home that far exceeded expectations, and the idea of the contest came into question. Eventually we decided to sideline the contest in order to more fully explore what could be done with the product that had been developed. Significant time, talent, and resources were invested in the creation of the model home and the product was truly impressive. We knew that there was potential to use the already created product, which we named The LiveAbility House, that reached beyond our initial vision of using it only as an example or model upon which others would improve.

Once we decided to employ The LiveAbility House as the definitive product, we finalized the universal design features and assistive technology devices that we wanted to showcase. During the developmental process, we also generated ideas for additions and improvements to the home. In the hopes that we could share our space with professors, event sponsors, and caregivers we added a meeting space for classes, conferences, and support groups. We supplemented the exterior space surrounding the home with an accessible garden in order to demonstrate the need for accessible spaces outside of the home as well as inside. The inclusion of a resident service dog built upon the concept of independence and demonstrates the variety of options available to provide support and assistance for people with disabilities. The project has undergone many variations from the concept stage, and the process of development

has served as a lesson in flexibility, creativity, and imagination.

ENGAGED LEARNING AND PROJECT BOUNDARIES: THE LIVEABILITY HOUSE TODAY

Currently, The LiveAbility House exists and is open to the public on Morrill Island in Second Life®. The LiveAbility House lends itself to various types of learning including self-guided opportunities and synchronous learning experiences. The home is used for individual independent touring by SL residents or is available for group tours that are conducted by members of the Family Caregiving Community of Practice.

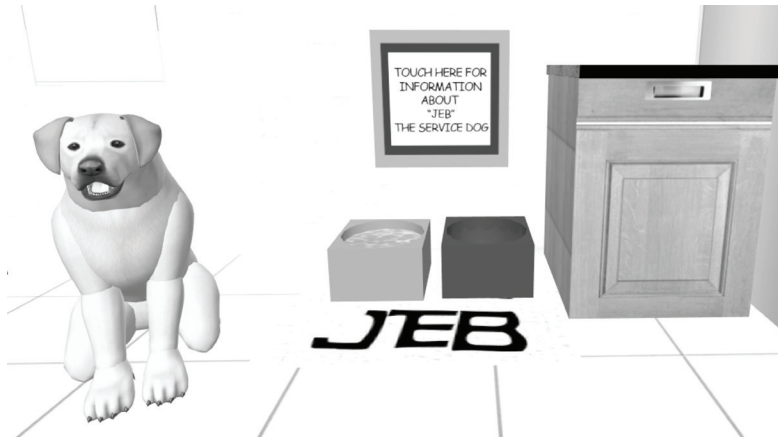
Foundational Aspects for Learning

In demonstrating real life concepts or physical objects in a virtual world, one goal is to correctly portray the concept or item as closely to the real-world counterpart as possible. The purpose of TLH project is for individuals to understand universal design concepts and assistive technologies demonstrated in a virtual world and apply those to real world situations. An obstacle for the project was determining the best way to portray essential concepts, ideas, designs, and items in TLH that were recognizable and applicable in a real world setting. In the case of housing design, scale and proportion are an important concern. With assistive technology devices, items need to be accurately represented to illustrate both form and function. In order to address these issues and to aid in learners' understanding, the virtual representation of the design feature or assistive device was created, and then was supplemented by a real-world photograph of that feature or device. In addition, audio narration and written text were created.

Figure 1. Entrance to the LiveAbility house



Figure 2. Example of kiosks placed throughout the LiveAbility house



Self-Guided Learning

A visitor to TLH is able to interact with the home itself: “the core element to any virtual world is the ability for the visitor to interact with the environment” (Johnson & Levine, 2009). When a visitor arrives on Morrill Island, he is able to identify TLH by its exterior signage (Figure 1).

As a visitor views the home from the street, he finds a kiosk that encourages him to “touch for an on-line narration about the project.” Information about TLH including the goal and suggested use of the project is provided in text and

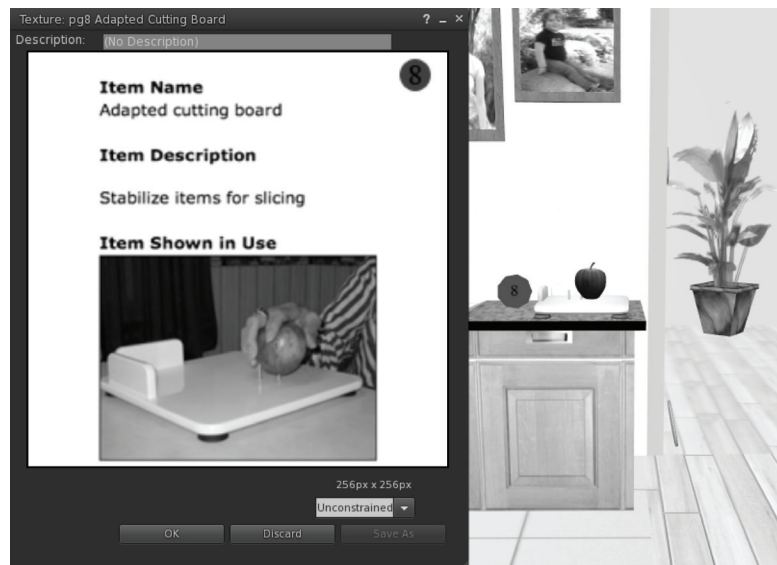
audio form. As with many accessible homes, TLH has a ramp leading to the front entrance where two additional kiosks provide further information in the form of audio narrations and text (what is universal design; what is assistive technology). Upon entering the home, the visitor encounters other informational kiosks placed in various rooms throughout the home. These kiosks provide supplementary information about family caregiving, universal design, and service dogs (Figure 2).

The main educational aspect of TLH is the actual demonstration of universal design features

Figure 3. Use of dots to identify universal design features



Figure 4. Example of a learning object in the LiveAbility house



and assistive technology devices. Universal design features are numbered with orange dots, while assistive technology features are identified by purple dots (Figure 3). As the visitor clicks on the desired feature or device, the name, description, and real-world photograph are provided to the learner with text and audio (Figure 4). In all, a visitor may encounter more than 50 universal design and assistive technology features in the

home. Examples of universal design features included in TLH are widened doorways, accessible appliances, a curbless shower, and an adjustable hand-held shower hose. Assistive technology examples included within TLH are a long-handled toilet bowl brush, an adapted cutting board, and a standing card holder.

Throughout this exploration, the visitor is in control of his own learning within TLH environ-

Figure 5. Group learning tour in the LiveAbility house



ment. If he is interested only in universal design features, then clicking only on the orange dots will provide this individualized instruction; the same is true for assistive technology. Or, if a visitor is interested only in adapting a bathroom, then immersing himself in this particular room and learning the specific requirements for accessibility is an individual option.

As SL is limited in reach to its users, community of practice members developed additional learning options for non-users. As one example, the blog is public, and may be found on eXtension and university web sites. We developed a learning lesson that introduces students to Second Life®, TLH project, and educational opportunities found within TLH. We provide instructions on becoming a Second Life® resident, and have links to additional resources. Also housed within the learning lesson are links to several machinimas featuring TLH, which are animated videos created within the Second Life® environment. These video tools can be useful in illustrating concepts to audiences that are not familiar with immersive worlds. They effectively demonstrate the content of the project as well as the potential for Second Life® as an educational tool.

Synchronous Learning

Educators have increased the use of immersive virtual worlds (IVW) as options for instruction. Middleton and Mather (2008) write, “The value and attraction of IVWs to education is in the ease they promise the general education user for creating simulations in an immersive, abstracted space, offering students the opportunity to synchronously encounter authentic experiences involving other people, objects, and environments” (p. 207). Synchronous learning occurs when an instructor and a group of students interact together at the same time. Synchronous learning provides opportunities for engagement with—and learning from—others that self-exploration does not. One of the initial reasons for including the meeting space on the grounds was to encourage professors and teachers to visit and explore TLH with their students and then to discuss their experience. What we had not envisioned was that we could give tours of TLH to interested groups. This method of instruction was suggested to us when we were approached about participating in an all-day conference on health care and disabilities sponsored by the NonProfit Commons in Second Life®. As part of the day’s conference activities, we provided two tours for attendees (Figure 5).

We began the tour in the presentation area, where the participants received a welcome and overview of Cooperative Extension and eXtension family caregiving. We walked to the house entrance, where we shared some of the history of the house and our vision for the project, how it began, and what we hoped to achieve. We then encouraged participants to tour the house, and we engaged the visitors in discussion and responded to their questions about design and technology features. This activity represented our first entrée into engaging a live audience with TLH apart from other community of practice members. From this effort, we received requests to provide tours for other conferences, and there was much discussion about possible collaborations in the future.

As a result of these first tours and as part of our presence in Second Life®, we are now available to provide guided tours of TLH. Individuals interested in this type of learning activity contact us to schedule an in-world presentation. While we may tailor content to the specific audience, the focus of the tour is the history and development of TLH, the answering of questions from participants about the concepts illustrated in the home, a demonstration of the various devices and features in the home, and open discussion and dialog with the visitors.

Evaluation of The LiveAbility House

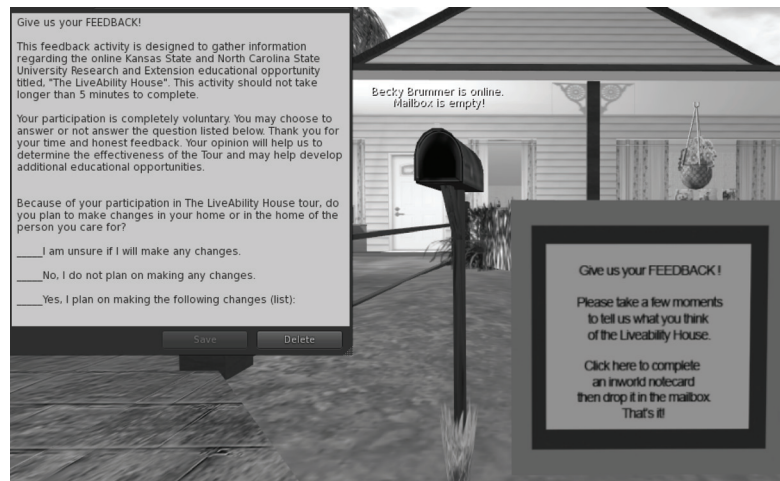
Dialogue and informal feedback has been an important conduit for the development of The LiveAbility House throughout its history. However, an important component to any educational endeavor is formal evaluation to ascertain the impact of the effort. This is helpful in determining what the learner gained from the experience, and also in establishing if any revisions should be made to the existing curriculum in order to maximize the learning event. Further, “learners should be directly involved in developing, implementing,

and evaluating learning experiences to encourage critical reflection between teachers and learners and the learning environment” (Franz, 2007, Putting Theory into Practice section, bullet 7). Evaluating the impact of a project in a virtual environment is complex and challenging. For example, Woods (2010) used a complex evaluation scheme involving a chat-based survey that required code access and the teleporting of avatars to other locations in order to measure the impact of an immersive learning experience in SL. The LiveAbility House includes two different methods of collecting impact data, both of which were approved by the Institutional Review Board at Kansas State University.

The first method of data collection utilizes a common communication strategy within SL, called a notecard. We created a short evaluation form, and a kiosk located outside TLH at the mailbox invites visitors to take one of our notecards and answer three questions (Figure 6). A second kiosk, located inside TLH in the living room, provides residents with a link to a web-based survey. This survey is more in-depth, and also includes demographic questions.

Although current analytics indicate approximately 1650 visitors since TLH was developed (L. Phillips, personal communication, July 16, 2010), survey completions, both short and long, have been meager. Gathering survey information from the home’s visitors has been difficult and we are exploring ways to increase feedback results. Currently, we are investigating ways of embedding evaluation or assessment into the actual touring experience as: “using paper and pencil, in the form of standardized tests, is not an effective way to evaluate a virtual learning experience. As VR [virtual reality] is a dynamic learning tool, evaluation should be tightly coupled with the actual learning process” (Roussos, Johnson, Moher, Leigh, Vasilakis, & Barnes, 1999, pg. 254).

Figure 6. Notecard evaluation in the LiveAbility house



FUTURE DIRECTIONS FOR THE PROJECT

Capturing the Essence of The LiveAbility House Outside of the Second Life® Environment

A considerable limitation of The LiveAbility House is its location within the Second Life® environment, an ironic situation, as one of the reasons for creating TLH in SL was to eliminate the geographical restraints found within the real world. We recognize, however, that those who do not choose to engage in this virtual world, those who have limited access to technology, and even those who have difficulty adapting to and navigating a virtual 3-D world cannot benefit from its development. Others have questioned whether virtual world projects serve only those individuals that have the luxury of time to investigate the technology of virtual worlds and if projects limited to virtual worlds reduces the size of the population that can be reached with information (Toth-Cohen & Gallagher, 2009).

Although our presence in SL has enabled us to access a non-traditional audience for Cooperative Extension educational programs, we are unable

to use this resource in a broader way within our states. The reasons for this situation are varied, are tied to the historical mission and organizational structure of Cooperative Extension, and are reflective of others' experiences related to computer hardware requirements, technical failures, and the complexity of navigating the SL environment (Siribaddana, 2010).

As educators we create resources and related training for Extension agents in our states. Agents then share these educational opportunities with their constituents in their home counties. As discussed previously, this grassroots approach to informal education was designed approximately 100 years ago. When faced with a new technology such as Second Life®, the infrastructure of the system can become an obstacle. The computer hardware available to Extension agents is varied, as county partners often have different views regarding field needs as well as varying levels of resources available. The use of SL requires a specific level of computer compatibility including the memory, operating system, processor, screen resolution, and graphics (Linden Research, Inc. 2010). Too, technical failure within Second Life® is very real and may result in an inability to access the SL grid. This inability may result in high

levels of frustration for the user and abandonment of efforts may occur.

In North Carolina and Kansas, as well as across the country, the availability of high-speed internet connectivity and permitted access to specific sites including Facebook, Twitter, and Second Life® is not consistent across counties. There are county governments that do not allow access to certain sites, as they are viewed as social media, and not as an educational dissemination method. These sites are considered as inappropriate for staff to access during work hours.

As we are well aware, navigating Second Life® requires a commitment of time. Becoming comfortable with the use of an avatar, interacting with other residents, identifying landmarks, and moving through the virtual world requires practice and a willingness to learn new technology. Extension agents and the clients they serve may have limited time to devote to this medium and limited access to technical assistance available to help them traverse this new technology.

We were unwilling, however, to concede that we could not bridge the in-world content with a real-world application that would benefit Extension agents and those they serve. Through discussion with members of the CoP, eXtension collaborators, and other Extension faculty and staff about some of these issues, we decided to explore ways to create educational opportunities that would be useful for those outside of Second Life® (The LiveAbility House-Outside; TLHO).

One of our first steps was to engage Cooperative Extension agents and educators in North Carolina and Kansas in a discussion about the possible uses of The LiveAbility House. Each of us invited Cooperative Extension staff to participate in a webinar where we outlined the project and provided a tour of TLH. We then asked questions and facilitated a free-flowing discussion that encouraged brainstorming. After these discussions, we came together and compared the major themes generated by each group. It became evident that

agents viewed TLH as extremely relevant in terms of the current conflicts and needs of wounded warriors in their communities. Young men and women are currently returning from war with significant disabilities and injuries, including amputations and traumatic brain injuries (Hoge, McGurk, Thomas, Cox, Engle & Castro, 2008; Gleicher, Lindenberg & Sumter, 2008; U.S. Congressional Research Service, 2009). These individuals have a very real need for timely information that can assist them in creating home environments and discovering technology that supports their ability levels and increases or maintains independence (Homes for Our Troops, 2009; Gleicher, Lindenberg & Sumter, 2008).

As we further explored the idea of targeting The LiveAbility House-Outside to meet the educational needs of wounded warriors and their families, we began to consider developing characters that lived within TLH. We could use these characters in different scenes to illustrate key concepts through narrative storytelling. Narrative is a tool that facilitates knowledge construction as it organizes information in a way that is memorable (Pachler & Daly, 2009). We began to explore the idea of integrating characters within the SL environment, and specifically, within TLH. We could create interactions and stories among these characters. Digital storytelling consists of “short vignettes that combine the art of telling stories with multimedia objects including images, audio, and video” (Rossiter & Garcia, 2010, p. 37). We decided that we could use our characters in real-life situations in order to teach caregiving concepts. The creation of digital stories in this way would introduce our subject-matter content and would capture the attention of learners (Robin, 2008).

However, as was necessary throughout this project, we required continued flexibility as we developed TLHO. We wanted to address the needs of wounded warriors, but we also wanted to remain relevant for our more traditional audience, consisting of older adults and their caregivers. The

Figure 7. Sage and Katie, digital narrative characters



development of a set of two pairs of characters allowed us to achieve both objectives.

This concept was once again, outside of our technical abilities. As with the creation of TLH, it was necessary to add expertise to our team. Our community of practice expanded to include an instructional designer, drama therapy student, radio producer, electronic media coordinator, and community actors.

We embarked on a pilot project to assess proof of concept for our idea. In conjunction with the instructional designer and drama therapy student, we created several characters and scenarios (Figure 7). Sage was an older adult caregiver; Bill was her husband, and had suffered a stroke; Derek was a veteran of the current conflict and had a traumatic brain injury; Katie was Derek's wife. We developed a script that showcased the four characters interacting with each other. The initial situation that we created focused on the physical and emotional issues of caregiving.

To create the digital narrative, we used The LiveAbility House as the setting for the interactions. We created our characters of Sage, Bill, Katie, and Derek as avatars within TLH, and community of practice members positioned them to mirror the interactions occurring within the

script. We then took pictures of these interactions. With the help of the radio producer, community actors recorded the script. The pictures and audio were provided to the electronic media coordinator for creation of the digital narrative.

Through the use of this digital storytelling, we facilitate knowledge gain as learners engage with the characters (Rossiter & Garcia, 2010). They hear Sage discuss various topics related to caregiving with Katie. Together, Sage and Katie explore issues such as the importance of a caregiver's physical health and changes that may occur in spousal relationships due to the caregiving role. These initial digital narratives may be viewed at <http://www.aging.ksu.edu/DesktopDefault.aspx?tabid=187>.

This project continues to evolve; if the pilot is successful, we plan for future modules to include scenes where Bill and Derek talk about the frustrations of living with a disability and strategies that help them successfully adapt, with an emphasis on universal design features and assistive technology devices. We envision that the four characters will move through The LiveAbility House demonstrating its features and highlighting the items that help support care and independence. Ultimately, as a result of taking TLH out of SL and creating these four characters, we hope our

audience will identify with the individuals in the story, and visualize using the assistive technology and universal design features to modify their own homes. In addition, we envision the opportunity to proactively address emerging issues as they arise, similar to an educational soap opera.

CONCLUSION

The LiveAbility House is a virtual home, housed within Second Life® and built to educate family caregivers about universal design principles and assistive technology devices that can help support caregiving. This project is the result of a partnership formed within the eXtension Family Caregiving Community of Practice, where faculty and professionals within land-grant universities came together virtually to share and use research-based knowledge to address the real life critical issues facing family caregivers. The LiveAbility House serves as one example of a virtual immersive learning environment that teaches applicable concepts and principles for the real world.

In terms of a project team, we have exceeded our original expectations for the project. Like-minded yet diverse Family Caregiving Community of Practice members created a strong foundation and creative environment, which nurtured and strengthened the initial vision of the project. The Community of Practice provided a structure that created the synergy among members that was needed to develop The LiveAbility House project, and this structure was essential for the initial and ongoing development of the project. We were able to broaden our community of practice to include team members with technical expertise in virtual worlds and expand our perspectives regarding the possibilities for educational use. These experts helped us translate our nebulous vision into the concrete, instructional opportunity that is represented by The LiveAbility House. It was the efforts and support of the members that moved it to actual completion. We have been

able to positively impact the development of the Family Caregiving CoP, contributing to a strong collaborative partnership model.

As a working dyad of subject-matter experts within this model, we shared one essential element, an eagerness to communicate our educational content to new audiences through nontraditional and creative methods. As content specialists, we understood the concepts we wanted to demonstrate using virtual world technology but we lacked basic knowledge regarding its use. It was this desire that motivated us to overcome fears related to technology use and to conquer the many obstacles that faced us due to our inexperience and lack of knowledge. Eventually, we came to realize that the project actualization was not dependent upon us becoming technologically savvy. We did need to become technologically familiar, and the inclusion of others with the needed expertise allowed us to learn from them and experiment under their watchful eye. This was an important aspect of the project's process and eventual ability to produce learning opportunities.

As Extension specialists, The LiveAbility House represents an educational opportunity that is completed, usable, and open to a global audience via Second Life®. We are able to share our subject matter with other educators and content developers. Presentations occurring in-world and in real life demonstrate the potential of similar possibilities to others.

Most importantly, we are able to use this demonstration home to share our subject matter with clients, some of whom may have a very real need for caregiving assistance. Residents of SL are visiting TLH, exploring its contents, and investigating its features. Tours have been conducted for those interested in learning more about family caregiving, universal design, and assistive technology. Although our evaluation of the project has been limited, we have some indication that TLH is providing information and assistance to those who have caregiving needs.

One last aspect of our success may be found within the potential of the project for future educational opportunities. From the earliest establishment of the project, the vision has remained constant, but the methods have been adapted, changed, abandoned, and recreated. We are mindful that with every new Community of Practice member added, skill learned, or innovative technology mastered, the options for using The LiveAbility House as a tool to educate caregivers and care recipients expand and provide additional promise. We are currently in the midst of developing The LiveAbility House-Outside, which will extend the reach of our project to field agents and the citizens that they serve. We look forward to these as yet unknown in-world and real-world opportunities and will continue to explore ways to create quality learning experiences for individuals with functional challenges and their caregivers.

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KEY TERMS AND DEFINITIONS

Assistive Technology: Devices, equipment, and tools that support, enhance, or enable individual ability in order to perform activities of daily living.

Cooperative Extension: An informal education, outreach and engagement system focused on the practical application of research knowledge and comprised of land-grant universities.

Digital Narrative: Short, digital vignettes that use the products developed in Second Life to illustrate educational principles through storytelling.

eXtension: An initiative of the Cooperative Extension System that provides real-time educational opportunities for clientele across the nation and globe.

Family Caregiving Community of Practice: A virtual network of land-grant university faculty, educators, and staff, with subject-matter expertise in family caregiving who work together to create educational resources to assist this population.

The LiveAbility House: A demonstration home built in Second Life® that illustrates the integration of universal design features and assistive technology devices to enable people to live at home despite physical or mental challenges caused by aging, illness, or disability.

The LiveAbility House Outside: Educational opportunities that use the product developed within Second Life in a manner that does not require access to the Second Life platform.

Second Life®: An on-line virtual reality world.

Universal Design: Design of products and living environments that can be used by all individuals regardless of age, gender, ability or change in ability.