Virtual Learning for Seniors in Second Life

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ABSTRACT
Senior citizens are still under-represented as Internet users despite their fastest growing rate and their various interests. In addition, more than half of senior Internet users spend their online connection mainly in emails, news, health information, product information, and travel reservations. Many also have less interest in other activities such as online purchasing, searching government sites, online games, and online photos sharing. Furthermore, they are also benefiting from online learning especially in topics dealing with health information since they use health services more than any other age group.

Online learning is self-oriented and doesn’t offer opportunities for collaborative learning where they can at the same time be immersed in new learning experiences and extend their social network. Our goal is to enlarge the spectrum of internet interests dedicated to seniors especially in the context of online collaborative learning. Since second life is considered as one of the most widely used virtual environments for online learning as well as socializing, it represents the best fit for our goal.

Our study aims at building virtual classes in second life for seniors by taking into consideration their favorite interests and applying the principles of interaction design. Moreover, our study extends the previously created virtual learning environment by the engineering college of Auburn University through the addition of three new classes to the already existing ones summing up the total number of classes to six. The obtained results from our study show that virtual learning for senior citizens is a promising field for online learning.

Authors Keywords
SecondLife®, senior citizens, virtual world, collaborative learning.

ACM Classification Keywords
H.5.3. Group and Organization Interfaces: Collaborative computing.

INTRODUCTION
The use of online learning has known a great expansion in the last decade among young populations. However, senior citizens have been under-represented as online learners and even as internet users with very few sites dedicated to their interests due to several barriers.

Seniors are considered as non regular users of Internet since many of them don’t have access to high bandwidth connection and were not born in the boom of computing era. Thus, the use of new technologies is not part of their habits and cultures. Moreover, having a previous negative experience with Internet use may also block seniors from using Internet especially if they were victims of an online scam.

Although aging may affect the cognitive and health capacities of humans, their motivations and enjoyment of life make them more open to adopt measures for a delightful life. Unlike what is widespread among societies about the lack of interest and inability to adapt to Internet among seniors, research proved the opposite [1].

Our goal in this study is to promote Internet use among seniors and best practices for designing virtual learning environment for this growing population. Our study deals with the creation of virtual classrooms for seniors in Second life, which is a continuation of a previous study on virtual learning among seniors led at the department of computer science and software engineering of Auburn University [2]. In addition, promoting virtual learning for seniors meet their later lives interest:

- Part of the joy of learning in later life is that it is not necessary for a job and no grades or homework is needed.
- Learn new things, which help them in maintaining their cognitive capacities.
- Fight loneliness by enlarging their social network.

LITERATURE SURVEY AND BACKGROUND
Virtual worlds represent intelligent simulated environments where users take the appearance of agents or avatars and undertake many of their real life activities such as
socializing, creating business, and learning. The last
generation of created virtual worlds support several features
such as multimodal input, heterogeneous clients, highly
scalable servers, and take into account network constraints
such as high network traffic [3]. Therefore, virtual worlds
can be used for online games, and metaverses such as the
widely used virtual environment “Second life”.

**Second Life and its use as a virtual learning environment**
Second Life (SL) is a computer program, featuring a three-
dimensional world whose inhabitants are all users, all users
can chat via text or voice communication, and all the
objects in this world are user-made; everything from the
clothes the avatars wear, to the chairs they sit on, to the
houses they inhabit, and in some cases even the body the
avatars have. All blocks of land are interconnected, and any
land that isn’t set to be private can be visited by any user.
Additionally, the in-world currency is purchased using real
world money, and can be sold for real world money.

SL allows users from all over the world to meet and
communicate in a shared realm has attracted attention from
many areas, including educational programs such as
Harvard [4], University of London [5], Duke University [6],
and a collection of astrophysicists [7].

A virtual learning environment is a computer based system
designed to aid or replace traditional learning environments
such as classrooms. They are usually Internet-based. The
idea is to take advantage of the various tools that
computers, and the Internet, provide; such as wikis, e-mail,
websites, and in our case three-dimensional virtual worlds.

Building a classroom in Second Life allows us to provide
learning at almost any time of the day, at the user’s speed
and when the user is best able to access it. Additionally, this
allows us to provide learning in the user’s home, which is
beneficial to users with limited mobility. Furthermore, the
expenses associated with creating virtual classrooms are
much less than those associated with physical classrooms,
allowing this education to be offered at much lower rates;
potentially even freely. All these favor senior citizens, who
may be unable to leave their home easily and are often
living on a fixed income. A virtual classroom would allow
any senior citizen with access to a computer to take the
classes offered. SL provides various educational level
students with specific spaces dedicated to their school study
and research such as “Campus: Second Life” and “Teen
Second Life”.

In addition, an increasing number of schools and
universities around the world are using SL as a virtual
learning environment. The University of Hamburg
established a virtual campus called Students@Work where
information science students attend lectures, international
guest-speakers talks and participate in virtual field trips
regardless of their real world location and with lower cost
and higher safety than real plants visits [8]. Lancaster
university researchers have also developed a drawing tool
in SL to teach primary-school students 3D graphics and
geometry and improve their spatial thinking [9]. In addition,
the use of SL in teaching software engineering at Ohio and
Mary Washington Universities showed it effectiveness in
collaborative education through virtual teamwork and
remote interactions [10]. Although SL is widely used as an
educational tool within universities and schools, its use as a
learning tool for seniors is still limited.

**WHAT HAS BEEN DONE SO FAR**
Senior citizens represent the fastest growing demographic
worldwide. As indicated in the Year 2000 U.S. Census,
there are 35 million people 65 or older in the U.S., and by
2030, it is estimated that there will be about 70 million
growing rapidly and being increasingly exposed to
computers and technology, it is important that they be made
aware of what computers can do for them, (e.g., email,
document creation, games, and Internet).

“Life Long Learning”, a research study done last year by
students in the Computer Science and Software Engineering
Department at Auburn University last Fall [2], focused on
the use of a longitudinal study, which employed a mixed
method approach to data collection and analysis, including
the use of standardized surveys, measures of physical
fitness and physiology, observations in their retirement
community, and interviews. It drew upon Auburn
University faculty in the College of Engineering,
encouraging Senior Citizens to participate in workshops
designed to develop their skills in computing.

In fact, they designed three main classrooms, *email, health
care, and art*, in the Auburn Academic Island. This project
had a potential significance in creating a valid, reliable and
reproducible model for outreach to retirement communities
and other centers for senior citizens. As a result, rather than
re-inventing the wheel, our project will focus on expanding
these research efforts based on the results from the Senior
Interest Survey (Figure 5) and hopefully design classrooms
of great usability which will support seniors and promote
computer interest and computer literacy.
METHODS
The study was conducted for eight weeks. The first step of our study dealt with choosing the topics of our intended virtual classes from a survey that gathered seniors’ interests (figure 5). Then, bi-weekly meetings were held with the client to gather the requirements and discuss the main design of the classes from their initial wire frame to conceptual model and final design.

WIRE FRAME
The chat room feature in Second Life is only effective when the persons involved in the conversation are within 20 meters of each other. As a result, our proposed design is of a circular room having a 10-meter radius, with the instructor’s desk located at the center of the room (Figure 1). Participants would then be at most 10 meters away from the instructors, and at most 20 meters away from each other. The lectures will be displayed on presentation boards mounted on the walls.

CONCEPTUAL DESIGN
Seniors Citizens will have access to a virtual academic center in Second Life, which will offer a multitude of facilities that will help them in their learning experience. This virtual campus will undoubtedly have several vital academic buildings such as a library, a lecture hall, a student center, a conference center, and many regular classrooms (Figure 2). This project will then focus on the design and implementation of Tiger Hall, a learning center in which will be located a reception area and three main classrooms around which will be centered our usability study. In fact, senior citizens will be given the opportunity to attend a virtual class on Gardening, Photography, or Cyber Security.

Figure 1: Classroom Design

Figure 2: “Seniors in Second Life” Annex on the Auburn Academic Island

We plan to re-create a traditional classroom environment as much as possible, despite the circular shape of our design. Upon entering Tiger Hall, the students will be given the opportunity to select any of the three classrooms being offered by selecting a door in the lobby. Each classroom will contain chairs, desks, presentation board continuously showing a series of slides, and sometimes an instructor (Figure 3). We are quite optimistic that the users will be engaged by the material – such a presentation board (Figure 4) – and interact as they would in a real classroom by following the lecture, asking questions, taking notes, and hopefully learning something new.
Tiger Hall will have four levels, each containing a main room or classroom: the main entrance and reception areas in the lobby, Classroom A on the second floor, Classroom B on the third floor, and Classroom C on the fourth floor. The conceptual design behind each area can be illustrated by the following scenarios:

**SCENARIOS**

**Lobby/Main entrance**

Students- in this case Senior Citizens- will enter the "Tiger Hall", our main facility through central double doors. There they will be greeted by an intelligent agent serving as receptionist such as a presentation board or any other automated being or object. The receptionist will give them a one to three sentences speech regarding the conceptual design behind this virtual school, then show them three doors, each leading to a classroom in "Gardening", "Photography", and "Cyber Security". In order to make a selection, the user will simply to walk towards the desired door and a script will teleport him/her to the appropriate classroom. When exiting any classroom, a different script will teleport them back to the main entrance. As such, users will have the impression that the classrooms are located on the same floor, whereas they lie above each other.

**Gardening classroom**

After accessing the Auburn Academic Island in Second Life, a student can teleport to his/her chosen class (Gardening in this case). Once in the class room, s/he can sit and watch an introduction regarding the course. Then, choose to watch the lecture of the day, learn more about a specific plant, or discover gardening steps for a type of plants or watch experts’ opinions in gardening, through a menu selection. After watching the lecture, she can ask her virtual professor, give comments, or suggestions. She can also practice her gardening knowledge in the sample gardens available in the class room corners.

**Photography classroom**

The user will enter the lobby and click on the "photography" door, which will likely be marked by a picture of a camera. They will be teleported to the classroom. Inside, the classroom will have a teacher and several displays, each of which acts as a projector screen that displays slides demonstrating the basics of taking pictures. The classroom will focus on picture taking techniques rather than issues specific to the physical camera. There are several issues we plan to cover through our classroom implementation: First, the rule of thirds, which helps with composing pictures. The eyes tend to move along lines to divide the picture in thirds, and so the user use these lines to frame important features, or to draw attention to them. Moreover, the class presents learners with techniques on how to use light, specifically on avoiding flooding the picture with too much light or having shadows obscure parts of the subject. The use of frames to emphasize the subject, or to give a sense of the scenery is also presented. Finally, seniors learn also how to handle action shots, such as children running around. These subjects will be presented using slides, and discussed by the teacher, with example photos being displayed and handed out to the class.

**FUNCTIONAL REQUIREMENTS**

**Lobby/Main entrance area**

1. The system shall allow the user to enter the building through a main entrance such as double-doors.
2. The system shall have a joyful, friendly, and helpful receptionist who will assist the user whenever s/he desires so.
3. The system shall provide means for the user to easily identify the classes being offered through a visual display such as a poster or presentation board.
4. The system shall indicate which door leads to a given class.
5. The system shall provide a safe script to teleport the user from a selected door to the corresponding class.
6. The system shall allow the user to exit the building when s/he desires so.

**Gardening classroom**

1. The system shall support users in finding information about how to connect to their preferred classes.
2. The system shall support users on how to use the gardening virtual class by providing a help option and a tutorial.

3. The system shall provide users in the hall of the academic building with a mechanism to help them choose their preferred class: provide a menu that enables them to trigger their teleport to a specific classroom.

4. The system shall provide the users with the option of teleporting to their class.

5. The system shall launch an introduction presentation on the class white board once students take their seats.

6. The system shall provide students with an in-class menu to choose between watching the lecture of the day, learning more about a specific plant, discovering gardening steps for a type of plants, or watching experts’ opinions in gardening.

7. The system shall provide users with a mechanism to ask questions, leave comments or suggestions.

8. The system shall provide senior learners with virtual practice gardens.

Photography classroom
1. The system shall have all the functionality expected from the other rooms, such as chairs, a teleport in and out, etc.
2. The system shall teach users how to take good quality photographs for day to day purposes, e.g. taking pictures of family gatherings.
3. The system shall teach users about techniques they can use to improve their photos: framing, rule of thirds, and the effect of light and shadow on the subject matter and the camera.

Cyber security classroom
1. The system shall allow users to safely teleport into this classroom.
2. The system shall provide a room capacity restriction.
3. The system shall provide means to easily identify the lecture materials being presentation through the use of a poster or presentation board.
4. The system shall provide an index of other classes being offered in the building.
5. The system shall provide a help menu through a visual display such as a poster or presentation board.
6. The system shall provide means for students to select and acquire lecture material when applicable by using various interaction techniques such as manipulation and exploration.

7. The system shall allow user to leave the classroom when s/he desires so.

PILOT TESTING
A pilot testing was performed over a period of nine days by students, faculty and staff at Auburn University. Although they were not our primary target, they helped us identify various errors in our design and implementation as they were all computer-experts, at least with respect to our primary audience. They were each asked to create a Second Life avatar, teleport to our classrooms – after receiving a landmark notecard-test the system, and finally to complete a heuristic evaluation and a survey. Although their first visit to our classroom was uncoached, the second one was guided by our task list based on the aforementioned functional requirements and meant to emphasize some features they might have missed during their first visit.

EVALUATION RESULTS
Overall, all pilot testers liked the classrooms’ layout because they all resembled real classrooms, with no distracting objects around. In other words, “All classrooms were appealing and easy to use”. They also appreciated the idea of using presentation slides for our lectures since these apply to persons of all ages (see Figures 5-7). Furthermore, the idea of teleporting from one room to another was loved by everyone, thus showing that the system is indeed more usable when the user is not aware of implementation details.

We were also able to identify potential issues that will arise when the system is used by users of opposite preferences. For example, some of the pilot testers really liked the floor and walls of the gardening classroom because they represented the topic quite well, whereas others truly disliked them.

![Figure 6: Survey Results: Overall System Rating](image-url)
CONCLUSION

Overall, we successfully implemented and pilot tested a new approach of designing classrooms for Senior citizens in a Virtual World. The next step will be to perform usability studies with actual Senior Citizens in order to identify critical incidents, and therefore improve the conceptual design presented in this paper.

REFERENCES


