

Accessibility and Inclusion in Learning Management System Design:
**Creating an Online Learning Platform
for Lifelong Learners**

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Applied Project Overview

As the impact of technology on daily life continues to grow, online learning platforms for primary, secondary, post-secondary, and professional institutions find ways to:

1. Connect peers and instructors through digital communication,
2. Engage users more fully in learning, and
3. Provide access to resources that enhance deep-impact education.

Online learning platforms, sometimes called learning management systems (LMS), are used to connect instructors and students through synchronous and asynchronous engagement tools, provide space for the transfer of resources and ideas, and track progress. However, these platforms were designed with more mainstream purposes – and more digitally savvy – users in mind.

Adult learning programs (with members ages 50+) currently have no online learning and sharing platform specifically designed to fit the needs and desires of their users. Adult users ages 50+ are not “digital natives” and have significantly varying levels of experience and comfort with new technologies, specifically Internet-based technologies. In the article “Digital Natives, Digital Immigrants,” the author defines digital immigrants (or digital non-natives) as “those of us who were not born into the digital world but have, at some later point in our lives, become fascinated by...new technology” (Prensky, 2001).

Despite the multitude of barriers to successful use, adult learning programs recognize the need to engage with members digitally and are seeking an online learning platform centered around their users.

This project, utilizing best practices in technical communication and mixed methods user experience research, will broaden the boundaries of communication design by creating an online learning platform prototype specifically focused on adults ages 50+ through the lens of information design, content management, and user experience outcomes to develop a digital space in which users ages 50+ feel comfortable exploring, sharing, and interfacing.

Note: As Jeff Johnson and Kate Finn note in *Designing User Interfaces for an Aging Population: Toward Universal Design*, “Many people don’t want to consider themselves old, older, aged, or aging. Still, we need a common language for talking about it...We’re going with the term *older adults*. While no term will meet with everyone’s approval, we hope the term *older adults* doesn’t offend anyone” (Johnson & Finn, 2017). This project will use the terms “older adults” and “ages 50+.”

Lifelong Learning | Adult Learning Programs

Adult learning programs (with members ages 50+) provide programming for members who are interested in learning about new subjects, participating in activities, and creating a community of peers. These programs are usually tied to a university or an institution of higher education, can offer college credit or audit college classes, and can be intergenerational or strictly adult learners. They generally do not have a mission of professional or continuing education – although it may be one of the things they offer. Their main goal is providing quality learning and sharing experiences to adults ages 50+, simply for the love of learning.

Adult learning programs are an integral part of successful aging. Based on research by Douglas Powell, members of lifelong learning institutes tend to fall into the 20-30% of adults who are in the “‘optimal cognitive aging’ cohort...[by] ‘being open to new experiences and to new communication technologies’” (Shinagel, 2012). They also promote self-reliance and independence, enable more effective coping skills, enhance the potential of adult learners to contribute to society, provide an outlet for communication of experiences to peers and other generations, and allow possibilities for self-actualization (Shinagel, 2012).

The stereotype that many have of adult learning programs as existing to fill a hole in a retired person's day vastly differs from the content and enrichment that characterize the adult learning programs found in our global society. Many retired adults face a new life and endless possibilities after being relieved of child-rearing and/or work responsibilities and have a desire to contribute to and learn from their community.

A report by the PEW Research Center states that "46 million seniors live in the United States today, and older Americans – those age 65 and older – now account for 15% of the overall U.S. population. By 2050, 22% of Americans will be 65 and older, according to U.S. Census Bureau projections" (Anderson & Perrin, 2017). This increase in the population of older adults has led to a significant rise in lifelong learning institutes and adult education programs. According to data collected in 2018 by the National Resource Center for Osher Lifelong Learning Institutes (Osher NRC), there are approximately 420 Lifelong Learning Institutes (LLIs) in the United States, with 124 of those being Osher Lifelong Learning Institutes (OLLIs) serving over 170,000 members (National Resource Center for Osher Lifelong Learning Institutes, 2019, 1).

In a survey by the Osher NRC Distance Learning Committee in May 2019, 87% of participants (64% of all OLLIs) indicated that they are interested in distance learning, and 25% of participants (around 21% of all OLLIs) are currently offering some form of distance learning as part of their programming (National Resource Center for Osher Lifelong Learning Institutes, 2019, 3).

For the purposes of the survey, distance learning was defined as "a method of content delivery in which: 1. Classes (or courses, discussion groups, lectures) are broadcast/streamed to off-site locations (homes, classrooms, or other) and/or 2. Classes are fully or partially conducted over the Internet (synchronously or asynchronously) without members present in a physical classroom."

Of the 87% interested in distance learning, 73.4% are currently exploring or planning to implement distance learning, and 33.3% are developing distance learning programming for 2020. Of the 25% offering distance learning currently, 29.6% offer asynchronous learning options, 81.5% offer synchronous learning options, 61.54% offer hybrid/blended learning options, and 57.7% provide online materials to members. In that same subset, 34.6% use LMS, 26.9% use an online class website, 23% use online file sharing, and 76.9% use video conferencing software.

The participants in the study indicated perceived benefits of distance learning including: providing access to members unable to attend campus (81.2% of participants), increasing membership (57.4% of participants), providing new learning environments (53.5% of participants), and providing more offerings (47.5% of participants). The participants in the study indicated perceived impediments of distance learning including: reduction in the "sense of community" (59% of participants), technological acumen of members/volunteers (59% of participants), time to research, plan, implement and manage the programming (57% of participants), and cost for technology, applications, and/or support (56% of participants).

This feedback from the OLLI network speaks to the growing desire for an integrative, useful, and accessible LMS specifically designed for adults ages 50+. LLIs and adult education programs are rapidly entering the digital space of education content design, development, and management; this growing population interested in continuing to learn and engage with their communities through digital technologies would dramatically benefit from digital technologies specifically created for their target demographic.

Research Overview

The Osher Lifelong Learning Institute at Arizona State University (OLLI at ASU) offers varied learning opportunities to over 2,400 members in the Greater Phoenix Area, including more than 350 short non-credit classes, intergenerational projects, local and global travel opportunities, and member-led Learning Enrichment Groups (LEGs). OLLI at ASU's tripartite mission to provide learning experiences for adults ages 50+ through diverse classes, campus-based learning opportunities, and public service initiatives echoes both ASU's charter and many LLIs across the nation and world (OLLI at ASU, 2019).

OLLI at ASU is situated in a state where "there is unprecedented growth in the older adult population across all communities," in part due to "the continued migration of older adults who choose to spend their retirement years in Arizona" (Humble, 2014). This allows the members of this lifelong learning program – coming from many areas of the nation and world – to provide multiple perspectives on the research of this project. As part of a larger network of 123 other OLLIs in the nation, OLLI at ASU benefits from a relationship with the Osher NRC. The Osher NRC serves as the convening center for the network of OLLIs by connecting OLLIs to each other and to resources, collaborating with OLLIs and partner organizations, and consulting with OLLI leaders to find solutions to pressing issues in older adult education programming.

Out of the 147 unduplicated participants in the project, 96.6% of them were past or current OLLI at ASU members. OLLI at ASU member participants had varying levels of experience with, knowledge of, and comfort with digital technologies. Non-member participants had low levels of experience, knowledge, and comfort. Recruitment for research participation was completed by one full-time OLLI at ASU staff, the program coordinator Abby Baker.

Research Design

The first step in research design was to use an emailed fixed-question/fixed-response cross-sectional quantitative survey to the target demographic to gauge user knowledge, interest, and reluctance to interacting with an online learning platform.

The next step was to complete heavy marketplace research, which provided insight on how to create a platform with a range of usability similar to those in the marketplace for secondary, post-secondary, and professional education but with intuitive guides and support for adults ages 50+ as both users and creators of the platform.

A review of relevant literature surrounding the creation of digital communication tools and LMS, as well as research on digital organization, content creation, and structure to enhance user experience for adults ages 50+ also added depth and insight to project development.

Then, elements of an online platform were designed with adults ages 50+ in mind. This effort was informed by participation in the Distance Learning Committee through the Osher NRC, quantitative data collected from the survey, marketplace research, and relevant literature surrounding the creation of LMSs to enhance user experience for adults ages 50+.

In-home usability "beta" testing with target users throughout platform prototype development created an informal feedback mechanism on navigation, element placement, and intuitive design.

After creating the first iteration of the online learning platform prototype, qualitative focus groups beta-tested the prototype and gave feedback for development or implementation, which improved usability, accessibility, and user experience. Analysis of the focus group feedback informed the second iteration of the prototype (presented at the Association for Computing Machinery's (ACM) Special Interest Group for the Design of Communication (SIGDOC) 2019 Conference).

Feedback from participants at the ACM SIGDOC 2019 Conference led to final changes and updates to the platform prototype. Next steps were determined, and the project was publicly defended to a faculty committee.

The next steps in research design would be to identify an implementation timeline for outlined next steps, which include performing mixed methods research through a quantitative eyetracking study and post-study qualitative exit interview to inform the next iteration of the prototype, and presenting the prototype to an identified LMS developer.

Research Questions

Central Questions	<p>How is user-centered LMS design for adults ages 50+ different than user-centered LMS design for younger adults?</p> <p>How will a prototype LMS specifically designed for adult education programs (ages 50+) fill a gap in online learning for a currently underserved population?</p>
Survey	<p>In what ways will a quantitative survey of adults ages 50+ (specifically members of an OLLI) serve to contribute to a more comprehensive and nuanced understanding of the ways adults ages 50+ understand, use, and have interest in formal and informal online interaction and learning?</p>
Marketplace Research and Literature Review	<p>In what ways will a detailed analysis of current LMSs in the marketplace, alongside a comprehensive literature review of best practices in learning psychology of adults ages 50+, digital interactions of older adults, and best practices in technical communication, work in conjunction with data analysis from the quantitative survey to develop a first draft of a prototype LMS specifically designed for adults ages 50+?</p>
Informal Usability “Beta” Testing	<p>How can in-home usability “beta” testing of a prototype LMS specifically designed for adults ages 50+ assist in developing useful, accessible, and intuitive elements within the prototype?</p>
Focus Groups	<p>How will the experiences of adults ages 50+ beta-testing a prototype LMS specifically designed for adults ages 50+ be explored in a qualitative focus group atmosphere and further develop the LMS based on direct user experience?</p>

Research and Development Timeline

Month	Applied Project Task
March	Develop and send out quantitative survey.
April	Analyze data from quantitative survey. Marketplace research. Survey literature for review (begin developing citations).
May	Use quantitative data, and marketplace / literature research to develop the platform prototype. Informal usability testing ("beta testing") in homes.
June	Use quantitative data, marketplace / literature research, and usability test feedback to develop the platform prototype. Informal usability testing ("beta testing") in homes.
July	Use quantitative data, marketplace / literature research, and usability test feedback to develop the platform prototype. Develop quantitative focus group documents.
August	Complete qualitative focus groups. Analyze data from qualitative focus groups.
September	Update platform prototype based on data analysis and focus group feedback.
October	Present the platform prototype at 2019 SIGDOC Conference - SRC. Write literature review and metacognitive statement.
November	Complete the platform prototype and present it to committee for approval (defense).
December	Identify implementation timeline for suggested next steps (mixed methods eyetracking study, present platform prototype to LMS developer).

Survey

The first step in the research process was collecting fixed-question/fixed-response quantitative data from currently enrolled members of OLLI at ASU through an online survey. This garnered a more comprehensive and nuanced understanding of the ways adults ages 50+ understand, use, and have interests in formal and informal online interaction and learning. The survey was facilitated through Google Forms, which has a clean, simple interface and allows for easy question “logic” – all survey responses automatically populated a linked Google Sheet.

By gathering data in a cross-sectional survey, as opposed to more time-consuming qualitative or longitudinal studies, the challenges users face at present and the current learning techniques and desires of users in their online learning was easily apparent. In an ever-evolving digital world, this data informed and directed the focus of research in the marketplace and scholarly literature.

Academic Support

Using survey design methods from Chapter 8 of the book *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, the outlined methods indicate the context of the survey in the larger project, why the survey was cross-sectional, the form of data collection, population characteristics, and sampling procedures (Creswell & Creswell, 149-150).

In the article “Online Survey Design and Development: A Janus-Faced Approach,” the authors assert that “it is imperative for researchers to formulate their questions with an eye toward the technological tools that will enable researchers to collect data in a way that is both engaging for the user and easily processed by the researcher” (Lauer et al, 335). This approach to survey development ensures that not only is user experience considered in survey development, but so are data outcomes - developing collection methods that allow data to be creatively collected and useful for research and analysis.

In the same article, it is stated that “the design of web surveys can involve two competing goals...to collect a large amount of data that can be cross-referenced to produce complex, interconnected results...to design an interface that will engage users long enough to complete the survey” (Lauer et al, 338). Considerations about the type and amount of data collected, combined with concern about survey fatigue should be built into the design of the survey.

The survey uses a Janus-faced approach to inform the medium used to create the survey, the “logic” of the survey questions, the way demographic information will be collected, and the structure of each question to aid in data collection while decreasing the likelihood of early survey fatigue.

Participant Recruitment and Survey Distribution

A call for participation to segmented Spring 2019 members of OLLI at ASU through an “email blast” in MailChimp was used to recruit participants. Using the “button” function and hyperlinks, the survey was directly embedded in the email for easy access and distribution.

The body of text in the email will ask members to identify their Reference Number; this will prepare them to have all necessary information to complete the survey on-hand before beginning. Reference Numbers are how members log in to the OLLI at ASU online registration system, so most members have easy access to this information. Asking members to provide their Reference Number to complete the survey did not seem to be a barrier to participation.

The survey was sent to 420 segmented members: 269 members opened the email, and 142 members completed the survey (response rate of 33.8%). The participants received an aggregate analysis of the data as a “thank you” for participation.

Since all members who receive the “call for participation” received it via email, all participants had an accessible email address (which excluded around 1% of OLLI at ASU membership without email addresses on file).

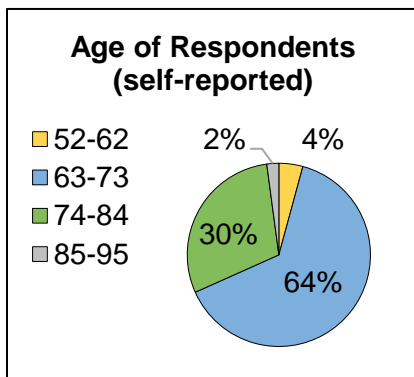
Survey Questions and IRB Documents

See Appendix A for the survey questions and IRB documents. IRB documents include research protocol, recruitment verbiage, consent verbiage, and the IRB exemption notice.

Note: Participants provided their email address and Reference Number from their OLLI at ASU registration. The Reference Number is connected to their membership profile, which not only provides a secondary verification of their connection to OLLI at ASU and identity, but also allows specific demographic data to be accessed (with consent of the participants) without taxing participation energy. The demographic information collected through their online registration profile was birth year, gender, ethnicity, city on file, and if they were a new or returning member.

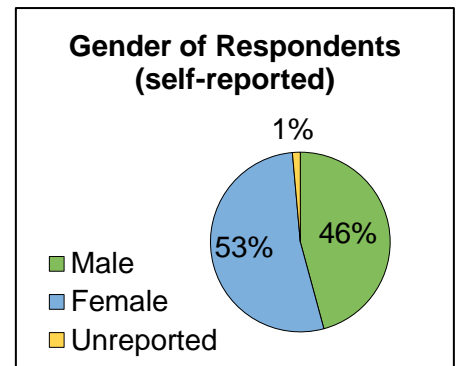
Data Analysis

Robust data collected from 142 participants in the survey allowed for information to be parsed in varying ways to identify patterns and create meaning – the information collated for this project only speaks to one way to aggregate participant responses. Further development by the researchers on this prototype LMS may aggregate the raw data from this survey with different focuses.



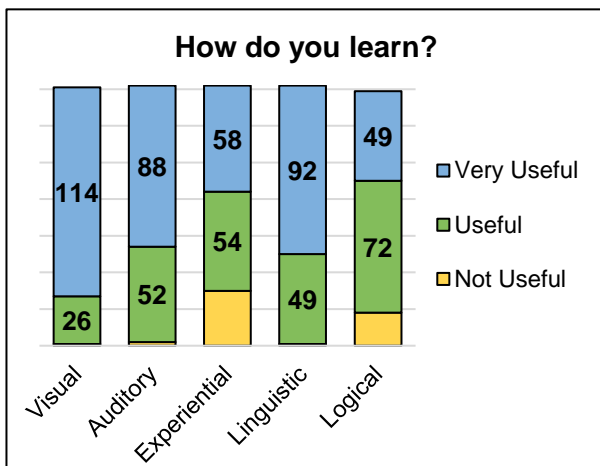
The average age of participants was 71; though many adult learning programs cater to adults ages 50+, this speaks to the age breadth of the population engaged in interactive learning. It is quite challenging to develop digital technologies for an age range that spans, in this specific case, 43 years, but acknowledging the difficulty of creating inclusive, accessible, and useful digital

technology for a group with such diverse technology experience can be helpful in guiding design.



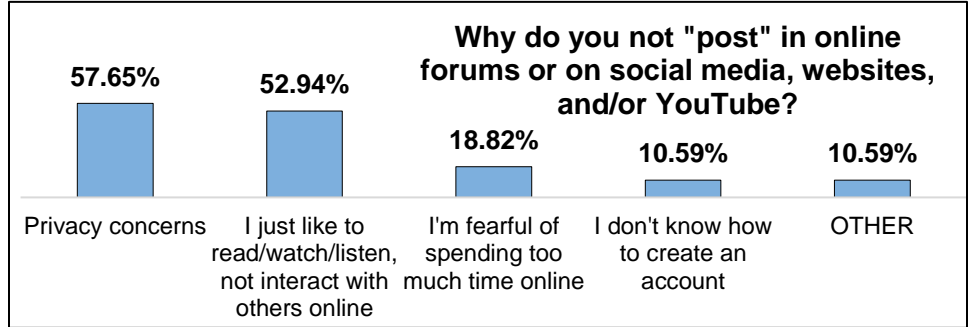
Although data from the Osher NRC shows that female-identifying participation is typically around 67-70% of the total (National Resource Center for Osher Lifelong Learning Institutes, 2019, 2), self-reported gender in this survey was more equally split with female-identifying

participation at 53% of the total. This could potentially indicate there is more interest from male-identifying older adults in online learning than in traditional learning experiences offered by many adult education programs such as in-class instruction or field trips.

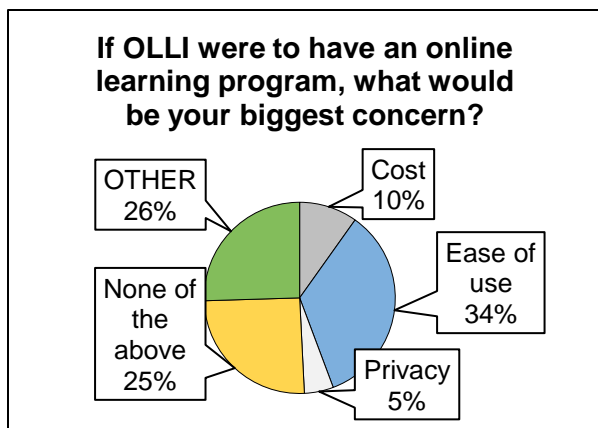


Just over 80% of participants indicated that visual learning was “very useful,” 65% indicated that linguistic learning was “very useful,” 62% indicated auditory learning was “very useful,” and 51% indicated that logical learning was “useful.” The varying learning preferences noted as being useful by participants shows that learning design and pedagogy should be multi-modal and engage several learning styles at once.

40% of survey participants stated that they post in online forums or post comments on social media, websites, and/or YouTube. They generally feel mostly neutral or good after interacting with others (4% of people who post indicated they generally felt bad after interacting). The 60% of



survey participants who do not post online largely indicated that they're concerned about privacy or they simply don't have interest. While privacy concerns are often expected from this demographic, it's important to take these apprehensions into consideration through the design process – digital technologies that seem unsafe or don't clearly communicate privacy protocols may be considered dangerous instead of useful to



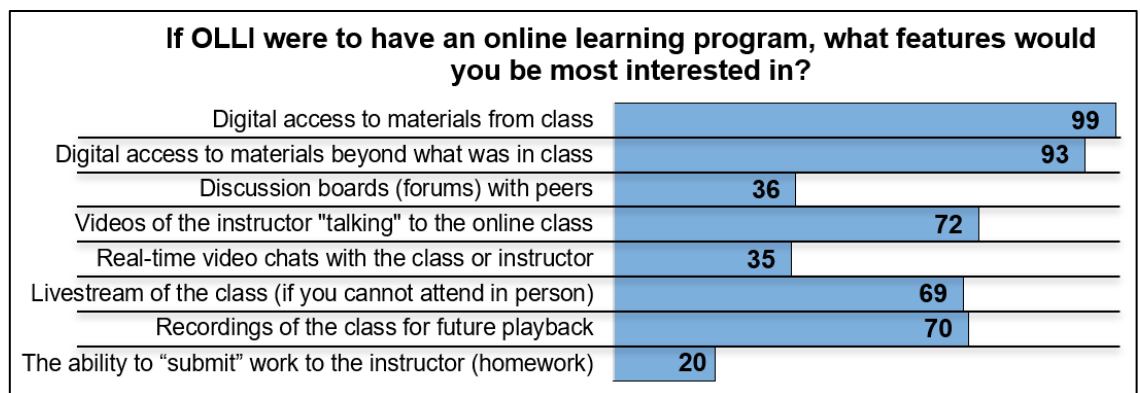
this demographic, which may impact user interaction and experience. The almost 53% of participants that do not post online because they don't have interest speaks to how this demographic may perceive the usefulness (or rather, lack of usefulness) of posting – this is a clear contrast from younger users, who often find meaning, connection, satisfaction, community, and information through posting online. Older users may not perceive posting as useful, which could lead to a decrease in interest.

When asked what the biggest concern for an online learning program through OLLI, 34% of participants stated "ease of use," which implies that they either don't feel like

the digital technologies they interact with at present are not as easy to use as what they would like or anticipate, but it also speaks to a potential anxiety by this demographic that design often is not intuitive for them. Since 51% of participants responded to this question with "none of the above" or "other," it would be beneficial to randomly select approximately five participants from each response to better understand those two large data areas.

Many of the interests or desires by participants for LMS elements are included as standard design for most educational LMSs, including digital access to materials from class, to materials beyond class, to recorded and uploaded videos of the instructor talking to the class, and embedded videos. While "recordings of the class for future playback" and "livestream of the class" are often more difficult for instructors than the other top three interests, this is almost entirely due to the need for external recording and storage equipment (such as cameras, microphones, Cloud storage, for example) and staff or volunteers to maintain the equipment. However, for some universities or campuses that already offer these options to traditional and non-traditional students, this may be easier, and equipment may be built into classrooms or meeting areas.

See Appendix B for all aggregated response data, including more graphs and charts.



Marketplace Research

See Appendix C for a table of LMS and software options currently in the marketplace that could cater to this target demographic or be modified to fit the needs and desires of the target demographic.

Identifying Relevant and Applicable Marketplace Options

Digital spaces and software design, especially Internet-based software applications such as LMSs, are ever-evolving. With the versatility of LMSs within the academic and professional spheres, there are countless LMSs that appear on the market (and countless that are re-branded, sold to other developers, and/or are no longer offered) annually.

The scope and breadth of LMS marketplace offerings is vast, and many are malleable, accommodating, or modifiable to some extent to a client's needs. Some LMSs are open source, while others come with access to information technology officers that can assist the client in changing their LMS code to better fit the needs of their users. Pricing for LMS usage is also variable, with some charging clients per user, others charging clients based on Cloud storage space and other ancillary costs including information technology officer support, and still others with a large up-front LMS development fee for the client and then a monthly or annual fixed rate cost – or the costs could be a combination of any of the aforementioned pricing structures. Since LMS, like other software applications, can be developed by any group or person, some are more safe or accessible than others in terms of their information servers, their information technology support for clients and users, and their assistance in navigating backend and frontend LMS development.

To narrow current viable LMS options for adult education software, SoftwareAdvice.com was used to identify popular and highly-rated LMS, along with simple Google searches for LMS specifically designed for older adults. After the LMS was identified as potentially suitable for the target demographic, the LMS website was researched.

During the LMS research process, the following areas of interest were considered:

- **Does the website list modifiable elements and synchronicity or embeddedness options with other software?** This speaks to the flexibility of the LMS for clients, and if the developer has a desire to allow integration and embeddedness with other platforms (this may include, for this demographic, video or audio software platforms).
- **Does the LMS identify its target market as secondary/post-secondary education clients or professional/continuing education clients?**
 - Some secondary/post-secondary education focused LMS may be too heavily developed in areas not of interest to older adults, such as embedded study games, quizzes and tests, and grades.
 - Some professional/continuing education focused LMS may be too heavily developed in areas not of interest to older adults, such engagement tracking, stand-alone pre-built modules without instructors, and information technology officer support in areas of pedagogy and content development.
- **Does the website list contracts with educational institutions?** If so, this may add credibility to the security of the LMS. Also, the more educational institutions the LMS caters to and works with, the more LMS developers understand the unique and varying needs of its learners and may have built-in accommodations and modifications for diverse learners to be more inclusive and accessible. LMSs that have current contracts with educational institutions may be available to adult learning programs affiliated with those institutions for a more reasonable cost than contracting directly from the marketplace.
- **Does the website note how the developer stores or protects data?** Since privacy is a concern for all web users, but especially for older adults, transparency about the safety and security of data is important.

- **Has the LMS been bought, sold, or re-branded (and how long has it been available)?** These all speak to the reliability of the LMS for clients. LMS that have been bought or sold do not immediately indicate an area of concern, but for clients who desire support from the LMS developer (through information technology officers or in other means), the transfer of LMS design from one developer to another could mean some advertised support isn't as robust as originally intended by the developer. While LMSs that are new to the marketplace aren't necessarily characteristically unfit for the target demographic, LMS that have been able to be flexible in the ever-evolving digital space and have good reviews could be a better match than newer ones.

As previously mentioned, there are numerous OLLIs, including OLLI at ASU to a small extent, that use video conferencing software to mimic livestream or recorded meeting options sometimes available in LMS design. Since these features seem desirable to the target demographic, and many OLLIs are already innovatively using these low-breadth software programs to develop content creation and delivery digitally, video conferencing software was considered in this marketplace research.

As LMS design for adult education programs is considered, it is important to consider the role of the adult education program in design. While many companies or organizations have information technology officers on staff (or a staff member with enough acumen to learn necessary digital skills for projects), adult education programs are often created and run by people in the target demographic (and often volunteers). This means that not only does a desired LMS need to be inclusive and easy-to-use for the user, but also for the client. Often, LMSs that stated they were easy to develop by the client were professional or continuing education LMS, where the client will often create the content design and use pre-build modules to deliver the content to their users. Often, LMSs that had the modifiable features desired by the target demographic but were not advertised as easy to modify by the client – many of the times, they required significant coding expertise and offered pay-for-services options to assist the client.

Over 100 LMS and video conferencing options were identified, and after researching areas of interest, the list was narrowed down to 30. Since the marketplace research was first completed in April 2019, several LMS options that were identified have been bought, sold, or re-branded, and one of the 30 is no longer on the marketplace. Of the 29 remaining LMSs, none listed that they were specifically designed for adult education programs or had a focus of design for older adults.

One of the top options, based on the areas of interest for this marketplace research, is Canvas by Instructure. It is "open source" (see section "Suggested Next Steps: Presentation to Instructure"), is modifiable and allows for embeddedness of other software applications, has contracts with many educational institutions, and openly discusses its security methodology. While Canvas only has certain elements that are modifiable by clients and doesn't have a lot of accessibility options, there are significant opportunities to slightly transform current design elements to make it more inclusive and useful for the target demographic.

Literature Review

See Appendix D “Accessibility and Inclusion in Learning Management System Design: Reviewing Relevant Literature to Create an Online Learning Platform for Lifelong Learners” for the full literature review.

Collecting Relevant and Applicable Academic Literature

Over 150 academic books, journal articles, publications, online articles, and presentations were identified as potentially relevant to the project between January and September 2019. These sources were identified by using search programs and connecting with professionals in the field of adult education programs or technical communication.

Several websites and search programs were utilized, including:

- Academic Search Premier (EBSCOhost)
- Alberta Journal of Educational Research
- ASU Library ONE Search
- Gerontology & Geriatrics Education
- Google Scholar
- International Journal of Lifelong Education
- OBM Geriatrics
- PsycARTICLES
- SAGE Premier
- ScienceDirect
- SocINDEX
- The Gerontological Society of America Journals

Through design and development of the project, the list was narrowed to 40 useful sources, which not only contextualize the relevancy of the project to the fields of adult education programs and technical communication programs (conjunctively and separately) but also discuss the potential impact of the platform prototype and considerations about how to design digital technology for older adults. Identifying academic literature about LMS design specifically for adults ages 50+ was challenging for myriad reasons.

First, academic discourse surrounding lifelong learning and adult education programs, as well as the populations they serve, does not have a formalized or systematic way of labeling its areas of study. Some terms for their studied and served populations include: lifelong learners, learners in retirement, later-life learners, third agers, older adults, aging (ageing), elders, elderly, seniors, and boomers. The populations, depending on the researcher, have different age inclusion markers, including 50, 55, 60, 65, and 70.

Second, much of the academic research surrounding older adults and technology focused on healthcare, with a robust discourse on areas such as determining health challenges and solutions, healthcare websites, healthcare hardware and software, and the usefulness of technology to empower older adults to be their own health advocates. While some of the insight is translatable to designing digital technology for the target demographic, the vastly different desires for development and implementation often impede the potential usefulness of the information.

Third, there is a gap in literature, research, design, and development surrounding LMS design for older adults. Overall, in the field of technical and rhetorical communication, inclusion of older adults in the design process – especially in the areas of user experience and usability testing – is not representative of the number of older adults using various technologies. And, in the field of adult education programs, focus of research and discourse often is theoretical or socially-based; much of the commentary is about why older adults should use technology or studying how they use technology, and not much of the research is focused on designing technology with older adults in mind.

Despite these barriers to identifying poignant and easily applicable literature, the sources used to develop the project were able to be juxtaposed in a way that allowed the two fields of adult education programs and technical communication to harmonically identify areas of LMS design that are inclusive, useful, and accessible to older adults.

Informal Beta Testing

Informal in-home usability “beta” testing informed development by providing perspective on how users interact with the prototype in their spaces, and how that helps or hinders the usability and accessibility of the platform.

Five usability sessions were conducted with adults ages 50+ that were not enrolled in any adult learning programs during May and June 2019. Since the sessions were informal, no notes were taken, but participant feedback was instrumental in developing the prototype. All five participants had low levels of experience with, knowledge of, and comfort with digital technologies.

Users were informed about the project, asked questions about development and use, and discussed the ways they use technology. They were asked ancillary questions to understand the way older adults with lower levels of exposure to digital technologies interpret digital concepts. Some ancillary questions included:

- What does forum mean to you?
- What does module mean to you?
- Do you think most technology is intuitive?
- Do you know anyone currently in college? How do they use technology?
- How did you learn in the workforce?

Users interacted with the prototype on a provided laptop in the space of their home where they usually interact with technology. Prototype interaction sites included: at a desk in an office, on a couch in a living room, and outside under a patio by a pool.

Some feedback included changing the prototype name, slightly changing the prototype font type, re-configuring the organization of the left navigation bar, using elements that looked like “folders,” separating training and support, and having more options than originally intended in the “My Inbox” section.

Academic Support

In the book *Usability of Complex Information Systems: Evaluation of User Interaction*, the author discusses the importance of informal in-home user testing: “The only problem with...pretesting surveys, our own interviews, as well as other user analysis methods, was that not a single piece of data was extracted from students in any sort of environment where they might actually use an online textbook....Had we decided to forgo this field research and ultimately conduct a typical laboratory test, this user behavior would not have been revealed (Still, 90).

The author states after the in-home testing, “although we didn’t acquire easily analyzable information, what we did learn was surprisingly enlightening” (Still, 91). In-home usability testing allows designers to see the way that users will really interact with their creations and provides a space for users to show their desires for design creation. By conducting in-home usability testing for the platform prototype, design concepts that previously were theoretical or anticipatory were able to be compared to realistic usage of the platform by target demographic users.

Focus Group Study

For the collection of qualitative data, three focus groups gave a formative evaluation of the platform prototype and provided valuable insight into how to improve interface and usability.

- **Focus Group 1:** A homogenous group of 5 or 6 OLLI at ASU members who expressed knowledge of or interest in online learning platforms
- **Focus Group 2:** A homogenous group of 5 or 6 OLLI at ASU members who expressed no knowledge of or interest in online learning platforms.
- **Focus Group 3:** A heterogeneous group of 5 or 6 OLLI at ASU members, some of whom expressed knowledge of or interest in online learning platforms, and some of whom did not.

The moderator used questions to facilitate an open discussion between participants about the usability and accessibility of the online learning platform, attempting to glean feedback that would further develop the prototype and enrich user experience. By allowing space for adults ages 50+ to discuss with each other the usefulness and usability of the prototype, frank and realistic feedback was provided by target users.

Academic Support

Participants engaged in a simple usability “beta” test prior to arriving to the focus group. Instructions for the usability test were developed based on concepts outlined in *Rocket Surgery Made Easy: The Do-It-Yourself Guide to Finding and Fixing Usability Problems*, and the script at the beginning of each focus group, introducing the project and protocols and obtaining secondary consent, is largely derivative of the “welcome” script listed in Chapter 8 (Krug, 2010).

From the article “Using Focus Groups to Supplement the Assessment of Technical Communication Texts, Programs, and Courses” by Eubanks and Abbott, the collection used *Premise 1: Listening to Stakeholders* as the guiding principle in the focus groups. By asking participants to beta-test the platform, write lists of elements that were a “plus” or “minus,” engage in moderated discussion through guiding questions, and “natural enough exchange of ideas,” (Eubanks & Abbott, 31) the focus groups will provide invaluable insight into the user experience.

Focus groups better fit the mission and directed outcomes for the project than interviews because they “place participants in a situation that is both structured and quasi-naturalistic” (Eubanks & Abbott, 31): this allows the moderator to guide participants through interior and exterior events and perspectives, similar to an interview, but in a setting where the goal is more easily defined and outcomes are developed by a group for an end-goal, instead of participants interacting one-on-one with a potentially blind understanding of the research goals.

Participant Recruitment and Preparation

A call for participation to participants from the online quantitative survey through an “email blast” in MailChimp was used to recruit participants. Using the “button” function and hyperlinks, enrollment in the focus group study through a Google Form was directly embedded in the email for easy access.

The desire was to have between 12 and 24 focus group participants, and 18 members enrolled in the focus groups (17 members participated, one member did not attend the focus group). At the time of enrollment, participants consented to participating in the focus groups and to being audio recorded during the focus group. Continuing relationships with peer members and satisfaction from participating in a focus group to further research and digital design were outlined as benefits to participation.

After participants opted into the focus group,

1. The moderator divided participants into three groups based on feedback about knowledge of and interest in online learning platforms (provided by the participant at the time of enrollment).
2. Participants were emailed with details of the meeting and asked to:
 - complete a guided beta-test of the online learning platform prototype.
 - list five plusses and five minuses about the prototype that they would be willing to share with the focus group.
3. Participants were emailed a “reminder email” before the focus group meeting.

All members who received the “call for participation” previously participated in the online quantitative survey, so no recruited participants had a barrier to participation based on lack of access to email.

Focus Group Questions and IRB Documents

See Appendix E for the focus group questions and IRB documents. IRB documents include research protocol, recruitment verbiage, consent verbiage, and the IRB exemption notice.

Application and Analysis

Meetings took place in a classroom where participants have potentially taken OLLI at ASU classes, on the ASU Downtown Phoenix campus. This allowed participants to feel comfortable interacting with each other in a space within which they are familiar. The meetings lasted about an hour and were structured with a moderator.

1. Upon arrival, the moderator asked for introductions and gauged participant mood.
2. The moderator asked participants if they had any questions before the focus group began.
3. The moderator read a “welcome” script, introducing the project and the premise of the focus group.
4. At the end of the meeting, the moderator thanked the participants for their involvement.

The three focus group meetings took place at separate times on the same date with the same moderator present for all three meetings.

Feedback from participants in the focus group was full-bodied and varied; some participants understood the purpose of the platform prototype, while others were unsure of its place in their experiences as a lifelong learning community. Within each focus group, participants discussed their background, experience, and perceptions of online learning and the way it impacts their lives.

A quote from each participant summarizes their relationship with online learning; these conglomerated quotes speak to the breadth of knowledge and comfort surrounding digital technologies found in the older adult population. There was a spectrum of insight and understanding among participants – some had significant backgrounds in developing digital technologies, some still engage in new digital technologies as part of their “growth” experience, and some rely on others to assist them with navigating digital technologies. Their professional or personal backgrounds also had substantial variation, which is common among lifelong learning communities in general.

Retired professor:

“In 1984, when I was doing my dissertation, I worked with the first touch-screen computers that were in the country. I developed my dissertation around them...so I had to program everything.”

Judy 1:

“I know nothing about developing anything. I have a live-in consultant when it comes to computers who can help me. Once I’m on the site, I’m pretty good at navigating it.”

Retired engineer:	“I’ve taken all kinds of online learning, continuing education, a statistics class.”
Retired patent attorney:	“I think you have to strike a happy medium to make interfaces that are so-called intuitive – I mean it might be intuitive to your grandchild, but not a lot of them are intuitive to us – so it has to be clear enough for people of all levels of computer experience. That’s a challenge.”
Judy 2:	“I take classes online occasionally; there’s one ASU is doing on one of the space missions and I’m in the middle of that, I’ve done online language learning, and I did one class through UC Berkeley, but it was intimidating to me so I dropped out of that one.” “I’m really comfortable with computers and I’ve done database design, years ago kinda when all of this stuff was coming to the forefront.”
Current federal judge:	“We should assign a 10-year-old to every one of us!”
Sam:	“I’ve taken a few online classes. The one that sticks in my head the most also had a workbook, so it was interactive between the computer-based stuff and the workbook.”
Website developer taking Kahn Academy classes:	“I did take an online course on social media about three years ago, that was pretty interesting. I have ‘gone back to school’ at Glendale Community College. I have a master’s degree, but I’m doing this intro to fiction writing course, and obviously they use a lot of online learning tools... Something called ‘Canvas’? I actually go to class – with a bunch of 20-year-olds – it’s kinda fun.”
Retired attorney:	“The only online education I’ve had is when I got a speeding ticket. I had to spend eight hours online...But also when I was an attorney, they had continuing education online. I found most of the time it wasn’t very worthwhile.”
Betsy:	“I’m not a great computer user.” “I’ve learned a lot of things online, but I wouldn’t call them classes. I get certain emails with just titles that might interest me to read more about. I get one from my doctor’s office, they put out a monthly newsletter, so I read that.”
Retired nurse:	“I do have quite a bit of experience with online learning, I did my entire master’s in nursing through [University of] Phoenix, which is an online program, and my specialty in my master’s program was nursing education, so at the place where I worked we used quite a lot of online education...I worked at Mayo Clinic – we had close to 10,000 nurses around the country, so we had a lot of internal education needs...we used a lot of online learning.”
Member taking Kahn Academy classes:	“I feel like I’m reasonably adept at using the computer”
Retired attorney:	“I spend a lot of time on the computer and on the Internet, not necessarily online learning so much. Although there is that one company, I can’t think of the name of it. They’re constantly sending me brochures with classes that I can download, and I have a bunch of them, I just never seem to find the time to be able to watch them, I have too many other diversions.”

Karen:	“We’ve had a computer in our house since 1980 and our first emails were 1983. There’s not a lot of people emailing longer than that!” “I’ve taken some computer literacy classes before through [lifelong learning] and they act like you’ve never looked at a computer before in your life: this is the on button, this is how you get on Facebook. That’s not exactly what I was looking for.”
Retired teacher (American International Schools):	“The thing is for me with online learning is that I stay too long at the computer. I get up and it’s like ‘UHH! Two hours? What’s happened, what have I done?’ But I have done a lot, you know, as long as I can absorb it.”
Barb:	“I’ve had some brief online learning, not a whole lot. I’m very comfortable with the computer; I have a personal computer assistant – my husband – and he can’t get enough of computers, so it’s very easy because he really works me through it.”
Retired secretary for accounting firms:	“I took a film course at Glendale Community College that was in-person, but you had to do lots of things online. I’m excited about the possibility of expanding the course load and having the option to take online classes.”

In all three groups, despite the variations, all participants recognized the power of digital technologies and were interested in leveraging that power to enhance their lives in some way. This may speak to the nature of the focus group enrollment process, which was done via email, or it may reflect the connective thread among the members – people actively interested in learning and growing to some degree, as shown through their participation in OLLI at ASU.

When asked to discuss the positive and negative design aspects of the platform prototype, the feedback was plentiful and often conflicting: one participant would list an aspect of the design they liked, and another would respond with the opposite reaction to the same design aspect.	The font stood out - it was easy to read	35%	
	It needs more graphics and color	47%	
	I like the name MyTribe	29%	
	I don't like the name MyTribe	24%	
	I like redundancy/repetition of buttons/links	18%	
	I don't like redundancy/repetition of buttons/links	53%	
	I like the control over my profile and settings	47%	
	I'm worried about security and privacy on this site	29%	
	This echoes the plight of older adults engaging with digital technologies in many ways: design that is meant to be helpful can sometimes be viewed as elementary for more skilled users, and design that is more “intuitive” can sometimes be viewed as inaccessible to less skilled users.	The letter icons for class type are cool	29%
		I can't find the letter icons for class type	29%
There are many channels for technical support		41%	
Technical support needs to be more robust and include FAQs		35%	
Easy to navigate, options seem to be readily available		82%	
It isn't navigable enough, there aren't enough options		82%	
I like the amount of access to others		35%	
I'm concerned about the amount of access to others	41%		

The table to the right demonstrates this conflicting feedback. Within each conflict, the positive perspective is listed on the top and the negative perspective is listed on the bottom.

One example of an interaction between participants focused on the navigability of the “My Profile” section, specifically the visibility of personal information to others. In the prototype, “on/off” switches similar to what

is used in the iOS interface (with an accessible yellow being “on” and an accessible grey being “off”) allowed users to hide or show personal information.

User 1: “You click on an icon and it turns from yellow to grey, grey to yellow – I assume that’s on/off – old people like me are more used to green and red.”

User 2: “Colorblind people like me don’t like green and red.”

User 3: “Sometimes I can’t see highlighted yellow, I just can’t see it.”

User 4: “Maybe it should just say on and off!”

This interaction indicates why including user testing with older adults is necessary – it highlights the unique challenges of designing for older adults, and it also provides insight into how to make design more accessible for all users. The final design of the switch was yellow and grey with interior demarcation of “on” and “off.”

Beyond the conflicting feedback, 41% of participants indicated that it was what they expected in terms of layout. One user, a retired nurse, stated “I think the layout followed general concepts...It looked familiar to me even though I’d never seen it before because that left-to-right process was there.” Also, 35% of participants indicated that they wanted a welcome page with information about the platform, with one user, a retired professor, saying “On the homepage, it just says ‘Home’ – welcome me in!”

Interestingly, all participants of the focus group, regardless of their experience or interest in digital technologies or online learning, noted that the platform prototype offers options currently unavailable to them. They generally saw the platform as an “adjunct piece of equipment” (member taking Kahn Academy classes), or as a supplement to taking classes in person, and as OLLI at ASU members they would not pay for it separately, although they would consider having it built into their membership fees.

The response that the platform is a good supplement to learning could be an indication of these specific users’ desires for physical social interaction and/or their current physical mobility. One participant, Karen, said about their current physical mobility: “It depends where you are in life, because when you reach a point that you’re no longer as mobile as we are at this point, it could be that, hey, we still want to take some Osher classes but it’s inconvenient or impossible to for us get to wherever it is, so I think it might be a great thing to do.”

When asked about ways to increase engagement within the platform, some responses from participants included: more videos, accessible audio, live interaction between peers and peers/instructor, the ability to “like” something in the discussion boards, and tips about how to reach out to new friends through the platform.

A couple less skilled users made assumptions that online education does not require financial investment to develop or maintain. A more skilled user suggested that “to make the instruction more personable or more interesting, maybe the online programming could introduce some jokes, some light humor” (retired patent attorney). Another user, Judy 2, compared the platform to a big filing cabinet for OLLI. Many participants appreciated the opportunity to communicate with peers outside of class, something they currently cannot do now unless they’re bold enough to ask a new friend for their contact information.

Though the feedback did not produce one singular next step in terms of designing the platform prototype, the nuanced responses of the individuals and groups highlighted successes of the prototype design and provided options for overcoming the challenges still present in the design. A vigorous re-design of the platform based on focus group feedback allowed the platform to be more inviting, accessible, and useful for users.

Project Completion: Processes and Outcomes

After all research, data collection and analysis, and feedback from target demographic users was integrated into the online learning platform prototype design, the final prototype serves as the actualization of best practices in technical communication for older adults, applied to LMS. Since there is currently no easily accessible LMS (for both developers and users) that utilizes best practices of design or development specifically for adults ages 50+, actively seeks usability feedback from primarily adults ages 50+, or conducts user experience tests with adults ages 50+ as the target demographic, this finalized platform prototype expands the discourse surrounding design for older adults and broadens the boundaries of communication design by introducing new, more inclusive perspectives to LMS design.

There are many design aspects of this LMS prototype that allow it to be more accessible, useful, and intuitive for adults ages 50+. While these design elements may not always be applicable to generally designing digital technologies for older adults, combining them in LMS design does allow for a broader audience of adults ages 50+ to feel empowered and successful in their use and navigation of the system.

For a deeper look into how the modified design elements manifested in the platform prototype, or how they were determined as most beneficial for the platform prototype design, see Appendix D: Literature Review.

To view the finalized platform prototype, visit: abbylbaker.weebly.com/prototype.

Online Learning Platform Prototype Modified Design Elements
Navigation instructions on the home page
User ability to adapt and modify design for accessibility
Accessibility settings on the home page
Off-white background
High contrast between text and background
Symbols that are easily recognizable for digital non-natives
Symbol/text combinations for clickable elements
Large clickable target areas
Minimal pages with scrolling availability/necessity
Minimal visual or textual “noise”
Accessible iconography for older adults (e.g. manila folders)
Easily identifiable buttons and hyperlinks
User control over settings and privacy
User control over notification preferences
User empowerment to interact with design through training
Multiple options for technical support, including phone
Embedded external content (when possible)
Two options for closing pop-up windows
Linear design with consideration to site reader programming
Transcription of video or audio

LMS Design for Lifelong Learners Outcome Wheel

Throughout development of the platform prototype, several themes for inclusive and accessible LMS design for lifelong learners emerged. These were developed into an outcome wheel, which can be provided to current LMS developers as key elements of consideration when designing for adults ages 50+.

At the center of the wheel is the desired outcome, LMS for older adults. Around the center are four major recurring themes in technical communication, technical design, and human-centered design:

1. **Control:** Users want to feel in control of their experience.
2. **Ease of Use:** Users want to feel successful navigating through their experience.
3. **Accessibility:** Users want to be able to access as much of the experience as possible.
4. **Support:** Users want to feel supported by design and through other mechanisms.

These four themes often guide designers and developers as they create new digital technologies with a user-centered approach. If the basis of this project is that current LMS offerings do not successfully provide these four themes in their design for adults ages 50+, then it is necessary to contemplate, through sub-themes, how LMS designers could become more successful at engaging adults ages 50+.

The below outcome wheel names twelve sub-themes that, when integrated into LMS design alongside usability testing and other outlets for target demographic user feedback, would allow for greater success at engaging adults ages 50+.



For a deeper look into how these sub-themes are supported by academic research on older adults, see Appendix D: Literature Review.

Implications for Universal Design

This project, beyond providing LMS design for adults ages 50+, also has implications for Universal Design. Universal Design, as outlined by the Centre for Excellence in Universal Design, has seven main principles:

1. Equitable Use
2. Flexibility in Use
3. Simple and Intuitive Use
4. Perceptible Information
5. Tolerance for Error
6. Low Physical Effort
7. Size and Space for Approach and Use (Centre for Excellence in Universal Design, 2012).

Considering inclusivity of design for older adults often easily translates to design most beneficial to people with diverse abilities, learning capabilities, and experiences through adaptability, flexibility, accommodations, and modifications.

LMS design is often noisy, layered, and not overly accommodating to the diverse needs of users – this means limits on the amount of modifications offered and sometimes content that is completely inaccessible to a group of users that need a specific accommodation or modification.

By considering how to integrate these design elements into LMSs, a developer could dually create an LMS that catered to the needs of adults ages 50+ and catered to the needs or desires of diverse learners. This is potentially important and impactful for mainstream LMSs that have major contracts with secondary, post-secondary, and professional institutions, since many of these institutions have users that could benefit greatly from Universal Design in LMSs.

Implications for Aging with the Population

This project, through providing LMS design for adults ages 50+, has implications for aging with our national and global population. Within lifelong learning communities and adult education programs, there are considerations about how programming can age with the population. When accessibility to standard classes or in-person programming due to physical immobility, health concerns, financial strain, or other responsibilities such as becoming a caretaker prohibits members of these communities from participating, there is a desire to find ways to age with membership and continue providing opportunities for engagement, community involvement, and learning.

When contemplating quality of life across the lifespan, it's important to consider how designers of digital technologies and creators of adult education programs can work together to integrate opportunities for meaningful connection, personal growth, and finding purpose into daily living. LMS integration with adults who are ages 50-70 presently could allow for a higher success rate of digital technology adoption among adults ages 50+ as they become less able to engage in community through traditional mechanisms.

Suggested Next Steps: Eyetracking Study

As a next step in designing this platform prototype, it would be beneficial to conduct a mixed methods eyetracking study. Using technologies such as eyetracking tools allows for more insight into the perspectives of the target user. By juxtaposing quantitative eyetracking study data with a short post-study qualitative exit interview, combined with data collected from this project, there would be more feedback for improvement to increase usefulness and accessibility.

The eyetracking study would provide another opportunity to understand how target users interact with the platform prototype, what areas of the platform they gravitate towards or focus on most, and then determine how to improve areas of concern and highlight areas of success.

Research Question: How will a quantitative eyetracking study, combined with a qualitative exit interview post-study, of the first draft of a prototype LMS specifically designed for digital non-natives in adult education programs (such as OLLIs) inform the further development of the prototype based on user experience and feedback?

Academic Support

The article “Tracking the Mind’s Eye: A New Technology for Researching Twenty-First-Century Writing and Reading Processes,” discusses the usefulness of eyetracking and states that eyetracking methodology “promises to reveal new insights about the psychological, visual, social, and educational dimensions of literate practice” (Anson & Schwegler, 152).

Eyetracking can allow a researcher and developer to understand what exactly a user focuses on, in what order, and for how long, and can then use that information to “supplement and enhance” the “social, cultural, and contextual dimensions” of interactions with screen-based learning (Anson & Schwegler, 163).

Tools and Protocol for Collecting Data

It is suggested to use the Tobii eyetracker and either Tobii or Imotions 7.1 software to complete the eyetracking survey on a laptop computer. Using tools built into the software, such as “replay” and “heatmap” data can be easily organized and analyzed.

After participants opt-in to the eyetracking study,

1. Prior to arrival, participants should receive a confirmation email with details about the eyetracking study and sign a consent form.
2. Prior to the study:
 - The researcher should notify the participants that a “pop up” window will appear on their screen during the eyetracking study with instructions to perform certain tasks within the online learning platform. The participant can click the “OKAY” button in the bottom middle of the “pop up” window to close it and can ask the researcher to repeat the instructions if they forget.
3. The study:
 - Participants will engage the eyetracker with researcher assistance to begin the study.
 - Participants will perform certain tasks in the platform prototype (between 3-10 tasks).
 - The eyetracking process should take no more than 30 minutes, to avoid participant frustration, anxiety, or fatigue.
4. At the end of the study, the researcher should conduct a 5-10-minute exit interview, asking participants how they felt about each of the tasks, thank the participants for their involvement, and answer any questions that arose during the process.
5. The researcher will follow-up the study with a “thank you” email and a link to an anonymous feedback survey (a combination of fixed question, fixed response and fixed question, open response).

Suggested Next Steps: Presentation to Instructure

As a next step in promoting this platform prototype, it would be beneficial to present the prototype, along with the marketplace research and literature review, to an LMS developer. Since Instructure, the parent company of Canvas, has developed Canvas to be somewhat open source, that means that Canvas can be downloaded, changes can be created off of the master branch, and then Canvas can opt to have those changes integrated into their main branch through a “pull request.” A contributor agreement must be on file with Canvas.

According to the website, “Canvas, unlike many projects hosted by GitHub, is commercially dual-licensed. We license Canvas via the AGPLv3 to the open source community, but we also offer Canvas via a subscription to many of our clients. For this to work, Instructure needs to retain copyright over the Canvas project. The contributor agreement is the legal step we must go through so we are able to continue to dual-license and serve our clients without fracturing the codebase. If you want to contribute, as soon as we have a copy of contributor agreement on file for you, we will be happy to accept your pull requests” (Cutrer, 2019).

It may be beneficial to contact Instructure with the prototype to see what feedback the LMS developer provides, and to see if they’re interested in creating a master branch in-house with the accessibility options and layout from the platform prototype, based on user experience research.

The platform prototype was designed to look and feel similar to Canvas, as many secondary, post-secondary, and professional institutions have contracts with Canvas. Since there are many LLIs that are connected to colleges or universities, this could make adoption and integration of the LMS easier and more affordable for the LLI. However, there is no exclusivity based on design – other LMS developers are welcome to integrate design techniques into their code that allows their LMS to be more accessible and inclusive to older adults.

Presentation at ACM’s SIGDOC 2019 Conference

See Appendix F for the poster presentation from the Association for Computing Machinery’s (ACM) Special Interest Group for the Design of Communication (SIGDOC) 2019 Conference.

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Appendices

Appendix A: Survey Questions and IRB Documents

15 pages:

- IRB Protocol
- Recruitment Verbiage
- Online Learning Questionnaire
- IRB Exemption

Appendix B: Survey Response Data

5 pages:

- Aggregated Response Data: Charts
- Aggregated Response Data: Graphs

Appendix C: Marketplace Research Table

4 pages:

- A table of LMS and software options currently in the marketplace that could cater to this target demographic or be modified to fit the needs and desires of the target demographic.

Appendix D: Literature Review

16 pages:

- Full literature review: "Accessibility and Inclusion in Learning Management System Design: Reviewing Relevant Literature to Create an Online Learning Platform for Lifelong Learners."

Appendix E: Focus Group Questions and IRB Documents

12 pages:

- IRB Protocol
- Recruitment Verbiage
- Enrollment Form
- Focus Group Preparation: Guided Beta-Test
- Focus group Questions
- IRB Exemption

Appendix F: Presentation at ACM's SIGDOC 2019 Conference

1 page:

- Poster presentation from the Association for Computing Machinery's (ACM) Special Interest Group for the Design of Communication (SIGDOC) 2019 Conference.

SOCIAL BEHAVIORAL INSTRUCTIONS AND TEMPLATE		
NUMBER	DATE	PAGE
HRP-503a	4/23/2019	1 of 6

Instructions and Notes:

- Depending on the nature of what you are doing, some sections may not be applicable to your research. If so, mark as "NA".
- When you write a protocol, keep an electronic copy. You will need a copy if it is necessary to make changes.

1 Protocol Title

Include the full protocol title: Online Learning Questionnaire

2 Background and Objectives

Provide the scientific or scholarly background for, rationale for, and significance of the research based on the existing literature and how will it add to existing knowledge.

- Describe the purpose of the study.
- Describe any relevant preliminary data or case studies.
- Describe any past studies that are in conjunction to this study.

As a "first step" in researching best practices in the development of an online learning platform for adults ages 50+, I need to start my research by collecting fixed-question/fixed-response quantitative data from currently enrolled members of an adult learning program. I want to gauge member knowledge, interest, and reluctance to interacting with an online platform. The best way to gather data in these areas is to survey members on how they learn in a standard classroom, how students currently use the Internet, and how comfortable members feel interacting with others in digital spaces.

By gathering raw data from current members in a cross-sectional survey, as opposed to more time-consuming or qualitative responses, I can then begin to understand what challenges in member interaction with the online learning platform that creators and integrators will face, and do research on how to overcome those challenges using best practices in information design, content management, and user experience for adults ages 50+.

3 Data Use

Describe how the data will be used. Examples include:

- | | |
|--|--|
| <ul style="list-style-type: none"> • Dissertation, Thesis, Undergraduate honors project • Publication/journal article, conferences/presentations • Results released to agency or organization | <ul style="list-style-type: none"> • Results released to participants/parents • Results released to employer or school • Other (describe) |
|--|--|

The data will be used for academic publications and conference presentations, and will be used in the development of a Masters of Science in Technical Communication applied project.

4 Inclusion and Exclusion Criteria

Describe the criteria that define who will be included or excluded in your final study sample. If you are conducting data analysis only describe what is included in the dataset you propose to use.

Indicate specifically whether you will target or exclude each of the following special populations:

- Minors (individuals who are under the age of 18)
- Adults who are unable to consent
- Pregnant women
- Prisoners
- Native Americans
- Undocumented individuals

I work for Osher Lifelong Learning Institute at ASU (OLLI at ASU), which is one of the largest adult learning communities in the Greater Phoenix Area. I will put out a "call for participation" to segmented Spring 2019 members, all of whom are 50+, current members, and have an email address.

5 Number of Participants

Indicate the total number of participants to be recruited and enrolled: Recruitment - approx. 1000 | Enrolled - approx. 100

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6 Recruitment Methods

- Describe who will be doing the recruitment of participants.
- Describe when, where, and how potential participants will be identified and recruited.
- Describe and attach materials that will be used to recruit participants (attach documents or recruitment script with the application).

I will put out a "call for participation" to segmented Spring 2019 members through an "email blast" in MailChimp, which is the standard way OLLI at ASU sends emails to members. Using the "button" function and hyperlinks, the survey will be directly embedded into that email, for easy access and distribution.

The body of text in the email will ask members to have their Reference Number; this will prepare them to have the necessary information on-hand before beginning, and Reference Numbers are how members "log in" to the OLLI at ASU online registration system, so most members have easy access to this information. If they do not have access to or knowledge of their Reference Number, they may not complete the survey, but I do not foresee this being a barrier to participation. If members have questions, comments, or concerns about the survey, they can either respond to the email directly, or my contact information will be listed in the email.

I hope to gather responses from a minimum of 100 participants in less than one week from the date of the "call for participation." If the first email does not garner 100 participants within the desired timeline, a secondary email will be sent, reminding participants to complete the survey if they have not already.

Since all members who receive the "call for participation" will receive it via email, all participants will have a current email address (which does exclude around 1% of OLLI at ASU membership that does not use email).

Email recruitment:

Hello OLLI at ASU members,

My name is Abby Baker and I am in a master's degree program studying Technical Communication at Arizona State University. I am conducting a study about online learning. Would you be willing to complete a short survey (around 10 minutes of your time) about your learning style and perceptions of online learning?

All you'll need to participate is your name and your 8-digit Reference Number (found in your confirmation email for Spring 2019 classes with OLLI at ASU). Make sure to have your Reference Number handy at the time of the survey! If you need assistance locating your reference number, email me at albaker6@asu.edu or call me at 623.866.8384.

Although there is no benefit to you, your participation will aid in the development of technology for lifelong learning programs. There are no foreseeable risks or discomforts to your participation. Your responses will be kept confidential and the results of this study may be used in reports, presentations, or publications but your name will not be used. Additionally, the results of the study will be shared in the aggregate form only.

[CLICK HERE](#) to complete the survey.

Thank you very much for your interest in my study!

Abby Baker
albaker6@asu.edu
 623.866.8384

NOTE: The study has been approved by the Arizona State University Institutional Review Board for Research Involving Human Subjects (the IRB). Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. You have the right not to answer any question, and to stop participation at any time. The average time it will take to fill out the survey is 10 minutes. You must be a current OLLI at ASU member and have access to an email address to participate in the study.

If you have any questions concerning the research study, please contact me at albaker6@asu.edu or 623.866.8384. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at 480.965.6788.

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7 Procedures Involved

Describe all research procedures being performed, who will facilitate the procedures, and when they will be performed. Describe procedures including:

- The duration of time participants will spend in each research activity.
- The period or span of time for the collection of data, and any long term follow up.
- Surveys or questionnaires that will be administered (Attach all surveys, interview questions, scripts, data collection forms, and instructions for participants to the online application).
- Interventions and sessions (Attach supplemental materials to the online application).
- Lab procedures and tests and related instructions to participants.
- Video or audio recordings of participants.
- Previously collected data sets that that will be analyzed and identify the data source (Attach data use agreement(s) to the online application).

The average time it will take to fill out the survey is 10 minutes. The survey will be open for participation for a day at the shortest and a month at the longest - collection, coding, and analysis of data will be completed within one month of the survey being closed to participants. Surveys will be completed by participants on their own time, in a space and on technology of their choosing.

Demographic information: I will ask participants to provide their email address and unique 8-digit Reference Number from their OLLI at ASU registration. The Reference Number is connected to their membership profile, which not only verifies that they are a current member of OLLI, but also makes it easy to collect specific demographic data without taxing participation energy. By comparing the Reference Number to the email address on file, verifying accuracy of Reference Number data input on the part of the participant will be very easy.

[Click here](#) to see the survey using Google Forms. Some questions listed below build off of participants' answers to previous questions within the survey.

1. In what ways do you use the Internet to learn new information? (select all that apply)
 - a. Emails from companies, organizations, or friends/family
 - b. Google search
 - c. News websites (examples: NPR, BBC, CNN)
 - d. Online forums (examples: Reddit, Quora, WebMD)
 - e. Podcasts
 - f. Social media (examples: Facebook, Pinterest, Twitter)
 - g. Structured online learning courses
 - h. YouTube
 - i. OTHER
2. How do you learn? (Please determine if each learning style is "very useful," "useful," or "not useful." Several learning styles may be identified in any of the three categories.)
 - a. Visual: pictures, graphs, color-coding.
 - b. Auditory: listening, speaking.
 - c. Experiential: action, physical movement.
 - d. Linguistic: reading, writing.
 - e. Logical: analysis, using linear systems.
3. Would you identify as a social or solitary learner?
 - a. Social (interpersonal): You prefer to learn in groups or with other people.
 - b. Solitary (intrapersonal): You prefer to work alone and use self-study.
 - c. A combination of both, but more Social.
 - d. A combination of both, but more Solitary.

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4. Do you take notes when you attend OLLI classes?
 - a. Always!
 - b. Sometimes, it depends on the class.
 - c. Sometimes, it depends on who I'm with.
 - d. Sometimes, it depends on if I bring note-taking tools.
 - e. Never!
5. Do you talk about new learning with others?
 - a. Yes, peers in class
 - b. Yes, friends and family outside of class
 - c. Sometimes
 - d. No, it doesn't appeal to me
 - e. No, I don't have anyone to talk with
 - f. OTHER
6. Have you "posted" (submitted a question, answer, or comment) on an online forum?
 - a. Yes
 - b. Yes, and I post comments on social media, websites, and/or YouTube
 - c. No
 - d. No, but I post comments on social media, websites, and/or YouTube

(if 6a) On a scale of 1-5 (with five being "great"), how do you generally feel after interacting with others in online forums?

(if 6b or 6d) On a scale of 1-5 (with five being "great"), how do you generally feel after interacting with others on social media, websites, and/or YouTube?

(if 6c) Why do you not "post" in online forums or on social media, websites, and/or YouTube? (select all that apply)

 - e. I don't know how to create an account
 - f. I don't know how to delete or edit a "post" after it is "posted"
 - g. I don't want friends/family to see what I ask or say
 - h. I don't want others to respond to me
 - i. I just like to read/watch/listen, not interact with others online
 - j. I'm fearful of spending too much time online
 - k. Privacy concerns
 - l. OTHER
7. Do you pay for access to digital news or learning tools?
8. How much do you pay, approximately, per year for access to digital news or learning tools? *OR* How much would you pay, approximately, per year for access to digital news or learning tools?
 - a. Less than \$50
 - b. \$50
 - c. \$100
 - d. \$250
 - e. \$500
 - f. \$1000
 - g. More than \$1000
9. If OLLI were to have an online learning program, what would be your biggest concern?
 - a. Cost
 - b. Ease of use
 - c. Privacy
 - d. None of the above
 - e. OTHER
10. If OLLI were to have an online learning program, what features would you be most interested in? (select all that apply)
 - a. Digital access to materials from class
 - b. Digital access to materials beyond what was in class
 - c. "Discussion boards" (forums) with peers
 - d. Videos of the instructor "talking" to the online class
 - e. Real-time video chats with the class or instructor
 - f. "Livestream" of the class (if you cannot attend in person)
 - g. Recordings of the class for future playback
 - h. The ability to "submit" work to the instructor (homework)
 - i. OTHER
11. Out of the above features, which would be most important to you?
12. On a scale of 1-5 (with 5 being "extremely likely"), how likely would it be that you would use an online learning program through OLLI?

Demographic information: birth year, gender, ethnicity, new/returning member.

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8 Compensation or Credit

- Describe the amount and timing of any compensation or credit to participants.
- Identify the source of the funds to compensate participants
- Justify that the amount given to participants is reasonable.
- If participants are receiving course credit for participating in research, alternative assignments need to be put in place to avoid coercion.

The 100 participants, at the end of the study, will receive an aggregate analysis of the data I received, as a "thank you" for participation. No compensation will be offered.

9 Risk to Participants

List the reasonably foreseeable risks, discomforts, or inconveniences related to participation in the research. Consider physical, psychological, social, legal, and economic risks.

There are no foreseeable risks, discomforts, or inconveniences related to participation.

10 Potential Benefits to Participants

Realistically describe the potential benefits that individual participants may experience from taking part in the research. Indicate if there is no direct benefit. Do **not** include benefits to society or others.

No benefits will be listed to the participants ("Although there is no benefit to you, your participation will aid in the creation of a new technology for lifelong learning programs.")

11 Privacy and Confidentiality

Describe the steps that will be taken to protect subjects' privacy interests. "Privacy interest" refers to a person's desire to place limits on with whom they interact or to whom they provide personal information. Click here for additional guidance on [ASU Data Storage Guidelines](#).

Describe the following measures to ensure the confidentiality of data:

- Who will have access to the data?
- Where and how data will be stored (e.g. ASU secure server, ASU cloud storage, filing cabinets, etc.)?
- How long the data will be stored?
- Describe the steps that will be taken to secure the data during storage, use, and transmission. (e.g., training, authorization of access, password protection, encryption, physical controls, certificates of confidentiality, and separation of identifiers and data, etc.).
- If applicable, how will audio or video recordings will be managed and secured. Add the duration of time these recordings will be kept.
- If applicable, how will the consent, assent, and/or parental permission forms be secured. These forms should separate from the rest of the study data. Add the duration of time these forms will be kept.
- If applicable, describe how data will be linked or tracked (e.g. masterlist, contact list, reproducible participant ID, randomized ID, etc.).

If your study has previously collected data sets, describe who will be responsible for data security and monitoring.

Only I will have access to the data, and it will be stored first in the Google Cloud (no demographic data will be present in this data, as only the participant's name and Reference Number will be stored). After the survey is closed to participants, data will be stored on an ASU secure server – in the secure server, the data will be coded and analyzed. The raw data and aggregate forms will both be stored in the ASU secure server, and the raw data will be deleted one year after the survey is closed to participants. The aggregate data will inform the applied project and be available to participants through me in an email. The secure server is a network drive on the ASU server. Consent will be given within the completion of the survey but will be parsed out from the rest of the survey data and held on file separately for instances of participant retraction of participation (the consent forms will be codified to match the aggregate data, in order to retrieve participant responses for retraction after the first year).

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12 Consent Process

Describe the process and procedures process you will use to obtain consent. Include a description of:

- Who will be responsible for consenting participants?
- Where will the consent process take place?
- How will consent be obtained?
- If participants who do not speak English will be enrolled, describe the process to ensure that the oral and/or written information provided to those participants will be in that language. Indicate the language that will be used by those obtaining consent. Translated consent forms should be submitted after the English is approved.

I will be responsible for consenting participants. The consent process will take place within the first page of the survey, and it will be a mandatory check-box the participant has to opt-in to.

13 Training

Provide the date(s) the members of the research team have completed the CITI training for human participants. This training must be taken within the last 4 years. Additional information can be found at: [Training](#).

Abby Baker - Jan. 17, 2019

Claire Lauer – Mar. 7, 2015

Hello OLLI at ASU members,

My name is Abby Baker and I am in a master's degree program studying Technical Communication at Arizona State University. I am conducting a study about online learning. Would you be willing to complete a short survey (around 10 minutes of your time) about your learning style and perceptions of online learning?

All you'll need to participate is your name and your 8-digit Reference Number (found in your confirmation email for Spring 2019 classes with OLLI at ASU). Make sure to have your Reference Number handy at the time of the survey! If you need assistance locating your reference number, email me at albaker6@asu.edu or call me at 623.866.8384.

Although there is no benefit to you, your participation will aid in the development of technology for lifelong learning programs. There are no foreseeable risks or discomforts to your participation. Your responses will be kept confidential and the results of this study may be used in reports, presentations, or publications but your name will not be used. Additionally, the results of the study will be shared in the aggregate form only.

[CLICK HERE](#) to complete the survey.

Thank you very much for your interest in my study!

Abby Baker
albaker6@asu.edu
623.866.8384

NOTE: The study has been approved by the Arizona State University Institutional Review Board for Research Involving Human Subjects (the IRB). Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. You have the right not to answer any question, and to stop participation at any time. The average time it will take to fill out the survey is 10 minutes. You must be a current OLLI at ASU member and have access to an email address to participate in the study.

If you have any questions concerning the research study, please contact me at albaker6@asu.edu or 623.866.8384. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at 480.965.6788.

Online Learning Questionnaire

My name is Abby Baker and I am in a master's degree program studying Technical Communication at Arizona State University. I am conducting a study about online learning.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. You have the right not to answer any question, and to stop participation at any time. The average time it will take to fill out the survey is 10 minutes. You must be a current OLLI at ASU member and have access to an email address to participate in the study.

The study has been approved by the Arizona State University Institutional Review Board for Research Involving Human Subjects (the IRB). Although there is no benefit to you, your participation will aid in the creation of a new technology for lifelong learning programs. There are no foreseeable risks or discomforts to your participation.

Your responses will be kept confidential and the results of this study may be used in reports, presentations, or publications but your name will not be used. Your birth year, gender, ethnicity, and status as an OLLI at ASU member may be used, but only in anonymous, aggregate form. Additionally, the results of the study will be shared in the aggregate form only.

If you have any questions concerning the research study, please contact Abby Baker at albaker6@asu.edu or 623.866.8384, or Dr. Claire Lauer at Claire.Lauer@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at 480.965.6788.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

* Required

1. Email address *

2. What is your unique 8-digit Reference Number from your OLLI at ASU registration? *

3. I consent *

Mark only one oval.

Yes

4. How do you learn?

Please determine if each learning style is "very useful," "useful," or "not useful." Several learning styles may be identified in any of the three categories.

Mark only one oval per row.

	Very Useful	Useful	Not Useful
Visual: pictures, graphs, color-coding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auditory: listening, speaking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experiential: action, physical movement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Linguistic: reading, writing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Logical: analysis, using linear systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Would you identify as a social or solitary learner?

Mark only one oval.

- Social (interpersonal): You prefer to learn in groups or with other people.
- Solitary (intrapersonal): You prefer to work alone and use self-study.
- A combination of both, but more Social.
- A combination of both, but more Solitary.

6. Do you take notes when you attend OLLI classes?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Always!
- Sometimes, it depends on the class.
- Sometimes, it depends on who I'm with.
- Sometimes, it depends on if I bring note-taking tools.
- Never!

7. Do you talk about new learning with others?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Yes, peers in class
- Yes, friends and family outside of class
- Sometimes
- No, it doesn't appeal to me
- No, I don't have anyone to talk with
- OTHER

13. On a scale of 1-5 (with five being "great"), how do you generally feel after interacting with others on social media, websites, and/or YouTube?

Mark only one oval.

1	2	3	4	5	
Terrible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Great

14. Do you pay for access to digital news or learning tools?

Mark only one oval.

- Yes *Skip to question 18.*
- No *Skip to question 23.*

15. On a scale of 1-5 (with five being "great"), how do you generally feel after interacting with others on social media, websites, and/or YouTube?

Mark only one oval.

1	2	3	4	5	
Terrible	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Great

16. Do you pay for access to digital news or learning tools?

Mark only one oval.

- Yes *Skip to question 18.*
- No *Skip to question 23.*

17. Why do you not "post" in online forums or on social media, websites, and/or YouTube? (select all that apply)

Online forum examples: Reddit, Quora, WebMD

Check all that apply.

- I don't know how to create an account
- I don't know how to delete or edit a "post" after it is "posted"
- I don't want friends/family to see what I ask or say
- I don't want others to respond to me
- I just like to read/watch/listen, not interact with others online
- I'm fearful of spending too much time online
- Privacy concerns
- OTHER

18. Do you pay for access to digital news or learning tools?

Mark only one oval.

- Yes *Skip to question 18.*
- No *Skip to question 23.*

19. How much do you pay, approximately, per year for access to digital news or learning tools?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Less than \$50
- \$50
- \$100
- \$250
- \$500
- \$1000
- More than \$1000

20. If OLLI were to have an online learning program, what would be your biggest concern?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Cost
- Ease of use
- Privacy
- None of the above
- OTHER

21. If OLLI were to have an online learning program, what features would you be most interested in? (select all that apply)

Check all that apply.

- Digital access to materials from class
- Digital access to materials beyond what was in class
- "Discussion boards" (forums) with peers
- Videos of the instructor "talking" to the online class
- Real-time video chats with the class or instructor
- "Livestream" of the class (if you cannot attend in person)
- Recordings of the class for future playback
- The ability to "submit" work to the instructor (homework)
- OTHER

22. Out of the above features, which would be most important to you?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Digital access to materials from class
- Digital access to materials beyond what was in class
- "Discussion boards" (forums) with peers
- Videos of the instructor "talking" to the online class
- Real-time video chats with the class or instructor
- "Livestream" of the class (if you cannot attend in person)
- Recordings of the class for future playback
- The ability to "submit" work to the instructor (homework)

23. On a scale of 1-5 (with 5 being "extremely likely"), how likely would it be that you would use an online learning program through OLLI?

Mark only one oval.

	1	2	3	4	5	
Extremely unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely likely

24. How much would you pay, approximately, per year for access to digital news or learning tools?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Less than \$50
- \$50
- \$100
- \$250
- \$500
- \$1000
- More than \$1000

25. If OLLI were to have an online learning program, what would be your biggest concern?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Cost
- Ease of use
- Privacy
- None of the above
- OTHER

26. If OLLI were to have an online learning program, what features would you be most interested in? (select all that apply)

Check all that apply.

- Digital access to materials from class
- Digital access to materials beyond what was in class
- "Discussion boards" (forums) with peers
- Videos of the instructor "talking" to the online class
- Real-time video chats with the class or instructor
- "Livestream" of the class (if you cannot attend in person)
- Recordings of the class for future playback
- The ability to "submit" work to the instructor (homework)
- OTHER

27. Out of the above features, which would be most important to you?

Click "Choose" for a dropdown menu.

Mark only one oval.

- Digital access to materials from class
- Digital access to materials beyond what was in class
- "Discussion boards" (forums) with peers
- Videos of the instructor "talking" to the online class
- Real-time video chats with the class or instructor
- "Livestream" of the class (if you cannot attend in person)
- Recordings of the class for future playback
- The ability to "submit" work to the instructor (homework)

28. On a scale of 1-5 (with 5 being "extremely likely"), how likely would it be that you would use an online learning program through OLLI?

Mark only one oval.

	1	2	3	4	5	
Extremely unlikely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely likely

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EXEMPTION GRANTED

Claire Lauer
 CISA: Interdisciplinary Humanities and Communications
 480/828-3881
 Claire.Lauer@asu.edu

Dear Claire Lauer:

On 3/8/2019 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Online Learning Questionnaire
Investigator:	Claire Lauer
IRB ID:	STUDY00009851
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> • IRB Survey.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • IRB Consent Verbiage.pdf, Category: Consent Form; • IRB Consent Verbiage Screenshot.pdf, Category: Consent Form; • IRB Recruitment.pdf, Category: Recruitment Materials; • IRB Protocol.docx, Category: IRB Protocol;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 3/8/2019.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

Demographics

Age of Respondents (self-reported)		
	Number of Respondents	
1924-1934 (85-95)	3	2.11%
1935-1945 (74-84)	42	29.58%
1946-1956 (63-73)	91	64.08%
1957-1967 (52-62)	6	4.23%

Gender of Respondents (self-reported)		
Male	65	45.77%
Female	75	52.82%
Unreported	2	1.41%

Social or solitary learner?		
Social (interpersonal)	15	10.56%
Solitary (intrapersonal)	15	10.56%
Combo, but more Social	39	27.46%
Combo, but more Solitary	73	51.41%

Learning Style

How do you learn?										
	Visual: pictures, graphs, color-coding		Auditory: listening, speaking		Experiential: action, physical movement		Linguistic: reading, writing		Logical: analysis, using linear systems	
Very Useful	114	80.28%	88	61.97%	58	40.85%	92	64.79%	49	34.51%
Useful	26	18.31%	52	36.62%	54	38.03%	49	34.51%	72	50.7%
Not Useful	1	0.7%	2	1.41%	30	21.13%	1	0.7%	18	12.68%

Retention Techniques

Do you take notes when you attend OLLI classes?		
Always!	35	24.65%
Sometimes, it depends on the class.	89	62.68%
Sometimes, it depends on who is with me in class.	0	0%
Sometimes, it depends on if I bring note-taking tools.	4	2.82%
Never!	14	9.86%

Do you talk about new learning with others?		
Yes, peers in class	6	4.23%
Yes, friends and family outside of class	103	72.54%
Sometimes	29	20.42%
No, it doesn't appeal to me	2	1.41%
No, I don't have anyone to talk with	2	1.41%

Online Learning and Interaction

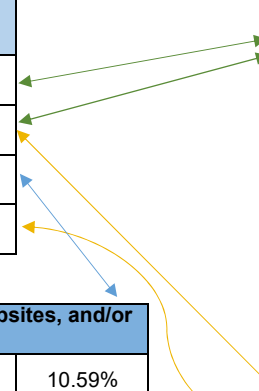
In what ways do you use the Internet to learn new information?		
Emails from organizations or friends/family	110	18.15%
Google search	131	21.62%
News websites	116	19.14%
Online forums	40	6.6%
Podcasts	41	6.77%
Social media	47	7.76%
Structured online learning courses	40	6.6%
YouTube	72	11.88%
OTHER	9	1.49%

Have you "posted" on an online forum?		
Yes	23	16.2%
Yes, and I post comments on social media, websites, and/or YouTube	10	7.04%
No	85	59.86%
No, but I post comments on social media, websites, and/or YouTube	24	16.9%

Why do you not "post" in online forums or on social media, websites, and/or YouTube?		
I don't know how to create an account	9	10.59%
I don't know how to delete or edit a "post" after it is "posted"	6	7.06%
I don't want friends/family to see what I ask or say	3	3.53%
I don't want others to respond to me	7	8.24%
I just like to read/watch/listen, not interact with others online	45	52.94%
I'm fearful of spending too much time online	16	18.82%
Privacy concerns	49	57.65%
OTHER	9	10.59%

How do you generally feel after interacting with others in online forums?		
1 (low)	0	0%
2	3	9.09%
3	22	66.67%
4	8	24.24%
5 (high)	0	0%

How do you generally feel after interacting with others on social media, websites, and/or YouTube?		
1 (low)	0	0%
2	0	0%
3	16	47.06%
4	18	52.94%
5 (high)	0	0%



Do you pay for access to digital news or learning tools?		
Yes	63	44.37%
No	79	55.63%

How much do you pay, approximately, per year for access to digital news or learning tools?		
Less than \$50	9	14.29%
\$50	3	4.76%
\$100	20	31.75%
\$250	22	34.92%
\$500	7	11.11%
\$1000	1	1.59%
More than \$1000	1	1.59%

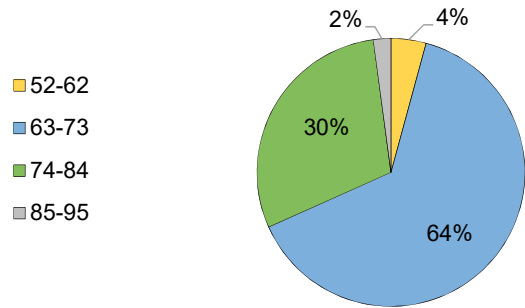
How much would you pay, approximately, per year for access to digital news or learning tools?		
Less than \$50	56	70.89%
\$50	8	10.13%
\$100	11	13.92%
\$250	2	2.53%
\$500	2	2.53%
\$1000	0	0%
More than \$1000	0	0%

How likely would it be that you would use an online learning program through OLLI?		
1 (extremely unlikely)	25	17.61%
2	32	22.54%
3	36	25.35%
4	30	21.13%
5 (extremely likely)	19	13.38%

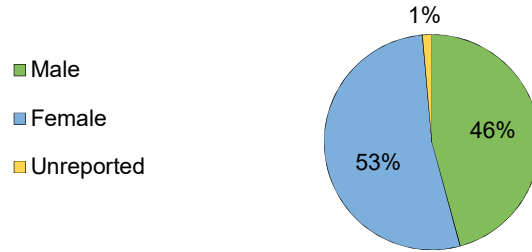
If OLLI were to have an online learning program, what would be your biggest concern?		
Cost	14	9.86%
Ease of use	49	34.51%
Privacy	7	4.93%
None of the above	36	25.35%
OTHER	36	25.35%

If OLLI were to have an online learning program, what features would you be most interested in?	Identified as "most important"			
Digital access to materials from class	99	19.57%	55	38.73%
Digital access to materials beyond what was in class	93	18.38%	20	14.08%
Discussion boards (forums) with peers	36	7.11%	5	3.52%
Videos of the instructor "talking" to the online class	72	14.23%	19	13.38%
Real-time video chats with the class or instructor	35	6.92%	5	3.52%
Livestream of the class (if you cannot attend in person)	69	13.64%	16	11.27%
Recordings of the class for future playback	70	13.83%	20	14.08%
The ability to "submit" work to the instructor (homework)	20	3.95%	2	1.41%
OTHER	12	2.37%	0	0%

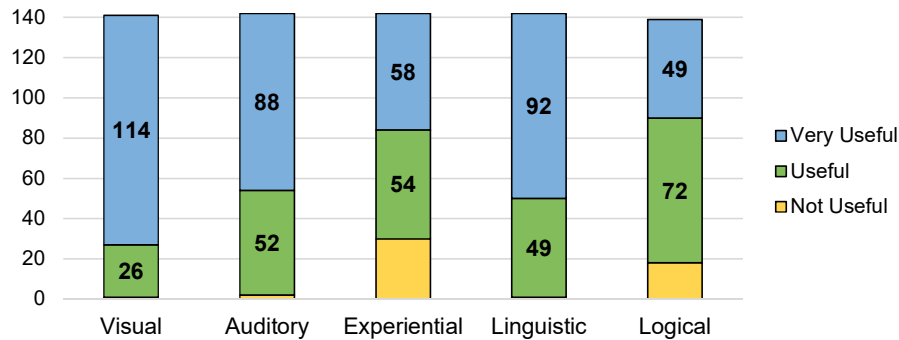
Age of Respondents (self-reported)



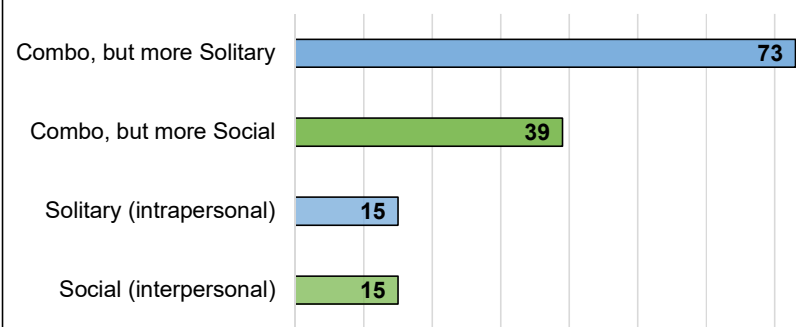
Gender of Respondents (self-reported)



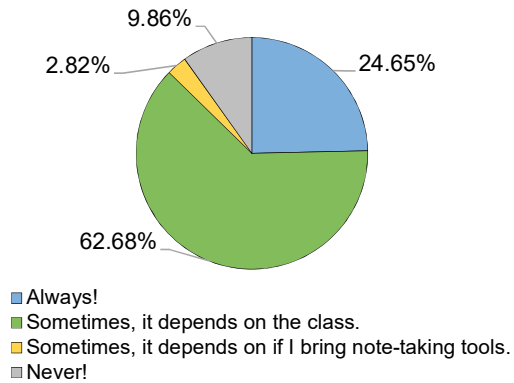
How do you learn?



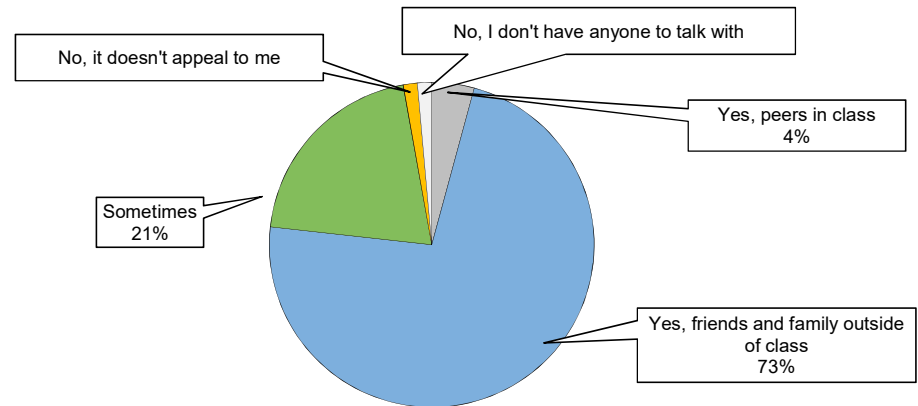
Are you a social or solitary learner?



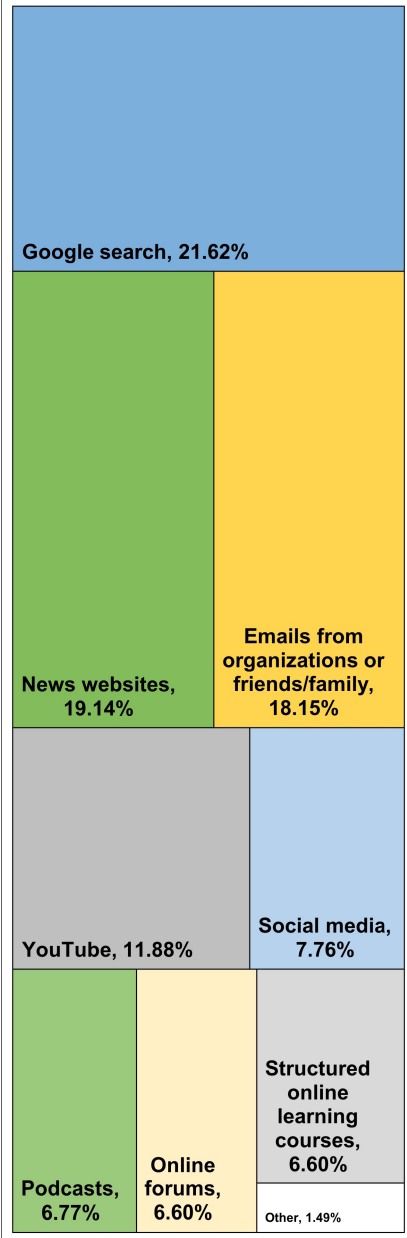
Do you take notes when you attend OLLI classes?



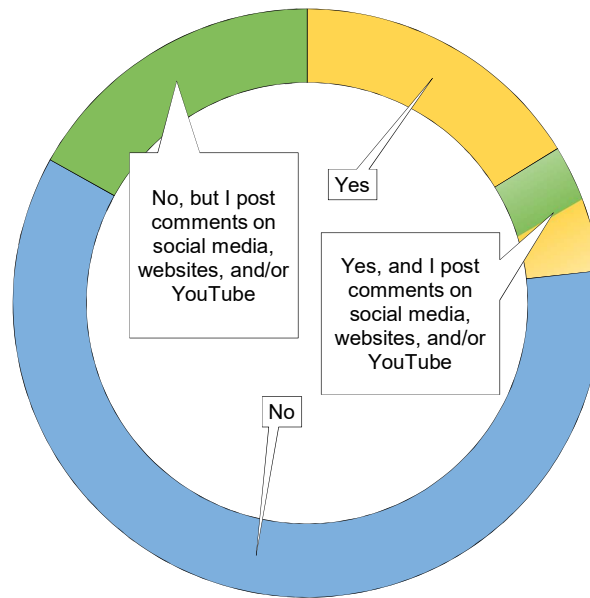
Do you talk about new learning with others?



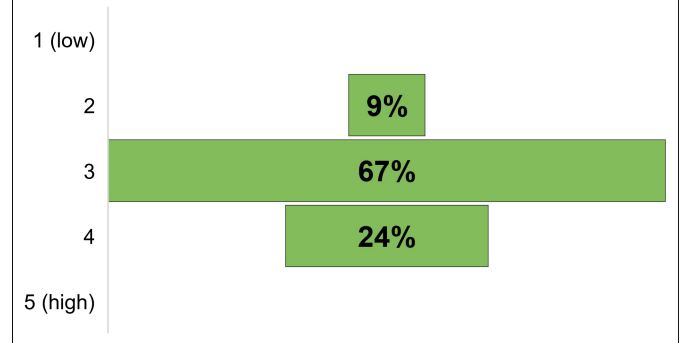
In what ways do you use the Internet to learn new information?



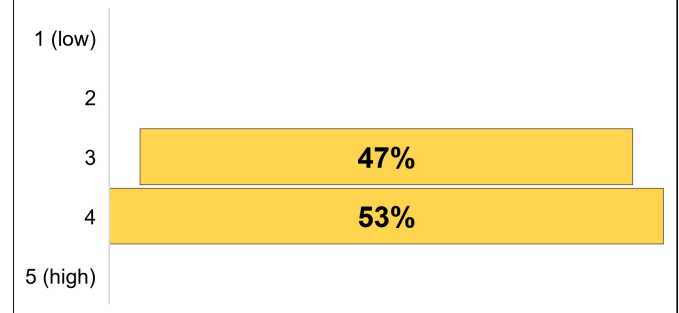
Have you "posted" on an online forum?



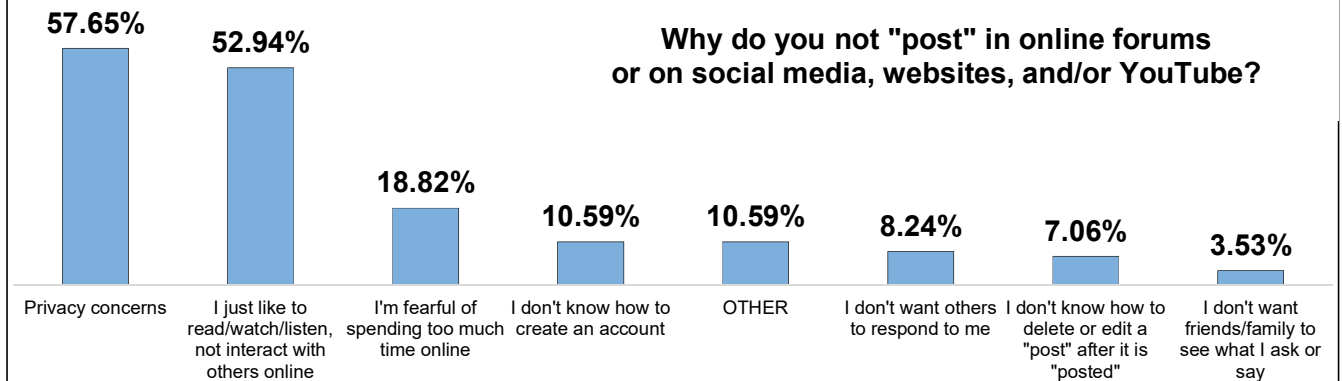
How do you generally feel after interacting with others in online forums?



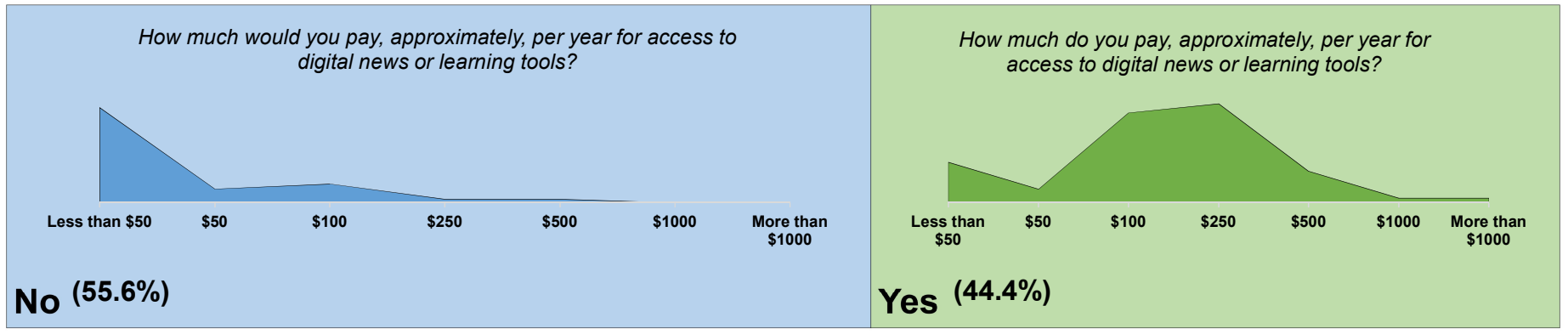
How do you generally feel after interacting with others on social media, websites, and/or YouTube?



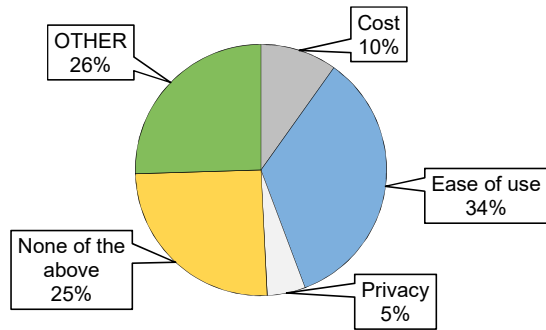
Why do you not "post" in online forums or on social media, websites, and/or YouTube?



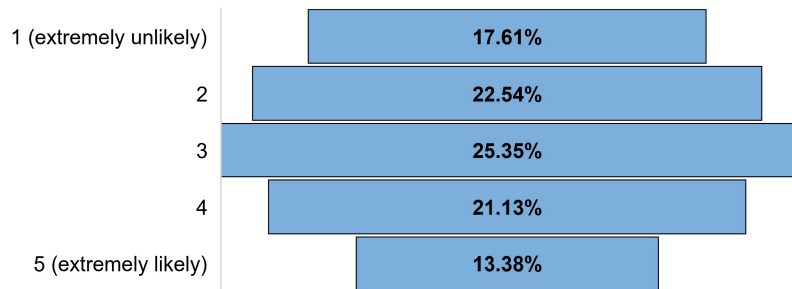
Do you pay for access to digital news or learning tools?



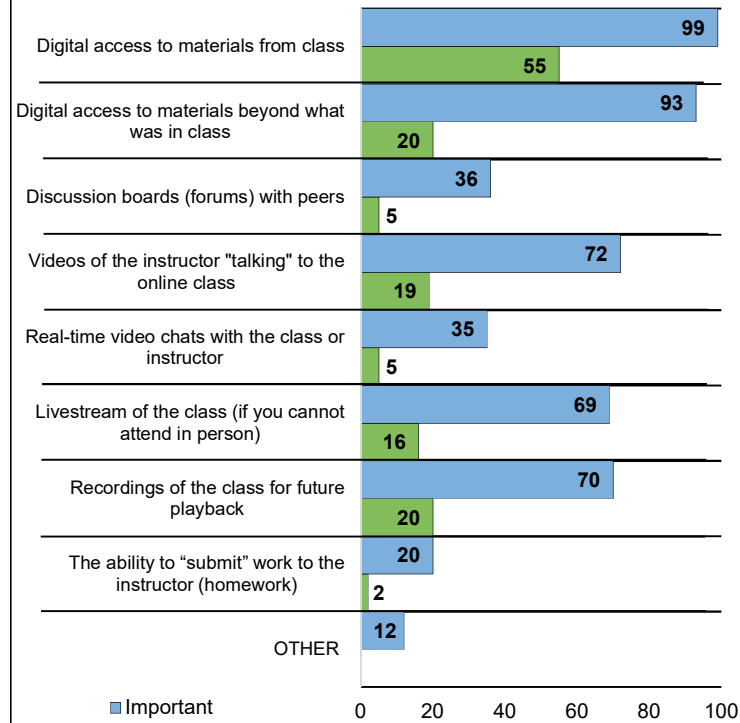
If OLLI were to have an online learning program, what would be your biggest concern?



How likely would it be that you would use an online learning program through OLLI?



If OLLI were to have an online learning program, what features would you be most interested in?



LMS Software	Website	Review	Summary (verbatim from website listed in Review Column)
2U and Trilogy	https://www.2uandtrilogy.com/		The acquisition of Trilogy Education expands 2U's university portfolio from 36 to 68 partners and deepen relationships across both 2U's and Trilogy's partners to make education more accessible for lifelong learners. Adding tech skills-focused boot camps to 2U's existing portfolio of offerings will increase marketing efficiency and extend the company's reach across the career curriculum continuum, which includes short courses, in-person and online boot camps, professional certificates, and graduate degree programs.
Absorb	https://www.absorblms.com/	https://www.softwareadvice.com/lms/absorb-profile/	Absorb LMS is a powerful cloud-based learning management system (LMS) designed to boost engagement and learning outcomes, while still being incredibly scalable and usable. Clients marvel at how quickly they can get up and running, gaining productivity with automated features and reporting, while feeling supported by in-house experts with direct access to the team building the software. Whether you are training internal employees, external audiences or worldwide partners, onboarding staff or developing new skills, Absorb LMS empowers you to thrive by tapping learning technology, proven to scale as your business grows. Users can create unique branding for different departments, customers or clients. Additionally, its responsive learner interface works on any device, includes full e-commerce out-of-the-box and supports xAPI, SCORM and AICC. Absorb takes compliance and data security very seriously, offering WCAG 2.0 compliance for both learners and administrators, SOC 2 Type 2 compliance, GDPR compliance and worldwide AWS servers to power international training operations. Join a growing community of customers building learning cultures—and driving tangible results.
Accord LMS Software	https://www.accordlms.com/	https://www.softwareadvice.com/lms/accord-lms-profile/	Accord LMS supports online courses, instructor-led training, certification and compliance management, gamification, and more. HTML5 content authoring, webinars, eCommerce and HRIS synchronization are fully integrated. Drag-and-drop features streamline the organization of learning content into folders and courses for different groups of learners. Resources such as videos, documents and web assets can be presented and tracked as well. Personalized setup includes the choice of colors, branding and layout. Learner UI templates can be customized for your business. High-performance data management supports clients with over 200,000 learners and 25,000 learning elements. Enterprise clients can take advantage of built-in website management and multi-tenant features to deploy any number of employee, customer and channel partner portals. Accord LMS is primarily a cloud-based application and can also be hosted on-premise servers at client's end. It is Windows, iOS and mobile ready. Pricing is based upon active learners with no hidden costs. Free demos and evaluation portals are available upon request.
Adobe Captivate Software	https://www.adobe.com/products/captivate.html	https://www.softwareadvice.com/lms/adobe-captivate-profile/	Adobe Captivate is an e-Learning Course Authoring tool which allows companies to design learning solutions for employees on any device, to be accessed at any time. Authors can deliver engaging, interactive content, including interactive videos and virtual-reality courses, which go beyond standard slideshows to up-skill employees quicker. Import PowerPoint content and update it into interactive, mobile learning courses.
AdobeConnect (web conferencing)	https://www.adobe.com/products/adobeconnect.html	https://www.softwareadvice.com/voip/adobe-connect-profile/	Adobe Connect is a web conferencing software solution used by companies for conducting online meetings, webinars and training sessions. The solution is for adhoc collaboration as well as planned online meetings. The solution enables online audio and video collaboration across devices (including mobile platforms). Participants using desktops can join meetings without installing any software. Adobe Connect Webinars offers features such as email integration and conference rooms that can be customized by users. The application also includes visualization tools such as polls, chat, whiteboards, and a console for mixing video streams for increasing participant engagement. Adobe Connect has a web-based learning solution designed for interactive training. Presenters can monitor participant engagement, create persistent virtual classrooms, and integrate the software with an existing learning management system (LMS). Features such as games, quizzes, tests, and surveys allow businesses to use Adobe Connect in place of learning management system (LMS). Trainers can train employees directly from their mobile devices. The software is available for a limited period free trial.
Blackboard	https://www.blackboard.com/index.html	https://www.softwareadvice.com/lms/blackboard-learn-profile/	Blackboard Learn is an interactive learning management system (LMS) suitable for higher-education universities, K-12 schools, government and military programs, as well as large businesses in a variety of industries worldwide. The suite features content authoring and virtual classroom capabilities, along with certification management, extended enterprise, and social learning functionality. Available either in managed hosting, self-hosting or software-as-a-service (SaaS) deployments, Blackboard Learn also works on mobile devices so learners can access courses on the go. The system features an in-system calendar so that users know due dates, along with an activity stream so important messages, projects, and courses that need attention surface to the top. Gamification features, including digital badges for learning achievements, are available along with e-commerce functionality so created courses can be resold outside the organization. Pricing is based on the number of FTEs (full-time equivalent learners) that will be using the system on an annual basis and is customized towards the organization's needs.
Blackboard Collaborate Software	https://www.blackboard.com/online-collaborative-learning/blackboard-collaborate.html	https://www.softwareadvice.com/video-conferencing/blackboard-collaborate-profile/	Blackboard Collaborate is an online collaborative learning solution designed primarily for elementary and high schools, higher education and government facilities. Blackboard Collaborate offers a browser-based web conferencing tool to facilitate interaction between instructors and students. It has a classroom chatter feature that offers a chatting platform for students to share text, audio and video content. The interactive whiteboard feature displays PowerPoint slides for engaging multiple participants with a single presentation. Whiteboard content can be added or edited directly from Blackboard Collaborate without opening PowerPoint. Users can personalize their profiles with pictures, videos and other content to facilitate communication. Blackboard Collaborate allows users to share PowerPoint and PDF files with classes without any additional software required. The solution can be integrated with Blackboard Learn to provide a complete learning management system (LMS).
Bridge	https://www.getbridge.com/	https://www.softwareadvice.com/lms/bridge-profile/	Bridge is an employee development platform built specifically for employees and managers. It provides peer-to-peer practice, live in-person training, external learning, online courses, mentorship, manager 1:1s, goal tracking and peer assessment. Other features include off-the-shelf courses, knowledge retention, interactive video, continuous performance management, skills assessment and reporting. With Bridge, learning paths and course offerings can be customized to individual user profiles. The solution also offers the ability for users to stop in the middle of courses and start back in the same spot, even if they're accessing the system from a different device. For administrators and course creators, Bridge offers quiz-building tools based on instructional design practices, performance analytics, customizable logic, and the ability to create and manage groups of learners. Courses can be created within the system itself, or users can import SCORM content. Bridge offers support via email, phone and through an online knowledge base.

LMS Software	Website	Review	Summary (verbatim from website listed in Review Column)
Brightspace Software	https://www.d2l.com/	https://www.softwareadvice.com/lms/brightspace-lms-profile/	Brightspace from D2L is a cloud-based learning management system (LMS) that helps K 12 institutes, higher educations and corporate organizations run both blended and fully online courses. Brightspace comprises of three integrated platforms - learning environment, learning repository and ePortfolio. The Learning Environment from Brightspace allows teachers and instructors to design interactive training courses and evaluate assignments. The solution offers a multimedia environment that allows content creators to use images, videos, audio files and other digital content in their courses. Its analytics tool facilitates performance tracking. Brightspace Learning Repository allows academic institutes and organizations to create, organize and find learning resources in a centralized content database. Users can search content using keywords, ratings, comments or any other business-defined search criteria. The Brightspace ePortfolio is a common platform where learners can share their experience with peers and mentors. Every D2L solution comes with 24/7 customer support via phone and email. Additionally, users can also join Brightspace community or watch video tutorials to learn more about the product.
Canvas	https://www.canvaslms.com/	https://www.softwareadvice.com/lms/canvas-instructure-profile/	Canvas LMS from Instructure is a cloud-based learning management system (LMS) specifically designed for K-5 on up through higher education institutions. Canvas LMS is a scalable platform that can be used to serve education organizations of all sizes and types, from individual classrooms to large universities, and from blended to fully virtual learning. The Canvas platform offers full-fledged LMS functionality including standards-based grade books, formative assessment, course authoring, mobile communication, and integration with a school's SIS and other teaching tools. The Canvas App Center offers mobile-ready teaching tools that can be added to bring new functionalities in the application. Over two hundred different LTI tools allow teachers to customize courses and monitor engagements with their class or individual students. Canvas also offers native mobile apps for iOS and Android devices, allowing teachers, students, and parents to view key information, share and receive updates, or submit results from anywhere and at any time, making for a truly mobile learning experience.
Classe365 Software	https://www.classe365.com/learning-management-system/	https://www.softwareadvice.com/lms/classe365-profile/	Classe365 is a cloud-based learning management system (LMS) and student information system (SIS) suitable for educational institutions. The software helps educators manage their students and course content and offers blended learning tools, discussion platforms and more. Classe365's pre-admission processes allows students to register for classes digitally. Customer relationship management tools include a click-to-call tool and scheduling email follow-ups. Finance and accounting features let users manage grants and scholarships, and analytics reports include student behavior and grades. LMS features include self-paced courses, quizzes and tests, video classrooms and discussion forums.
Coassemble	https://coassemble.com/	https://www.softwareadvice.com/lms/coacoh-profile/	Coassemble is a cloud based learning management solution (LMS) that allows training administrators to create, manage and deliver online education. The solution is compatible with Android and iOS devices and enables users to access and authorize content. Key features include user management, course management, performance tracking and assessments. Coassemble allows trainers to upload text, images, presentations, SCORM content and other related media to create online training courses. It also allows users to design lessons and quizzes using built-in templates to create assessment tests for learners. Coassemble enables users to analyze content performance through live analytics as well as receive real-time feedback on training delivery through content uptake statistics. It also provides a visual display of key metrics that helps training managers to analyze learner's performance. Coassemble services are offered on a monthly subscription basis. The solution provides integration with Salesforce, Intercom, Google suite and MailChimp. Support is available via live chat, a knowledge base, email and over the phone.
Cornerstone	https://www.cornerstoneondemand.com/learning	https://www.softwareadvice.com/lms/cornerstone-hr-profile/	Cornerstone OnDemand is a cloud-based performance management solution. It enables users to recruit talent, customize learning initiatives, generate compliance reports, prepare high performers for succession and more. Cornerstone can also be integrated with a variety of HRMS/HRIS and ERP solutions. Users can track applicants to identify their best sources of talent, initiate and automate the hiring process, manage interviews and customize onboarding plans. Cornerstone also comes with a library of training courses that employees can browse and that managers can assign as-needed. A succession dashboard displays the skills, potential and performance of employees, which helps managers identify colleagues who are ready to take the next step in their career and who needs more training to grow.
Docebo	https://www.docebo.com/	https://www.softwareadvice.com/lms/docebo-lms-profile/	Docebo is a cloud-based LMS solution to provide training programs for employees, partners and customers. Docebo serves various industries including IT, technology, retail, consulting, healthcare, manufacturing, energy, oil and gas. Docebo various features and applications can be enabled or disabled based on the company's needs. Users can deliver content, manage training, track certifications and reward learners through the platform. Privacy settings allow users to grant specific permissions while protecting different customers. It provides unlimited storage, courses, bandwidth and admins. The system can be integrated with third-party applications as well. Docebo offers multi-language support with over thirty different languages, training and customized on-boarding. The system is browser agnostic and accessible via mobile devices and apps for iOS and Android. Docebo Mobile for iOS and Android are white-labeled applications which enables users to use their own logo and brand on each subdomain of portal.
Edmodo	https://www.edmodo.com/	https://www.softwareadvice.com/lms/edmodo-profile/	Edmodo is a cloud-based learning management application for teachers to connect and collaborate with parents and students. The solution allows teachers to create academic groups, distribute assignments and homework, schedule online tests and track student performance. Edmodo also offers collaborative tools for students to post questions, conduct polls and interact with each other. Teachers can award certificates and badges to students based on their performance in online tests and exams. The snapshot feature allows teachers to monitor academic progress, track student performance and view upcoming sessions. Parents can also register with Edmodo and track the academic progress of their child in real time. With Edmodo, educators can categorize their content and can also sell premium educational content and request information from students or parents. Edmodo offers dedicated mobile apps for Android, iOS and Windows smartphones and tablets. Support is available through an online help center.
EdTek LMS Software	https://www.edtekservices.com/	https://www.softwareadvice.com/lms/edtek-profile/	EdTek is a cloud-based learning management system (LMS) suitable for small to midsize training organizations, nonprofits and educational institutions. It operates on a software-as-a-service model and includes a campus portal. The LMS is SCORM, IMS and AICC compliant, and the HTML5 and responsive web design format allows users to access the platform on both desktop and mobile devices. Along with LMS modules such as content authoring, virtual classrooms and certification management, the LMS includes instructional design and course development, instructor training, software upgrades and client service consultants who assist users with implementing and running their programs. An open API allows for integrations with third-party software.

LMS Software	Website	Review	Summary (verbatim from website listed in Review Column)
Education LMS	https://wordpress.org/themes/education-lms/		Education LMS is a simple, clean, responsive and user-friendly education WordPress theme specially designed for university, school, college or other educational institutions. The Education LMS theme has powerful theme customization options such as custom header media, logo, custom menu, social icons, featured slider, courses, title bar, news, and more. It makes your website more engaging and informative. Especially, the Education LMS theme works excellent with Elementor and LearnPress plugins, help you easily create flexible content and sell the course online.
EduME	https://www.edume.com/	https://www.softwareadvice.com/lms/edume-profile/	EduMe is a cloud-based microlearning solution that assists small to large sized organizations with content creation, session scheduling and custom branding. Its key features include employee productivity tracking, role-based access, bite-sized course development and reporting. The application comes with an authoring tool that allows trainers to use predefined templates and create localized content using text, images, links and videos. Team leaders can use the solution's online portal to connect with members and share training modules and updates. Additionally, the system enables managers to segment learners into groups and distribute courses based on roles and requirements. EduMe integrates with the third-party platform Zapier. The solution comes with a mobile application for Android and iOS. It is available on a monthly subscription and support is provided via live chat.
Lessonly	https://www.lessonly.com/	https://www.softwareadvice.com/lms/lessonly-profile/	Lessonly is a cloud-based learning management system that allows users to build, share and track training materials and activity from a singular interface. It is primarily used by customer service teams, sales teams, and human resources. Lessonly is compatible with mobile devices and tablets, making the system accessible on-the-go. Lessonly can be customized to match a company's look by incorporating their logo, colors, and a personalized URL. Users can create unlimited courses and lessons, utilizing text, images, audio, video, and more. Adding individual learners and groups to specific assignments can be achieved with just a few mouse clicks; through a due date feature, notifications are sent by email to ensure courses are completed in time. A support team is on hand to help with questions via live chat, email and phone calls during their regular business hours (EST); they also offer implementation services for new clients.
Mindflash Software	https://www.mindflash.com/	https://www.softwareadvice.com/lms/mindflash-profile/	Mindflash is a cloud-based training solution for contractors, resellers, and other partners of all sizes. With Mindflash, users can create courses, add quizzes and track results. They can upload PowerPoint, Word, PDF, SCORM or video files and create online courses that learners can take on any computer or mobile device. Progress can be tracked in real-time through automated quiz scoring. In Mindflash, users can also manage large-scale training programs by grouping them together in categories, such as "missed deadline" or "gold partners." The system provides reporting tools and can generate reports by group, course, quiz, question or learner. Mindflash offers content support, mobile management, branded training and customer support. It is built to support large-scale training programs. The system can also integrate with Salesforce.
Moodle	https://moodle.org/	https://www.softwareadvice.com/lms/moodle-profile/	Moodle is a free, open-source learning management system (LMS) available to users in corporate and academic settings. It allows course administrators to extend users' education beyond the classroom or office. Private websites can be created and customized to include dynamic courses that engage learners and allow their progress to be tracked and reported. Moodle's focus is on usability, and includes customizable themes and a wide range of modules and features. Individual learners can be tested through assignments and quizzes, and collaboration can be promoted through user-generated wikis, workshops and forums. Gamification features such as rewards, leaderboards and hidden easter eggs help keep learners engaged, while freely available plug-ins and add-ons allow course administrators to create a learning environment that fits their needs. Moodle is Web-based and comes with over 100 language packs for use in most parts of the world, along with the global network of certified Moodle Partners available to assist with integration and customer support.
Saba Cloud Software	https://www.saba.com/	https://www.softwareadvice.com/lms/saba-hr-profile/	Saba Cloud provides companies across the globe with a cloud-based learning and talent management application designed to drive employee engagement, elevate skills and improve business productivity. Saba Cloud provides traditional talent management features that include course building, learning management, performance management, goal tracking, succession planning, and recruiting. The solution offers personalized and relevant content recommendation to learners. The web and video meetings embedded into the content, help learners collaborate with the tutor during the training. Saba Cloud offers traditional classroom instruction with virtual classrooms and recording functionalities. With the personalized dashboard, teachers can track learner's progress, evaluate test scores and see how different pieces of content are performing in terms of engagement. Businesses can also integrate their KPIs with learning performance, and define employee promotion structure. Saba Cloud offers instant access to thousands of learning courses available online. Each learner gets a personalized portal to view content history, pending courses, scores and rewards achieved. The solution is suitable for midsize to large enterprises across a wide range of industries including airline, energy, healthcare, retail and financial services.
Schoology Software	https://www.schoology.com/	https://www.softwareadvice.com/lms/schoology-profile/	Schoology is a cloud-based learning management solution specializing in curriculum management, course instruction and system-wide resource sharing and collaboration. Users can upload course content and assignments into the database to create their website, which is hosted by the vendor. From there, dynamic content creation tools and a rich text editor allows for the creation of content and lessons. HTML and CSS tools are also available to keep lessons as visually simple or complex as desired. From the website, each student's profile can be viewed to gauge progress. Color-coded workload thresholds will show if any students are overloaded. With web-based and native apps for iOS, Android and Kindle devices, Schoology allows students and faculty to collaborate and learn from anywhere. From system-wide district announcements to messages with customizable roles and permissions, users can access only the tools they need. Other capabilities include third-party software integration, student performance tracking, a system-wide grading scale setup, audio and video recording and advanced analytics and reporting. Schoology is free to educators in K-12 public and private schools, colleges and universities worldwide. An enterprise version is also available, with pricing varying per implementation.

LMS Software	Website	Review	Summary (verbatim from website listed in Review Column)
TalentLMS	https://www.talentlms.com/industries/education	https://www.softwareadvice.com/lms/talentlms-profile/	TalentLMS is an award-winning, cloud-based LMS for those looking to build online courses for any purpose in a few easy clicks even with zero experience. TalentLMS offers functionality for course authoring, user testing, extended enterprise, teaching and training administration and e-commerce for small and midsize businesses and schools. The platform's course builder offers embedded content tools for video, audio, SCORM, xAPI and flash content, along with search functionality to find and embed YouTube videos, SlideShare presentations, Wikipedia articles and more into courses. All lessons are optimized for presentation on desktops, tablets or smartphone devices. Fixed and randomized testing is available to assess information retention and a variety of questions can be created and reused across courses. Learning portal UI is customizable and can be assigned to any URL, while branching and custom user-types ensure users only have access to what they need. Virtual classroom video conferencing is also available to facilitate blended learning. Users can opt for getting billed monthly or annually. All plans include unlimited email support and live support is available on the Premium plan.
Teachable	https://teachable.com/	https://www.softwareadvice.com/lms/teachable-profile/	Teachable is a cloud-based learning management solution used by small and midsize businesses. The solution allows users to create and share online courses by adding audio, video, images, text and PDF files. Students can access these courses across devices such as computers, tablets, and smartphones. The solution enables users to create online quizzes and certificates to evaluate students' progress. Google Forms are included to collect course feedback. Targeted emails can be sent based on filters such as enrollment, course completion and code redemption. The solution integrates with Zapier to provide access to tools such as Intercom, Olark, MailChimp and Zendesk. Teachable's dashboard provides an overview of student signups and revenue across a defined time period. In addition, users can incentivize enrollments by creating discount coupons. Advertising effectiveness can be tracked by adding conversion pixels to their website. The solution is available on a subscription basis and support is provided via an online ticketing system.
Thought Industries	https://www.thoughtindustries.com/	https://www.softwareadvice.com/lms/thought-industries-profile/	Thought Industries offers a cloud-based learning business platform designed to suit the needs of varying business sizes across multiple industries. All of the frontend learning experiences are customizable to be adapted for businesses in accounting, for-profit training and education, medical, media, banking, consulting, legal, and several others. Key functionalities of the platform include drag and drop course authoring tools, a custom microsite and page builder, learner management capabilities, eCommerce integration, certification management, social learning and discussion boards, gamification, mobile learning, in-depth reporting and analytics, and SCORM compliance - all within one integrated suite. Learning sites are customizable through design management tools. Courses and certifications can be created using interactive authoring functionality. Discussion boards and galleries are provided within the system as well. Thought Industries' learning business platform is a browser agnostic system. It is compatible with both desktops and mobile devices.
Tovuti	https://tovuti.io/	https://www.softwareadvice.com/lms/tovuti-profile/	Tovuti is an all-in-one, cloud-based solution designed to activate the potential of organizations through creating, delivering and tracking online training and education. The end-to-end solution gives users everything they need to build awesome eLearning programs, whether they're training their team, their partners or their customers. Features include: Course authoring, interactive content (including interactive video), live video conferencing, social communities, gamification, badges/certifications, reports/analytics, quizzes/assessments, user management, event management, eCommerce, subscription management, notifications (including geofenced notifications), instant messaging, blended learning, micro-learning, asynchronous learning, synchronous learning, directories, mobile learning and more. Tovuti also offers a full content management system (CMS) and the ability to host one or more websites with different branding, through its brand manager. Additionally, Tovuti has a library of 7,000 courses on HR training, compliance and professional development. Tovuti was designed to make training interactive, social and gamified – so your learners WANT to learn. And creating content is quick and easy. The built-in course authoring tool can either consume your existing content or can empower you to create more than 40 types of highly interactive content. And because everything is in one easy-to-use solution, you'll save time and money, and be able to report on your learners' entire journey.
UpAbility Software	https://www.memberclicks.com/learning-management-software	https://www.softwareadvice.com/lms/upability-lms-profile/	UpAbility is a learning management system (LMS) specializing in live-event streaming and recording. Other key features include content management and member engagement, as well as e-commerce. The solution is best suited for associations and nonprofits. In the system, users can create a content library and reuse existing recordings to bring in non-dues revenue. UpAbility allows users to customize their LMS, adding branded logos, menus and colors. Additional features include certification and compliance management, content authoring, social learning, mobile learning and course libraries. UpAbility also offers optional recording and video production services to help users capture and upload content to livestream or include in their content library. UpAbility offers personalized training for users setting up new systems. They serve clients in education, finance, health care, government, investor relations, information technology, legal, sales and marketing.
Zoom (web conferencing)	https://zoom.us/education	https://www.softwareadvice.com/video-conferencing/zoom-profile/	Zoom is a cloud-based video conferencing, group messaging, and online meetings solution for the educational, financial, health care, and government sectors. It is compatible with both PC and mobile devices. Users can incorporate HD videos and audio to meetings and make them interactive. The built-in collaboration tools allow multiple employees to share their screens and interact during meetings. All meetings, passwords, and other data are end-to-end encrypted in the system. The system can also generate searchable transcripts. Virtual backgrounds create a meeting-ready setting. Users can also track the engagement of participants with an attendance indicator. Engagement can be improved with polls and Q/A sessions. Zoom makes it easier for users to schedule and commence conferences by syncing with Outlook, Gmail, or iCal calendars.

**Accessibility and Inclusion in Learning Management System Design:
Reviewing Relevant Literature to
Create an Online Learning Platform
for Lifelong Learners**

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Introduction

In the research and development of an online learning platform prototype specifically focused on adults ages 50+, to broaden the boundaries of communication design and expand the impact of adult learning programs, a review of past and current literature surrounding older adults and technology identified areas of learning management system (LMS) design that would be most beneficial for adults ages 50+.

As noted in “Accessibility and Inclusion in Learning Management System Design: Creating an Online Learning Platform for Lifelong Learners,” the collection of relevant and applicable literature was challenging because:

1. academic discourse surrounding lifelong learning does not have formalized, systematized vocabulary,
2. much of the literature about older adults and technology is focused on healthcare, and
3. there is a gap in literature, research, and development surrounding LMS design for older adults.

However, this review of literature will discuss relevant and applicable sources that – despite many of the sources not specifically discussing LMS design for older adults – when juxtaposed, create a narrative about LMS design elements most beneficial for adults ages 50+.

To organize the literature, areas of interest were divided into four major themes (control, ease of use, accessibility, and support), each with three sub-themes. Figure 1, the “LMS Design for Lifelong Learners Outcome Wheel,” organizes the themes in a circular manner to indicate that although they may be able to be organized in a linear manner, the most authentic representation of their interconnectedness is in non-linear, flexible conceptualizations. These twelve sub-themes, when integrated into LMS design alongside target demographic user feedback mechanisms, allow for greater success at engaging adults ages 50+.

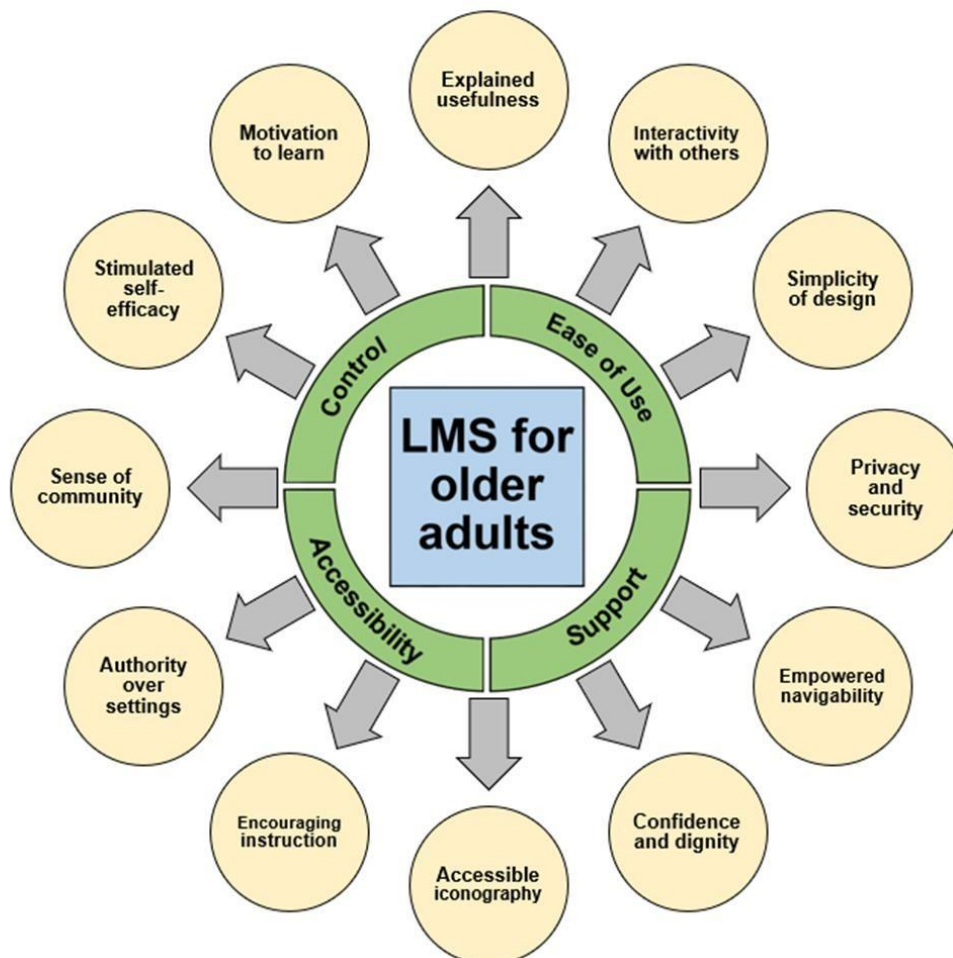


Figure 1: LMS Design for Lifelong Learners Outcome Wheel

The amount of technology acumen necessary to navigate modern life increases constantly as the flow of information shifts from traditional communication methods to now communication being “supported by [computer and Internet-based technologies] and, fundamentally, by Internet services” (Castilla, et al., 2018). Older adults must not only overcome anxieties surrounding the physical, mental, and emotional acquirement of new technologies, increase their understanding of safety in digital spaces, and overwrite past approaches to accessing, storing, and sending information, they must do so quickly – before new technological developments invalidate their progress. “The elderly represent one of the groups most affected by the digital gap with limited access, knowledge, and use of Internet, and their prior experience is mostly related to analogue references and linear information structures” (Castilla, et al., 2018).

It is imperative that digital designers work hard to not only close the digital gap through increased access to hardware, but also that they design software and systems with older adults in mind. As stated in the book *Solving Problems in Technical Communication*, “not only must technical communicators lead the research effort to learn about users, they must also represent the knowledge gained about users – their goals, their needs, their preferences – in the design process” (Hart-Davidson, 2013).

In the article *The attitudes, impact, and learning needs of older adults using apps on touchscreen mobile devices: Results from a pilot study*, researchers conducted an eight-week apps-based technology training course with 20 older adult participants with a mean age of 69.5. At the end of the course, three major themes emerged, all of which supported previous internal and external studies:

- participants with positive perceptions of Internet and application use prior to the course have increased motivation to keep learning,
- prior experience – both educational attainment and casual Internet usage – can be an important asset for learning technology, and
- a supportive environment assists in overcoming learning barriers (Chiu, et al., 2016).

These three themes tend to recur in literature surrounding older adult adoption of new technology. Academics and practitioners must understand how to better cater to the needs of older adults as they not only interact with new technologies, but also become more embedded in familiar or adopted technologies.

According to research from Martínez-Alcalá, et al., the educational model toward digital literacy for older adults should include 1) usefulness of learning, 2) cooperativeness and collaboration, 3) fostering social inclusion, and 4) promoting autonomy (Martínez-Alcalá, 2018). These four aspects of increasing embeddedness in previously adopted technologies, combined with the three themes in new technology adoption identified by Chiu, et al., are the theoretical framework through which the “LMS Design for Lifelong Learners Outcome Wheel” developed.

In consideration of practical design, the book *Designing User Interfaces for an Aging Population: Towards Universal Design* identifies several considerations of designing for older adults, including the physical, mental, emotional, cultural, and environmental impact through aging on interactions with technology – both technology that is new to the user and adopted technologies (Johnson & Finn, 2017). These considerations of digital design, alongside other research in technical communication, cyberpsychology, and older adult technology use, provide practical applications of accommodations for older adults in design as listed in the outcome wheel.

Through the next four major themes – control, ease of use, accessibility, and support – three highly correlated sub-themes will outline how consideration in LMS design for older adults would enhance user experience and lead to more engaged and empowered users. However, it is important to consider that all twelve sub-themes are inter-related and interdependent, thus this framework only provides the basis upon which LMS design can begin to meet older adult user needs.

1. Control

1.1 Authority over settings

As with any conversation regarding older adult users, it is imperative to begin with the recognition and celebration of “older adults [as] a disparate and heterogeneous group with regards to their digital technology use because their past employment, motivation, and existing knowledge varies” (Hill, Betts, & Gardner, 2015). This means that settings must be readily accessible, diverse, and flexible. Many settings within LMS design for older adults may be unique to older adults, but they lean toward universal design, including accommodations and modifications for low- or no-vision users, low- or no-hearing users, and users that have physical mobility limitations.

In the book *Designing User Interfaces for an Aging Population: Towards Universal Design*, some examples of ways to increase user authority over settings include:

- “Make it easy for users to enlarge important text by providing a highly visible control to do so”
- “If possible, give users a screen pointer (cursor) that is larger than the usual size”
- “On mobile touch-screen devices, wherever possible allow users to input data via gestures rather than by typing on a keyboard”
- “Ensure that a text-to-speech function is available, either in your software or in the underlying platform, so users can hear the text being read out loud”
- “Provide an easy way for users to replay audio messages”
- “Give users an easy way to adjust the play speed of multimedia content”
- “Allow users to choose alert sounds”
- “Allow speech input...But don’t require speech input”
- “Allow users to adjust aspects of the display, such as font size, color contrast, sleep timeout duration, audio volume, or text-to-speech speaking rate” (Johnson & Finn, 2017).

It is similarly important to remember that desired “settings” may be broader for older adult users than designers typically consider. In the article *Control and Personalization: Younger versus Older Users’ Experience of Notifications*, ten older adults, median age of 61, were interviewed regarding Internet-connected technology notifications. Three of the older adult participants “expressed harshly negative views of how notifications felt dis-empowering and out of their control” (Janzen, 2018). One participant “didn’t want to feel dependent upon them, and didn’t like how they infringed upon face-to-face time,” and “felt like her attention and emotions were being manipulated by notifications” (Janzen, 2018). Another participant was concerned because “notifications made him feel like he was no longer in control of his time,” and the third “felt that he could not stand to be so constantly connected” (Janzen, 2018).

Feeling like technology is controlling personal experience, instead of the opposite, can be daunting to overcome for some older adults who value independence and personalization. This specific study found that for older adults, the way they organize data could be different than standard notification settings allow; standard notification settings allow users to change “what” and “how” – older adults care more about “when,” “why,” and “where” (Janzen, 2018). By considering how authority and control over experience and impact can be placed back into the hands of the older adult user, designers can avoid some aversions to and disdain for technology some older adult users experience.

Depending on the technology being developed, the reorganization or re-purposing of notifications via SMS, pop-up, or email could be beneficial in allowing users to feel more in-control of their experience. Within LMS design, some older adult users may prefer to select why they are being notified, and where they are notified, instead of having a small number of options buried deep within the platform. Having readily accessible settings – for notifications and all other options available to users – means considering how those settings will be in a shallow hierarchy within LMS design, and how they can be highly visible within the hierarchy.

1.2 Privacy and security

In digital design for older adults, it is necessary to earn users' trust, as "they tend to show more fear than younger adults do of the hazards of using digital technology: viruses, hackers, unauthorized access, and spam. For example, one study found that older adults are less likely than younger adults to download files from the Internet [and]...to put personal information online, both for e-commerce and for social networks, out of fear that someone could misuse the information" (Johnson & Finn, 2017).

Sergey Polyuk, in an article for Toptal Designers called "Age Before Beauty – A Guide to Interface Design for Older Adults," discusses in-practice design elements for older adult users, including accessible privacy settings and security transparency (Polyuk, 2019). The article states that designers should "strive to be transparent about how information is used, and be forthcoming about any data breaches to ensure trust is maintained among older users" (Polyuk, 2019). Another design idea from *Designing User Interfaces for an Aging Population: Towards Universal Design* is to only ask users for information that is necessary, and to explain why the information is necessary (Johnson & Finn, 2017).

In one study, users were introduced to new technology and their perceptions of technology were tracked. Researchers in this study found "data suggested that once their initial fear of breaking the technology was overcome or removed, this was then replaced with a new fear associated with security and the vulnerability of both themselves and the technology" (Hill, Betts, & Gardner, 2015). This alludes to not only the need for designers to be transparent about privacy and security, to provide context for why information is being gathered or stored, and to create privacy and security settings, but also to understand that older adult users may mistrust themselves. This makes it necessary for designers to empower and train users to understand how and when to share information, and how and when to not share – allowing users to trust themselves more.

1.3 Stimulated self-efficacy

Some older adult users may be wary about, afraid of, or disinterested in computer and Internet-based technologies – "emotional attitudes such as self-efficacy, comfort, and interest are predictive of perceived usefulness and perceived ease of use. Elderly users are likely to be influenced by their emotional experience, which may affect their future intention to use [computer and Internet-based technologies]" (Castilla, et al., 2018). If the way older adult users feel about their ability to successfully use technology informs their perceived use of and desire for that technology, then providing opportunities for success within design is necessary for their user experience.

The research and implementation most often used to stimulate self-efficacy in older adult users is through in-person or blended learning with knowledgeable users of the technology. One study where computer and Internet-based technologies were introduced into assisted and independent living communities through in-person and blended learning with instructors found that many participants in the study "had fears and difficulties associated with learning new technologies; however, with an intervention that catered to their specific needs, the participants were able to confidently engage themselves in a new learning experience" (Berkowsky, Cotten, Yost, & Winstead, 2013).

Research points to this being one of the most successful ways to introduce new technologies to older adult users. However, interventions to increase self-efficacy are not easily scalable; for LMS design, with the intent to reach large numbers of diverse learners through digital technology alone, this is not feasible. It is then the responsibility of the LMS designer to find ways to stimulate self-efficacy through design alone.

Within LMS design for older adult users, self-efficacy can be encouraged in a variety of ways. "Research has shown that the ability to learn a new set of skills, such as learning to use a computer, is reduced in older adults....While older adults have greater trouble learning new information, they are able to access and use information and skills they had previously acquired" (Berkowsky, Cotten, Yost, & Winstead, 2013). This means that through building on prior knowledge – including experiences separate from technology use – users can

acquire new skills as they continue to use the design. This increases satisfaction within the user, and potentially could increase both perceived usefulness and perceived ease of use.

Some ways LMS design can stimulate self-efficacy within the system, from *Designing User Interfaces for an Aging Population: Towards Universal Design*, are to:

- Make sure users can hit desired targets; maximize opportunities for accuracy
- Provide immediate feedback; prominently show the success or failure of every user action
- Allow users to cancel or undo actions easily, if possible
- Design to prevent errors:
 - Minimize the impact of errors on users by not allowing users to enter invalid values
 - Offer examples of acceptable values and inputs
 - When possible, pre-structure inputs or reformat input data to the system's preferred format
- Support easy error recovery, and request user confirmation for functions that do not have easy error recovery
- When there are errors, describe the problem and how to recover from it
- Avoid blaming or frightening language in error messages
- Make language active, positive, and direct
- Label links clearly so users can predict navigation
- Help users successfully search using "smart" search functions
- Create software that can fix user errors without showing error messages, when possible
- When providing instructions, do not assume prior knowledge (Johnson & Finn, 2017).

2. Ease of Use

2.1 Explained usefulness

As technology intensifies in presence and impact during daily life, "an increasing number of older adults are expected to use Internet-based services – health, education, finance, and others...Furthermore, this population has shown considerable interest in learning how to use [computer and Internet-based technologies], to stay socially connected, to access instant information, and to perform everyday tasks such as shopping, traveling, and banking" (Martínez-Alcalá, 2018). Older adults recognize that there are many tasks that can be completed through computer and Internet-based technologies that would make their lives easier or more enjoyable, and many are interested in participating in those activities.

However, somewhat contradictorily, in the study by Chiu, et al., research found that "participants continued to surf the Internet and use applications if they believed they were useful; in contrast, if they saw no purpose for it in their lives, they did not adopt the Internet and applications" (Chiu, et al., 2016). This points to the digital gap discussed in the introduction of the literature review – older adults recognize that these technologies have benefits, but don't know how to access them or how to integrate the useful technology into daily life.

Often new technologies explain features of their products or services that will catch the attention of younger users, or use technical jargon when discussing how to use the technology in daily life. Older adults may see younger users integrating technology into daily life and understand that it could be helpful, but because there is a lack of explained usefulness for older adult users, it is difficult for them to see how to integrate it into their routines. "While it is commonly believed that costs deter older adults from using new technologies, it is actually the lack of perceived benefits that is to blame. Either the technology does not meet the needs of the user, or they do not understand the technology sufficiently to appreciate the benefits (Wagner, Hassanein, & Head, 2010).

A simple LMS design element when considering older adults is to clearly and concisely explain the usefulness of the LMS for older adults as they enter the system. Allowing third-party users of the LMS to customize this

content, but making it a required design element embedded in the home page, would point users to usefulness immediately. An example of explained usefulness of LMS is: “one of the advantages of a LMS is the possibility of keeping available all the resources and files as often as necessary” (Martínez-Alcalá, 2018).

2.2 Sense of community

Research suggests that community embeddedness for older adults leads to decreased feelings of isolation and increased quality of life; LMS design can consider this important aspect of healthy aging by creating a sense of community within digital spaces. The concept of community is flexible and ever-evolving, but social connectedness can be fostered in LMS design through branded language, access to information, calls to action, and ways for users to engage with each other.

In the article *Are older adults networked individuals? Insights from East Yorkers' network structure, relational autonomy, and digital media use*, among 41 older adult participants with a median age of 73:

- 22% were networked individuals where their diverse social networks were “enhanced by their use of digital and social media,
- 51% were “socially connected by not networked individuals,” mostly interacting with the same groups of people, and
- 27% were socially constrained – only three participants did not use any digital media at all (Wang, 2018).

The study found that for networked, socially connected, and socially constrained individuals alike, digital media supports the size and diversity of social networks, expands the geographical reach of social networks, facilitates intergenerational communication, and facilitates social support (Wang, 2018). Despite some beliefs that digital connection can constrain face-to-face interactions, “use of [digital technology] clearly enables these older adults to overcome physical barriers such as distance, personal mobility, limitations of time, prohibitive weather conditions, and...ensures their independence and maintains their role as a stakeholder in society” (Hill, Betts, & Gardner, 2015). LMS design, through enabling connections with smaller groups of people and being sensitive to issues of isolation, can allow users to feel connected, independent, and in control of their experience (Campbell, 2015).

It is also important to note that many older adult users are caregivers – in the US, 29% of the adult population are caregivers, the typical caregiver spends about 24 hours a week providing care, and one third of older adult caregivers are in poor health themselves (Johnson & Finn, 2017). Allowing caregivers, users with physical or cognitive impairment, and busy older adults who may still be working the opportunity to engage in non-traditional communities may provide much-needed opportunities for meaningful connection, personal growth, and finding purpose in daily life.

2.3 Interactivity with others

In creating a sense of community for older adult users within LMS design, interactivity with others – peers, instructors, and potentially other generations – is a necessary component for success. “As online learning matures, it is important for both theorists and practitioners to understand how to apply new and emerging educational practices and technologies that foster a sense of community and optimize the online learning environment” (Snyder, 2009).

LMS design for post-secondary education engages users with each other and the instructor through discussion boards, in-system emails, access to contact information, video conferencing, and group projects (which often rely on users to understand and have access to digital technologies made for interacting with others outside of the LMS). While “online learning and online communication tools can increase the ability of older adults to maintain educational activities and maintain social networks, even when physical mobility is hindered...online courses [allow] them to continue participating in education and interacting with others” (Githens, 2007),

interaction with others is more than a design component. Encouraging users to interact with each other is a pedagogical and theoretical framework that, beyond design, needs to be embedded in the ethos of design.

Older adults are adopting technologies at a faster rate than before, and “the most common use of computers and the Internet for older adults appears to be for communication and social support” (Wagner, Hassanein, & Head, 2010). LMS design can create spaces for older adults to feel connected to their educational community and create emotional bonds with peers.

3. Accessibility

3.1 Accessible iconography

LMS design for older adults, while leaning into universal design, differs from standard accessibility elements for myriad reasons, including that many older adult users navigate technology with several age-related perspectives that affect each other in unique ways: “even among a group of online older adults, there is significant variation in skills...This suggests that addressing issues of universal online access must focus on user skills in addition to physical access to the infrastructure” (Hargittai, 2018). While accessible design for computer and Internet-based technology for older adults could include aspects of accessible design for other users, including users with low- or no-vision or users with low- or no-hearing, “when it comes to using computers, older adults have different needs and concerns...resulting from the natural physical and cognitive changes that come with aging” (Wagner, Hassanein, & Head, 2010).

Also, because older adults may experience fear or anxiety related to technology use, it is imperative for design to go beyond “merely accessible for them. We also want to make it attractive, easy, productive, and enjoyable to use” (Johnson & Finn, 2017). Although older adult users often have significant understanding of communication, information storage, and information retrieval through past professional and/or personal experiences, “one of the important reasons for older people finding contemporary interfaces difficult to use is their low domain-specific prior knowledge” (Reddy, Blackler, Popovic, & Mahar, 2013). One way to overcome this challenge in LMS design for older adult users is to use iconography and metaphors that speak to users’ prior knowledge and allows users to understand new, potentially unfamiliar graphics or designs.

As Castilla, et al., points out, “elderly people face graphic interfaces full of elements, new metaphors, and terms, which, without an analogue reference, they are unable to intuitively understand. Moreover, there is an infinite amount of information with no particular order, beginning, or end” (Castilla, et al., 2018). This can be overwhelming and disorienting for older adult users, especially if the new technology is branded as intuitive or simplistic. Older adults often “struggle to negotiate the application of the codification, norms, and expectations anchored in traditional social interactions with the new methods of social interaction through [digital technology]” (Hill, Betts, & Gardner, 2015). This means that design for older adults differs from standard accessible design because “young people, regardless of ability, typically have very similar knowledge and attitudes about technology” (Johnson & Finn, 2017).

In LMS design for older adult users, identifiable metaphors should be integrated into the design hierarchy and conceptual model; complex conceptual models, or unclear structure, can disorient an older adult user who does not have a clear mental model of the system design. “Mental models that people learned and internalized to guide their use of mechanical, electromechanical, and analog electronic devices do not work well for using websites, smartphones, and tablet computers” (Johnson & Finn, 2017). By creating design metaphors that seem familiar or comfortable to older adult users, they can become familiarized with new models over time.

Accessible iconography in LMS design also includes labeling icons with text, using industry-standard icons when available, and ensuring icons are distinguishable from each other (Polyuk, 2019). Research has found that “many older adults pay little attention to icons on a digital device screen; they pay more attention to the words, possibly because the words mean more to them than the icons do” (Johnson & Finn, 2017). Decreasing

frustration related to inaccessible or unfamiliar icons can also decrease user fatigue and support good mental health; “to ensure older adults feel comfortable and confident using digital technologies to support their mental health, apps and websites should use...easy-to-use function buttons and clear explanations” (Andrews, 2019).

3.2 Simplicity of design

Although the National Institute on Aging (NIA) and the National Library of Medicine (NLM) developed website development guidelines for older adult users, according to the author of “Older adults and e-learning: Opportunities and Barriers,” in 2005 usability researchers “conducted usability tests with computer proficient older adults to determine whether the NIA/NLM guidelines were applicable to e-learning applications” (Githens, 2007). The guidelines were foundationally good, but users also valued interesting and engaging aesthetics and attractive visuals that were missing from these guidelines (Githens, 2007). Some updated, more comprehensive design guidelines for older adult users have been created since then, including “Designing Effective Interfaces for Older Users” in 2006, *Designing for Older Adults: Principles and Creative Human Factors Approaches* in 2009, and “Senior Citizens (Ages 65 and older) on the Web” in 2013 (Johnson & Finn, 2017).

There are no specific guidelines related to LMS design for adults ages 50+; however, web design principles based on research and development can be used to create a LMS that caters to the unique desires and needs of older adult users.

Specific to low- or no-vision older adult users, design elements should consider common age-related challenges, including reduced visual acuity, presbyopia (age-related farsightedness), glaucoma, macular degeneration, diminished light perception, diminished ability to discriminate colors, increased glare sensitivity, slower adaptation to changes in brightness, diminished ability to detect subtle visual indicators, and increased sensitivity to eyestrain and visual distraction (Johnson & Finn, 2017). These considerations have varying – and often competitive – design suggestions, but without considering these challenges, some older adult users could be unable to fully interact with LMS design. “The Internet-related skills of visually impaired older adults [fall] short of what active participation in the online information society requires, especially for more complex information” (Hargittai, 2018).

Studies with low-vision users show that “contrast is a fundamental perceptual aid to their seeing the text at all” (Schriver, 2013). The book *Solving Problems in Technical Communication* asserts that low-vision readers and standard-vision readers prefer sans serif on computer displays between 87-95% of the time, prefer non-italic type to italic type, and “when extra emphasis is needed, bold has been found to be a better cue than uppercase” (Schriver, 2013). Also, “off-white backgrounds are better than pure white ones because sustained reading of dark text on pure white backgrounds can cause eyestrain in older adults” (Johnson & Finn, 2017). Other design suggestions include providing mechanisms for users to adjust text size, paying attention to contrast ratios, testing design through screen readers, providing subtitles for video and audio content, and large buttons (Campbell, 2015).

Specific to older adult users and motor control, design elements should consider common age-related challenges, including reduced fine motor control, reduced hand-eye coordination, slower movements, increased variance in movements, and reduced strength and stamina (Wagner, Hassanein, & Head, 2010).

Larger buttons and larger click target areas are suggested to aid older adult users with challenges in motor control. Other design suggestions include avoiding splitting tasks across multiple screens (Campbell, 2015) and asking users to use simple gestures (avoiding click-and-drag or quick movements) (Polyuk, 2019).

Specific to low- or no-hearing older adult users, design elements should consider presbycusis (age-related hearing loss), reduced ability to hear low-volume sounds, reduced sensitivity to high-frequency sounds, reduced ability to localize sounds, reduced ability to filter out background noise, and reduced ability to understand fast speech (Johnson & Finn, 2017).

Some suggestions to aid older adult users with challenges in hearing are avoiding high-frequency sounds, increasing default audio volume, only including sounds in design when necessary, avoiding auto-playing videos, using alternative text on images and closed captions on videos, and allowing users to have multimodal options (Wagner, Hassanein, & Head, 2010; Johnson & Finn, 2017).

Specific to older adult users and cognition, design elements should consider fatigue, attentional scope, reduced memory capacity, and reduced ability to map digital design. Design elements to consider memory challenges include large clickable target areas under buttons – older adult users tend to “click under the buttons rather than in the middle: they need to see in order to be sure of what they are clicking” (Castilla, et al., 2018) – and easy, accessible links to common functions such as home, next, back, and undo (Polyuk, 2019).

One popular design element, scrolling through a page, can be difficult for older adult users, especially if there is no clear indication that a user needs to scroll to access more information. “Scrolling text on a screen prevents readers from forming a coherent mental map, as there is no point for a reader to remember that a piece of text was on the top of page, which “increases readers’ feeling of fatigue” (Hou & Wu Y., 2017). If possible, it is suggested to use more familiar metaphors to avoid scroll options, or use clear indications that a user needs to scroll to access more information.

Other cognitive design element suggestions include reducing visual noise and getting rid of unnecessary ancillary information; “older adults have a broader attentional scope than young adults, encompassing both relevant and irrelevant information,” (Weeks & Hasher, 2018) which allows older adult users to become distracted or disoriented more easily than younger users. Some ways to avoid this are to not divide users’ attention between multiple tasks or parts of the screen (Campbell, 2015), to have simple navigation (Polyuk, 2019), and to use shallow navigation hierarchy (Johnson & Finn, 2017).

Beyond these LMS design element suggestions to fit the needs and desires of older adult users, there are many other areas of interest for designers; user participation in design, specific user research, and usability tests can aid designers in identifying other elements of LMS design that could be modified to better support older adult users. By including target users in the design process, through standard research methods such as questionnaires, interviews, and focus groups, older adult users’ needs can be better accommodated (Roy, 2016).

3.3 Empowered navigability

When older adult users navigate new or adopted technologies with success, they are more likely to have positive perceptions about usefulness and ease of use (Wagner, Hassanein, & Head, 2010). However, the opposite is also true: “feeling depressed [is] likely to magnify difficulties with usability of digital technologies” (Andrews, 2019). It is then necessary for LMS design for older adult users to empower users through navigation.

Empowered navigability – fostering positive feelings about interaction within users through use – can be facilitated in LMS design through interface verbiage. Avoiding implicit assumptions in verbiage (Campbell, 2015), explaining acronyms, and using word phrasing that allows users to feel confident will increase positive feelings in older adults about learning to use and using new and adopted technologies.

It can also be facilitated through “proper onboarding” to introduce users to functions they may not be familiar with – onboarding that users can skip if they are familiar with the function – and through “contextual tips throughout an app that are both automatically shown the first time a feature is accessed, and are available at later points when the user requests them” (Polyuk, 2019).

The article *Designing for older adults: adaptable interface as an approach* argues that “it might be prudent to aim for developing interfaces that are intuitive to learn rather than intuitive to use. An intuitive-to-learn interface has the potential to counter the variability in prior knowledge and cognitive abilities over time and, eventually, to make the interface intuitive to use” (Reddy, Blackler, Popovic, & Mahar, 2013). This article defines an

intuitive-to-learn interface as “an interface that allows a person to intuitively apply various strategies to learn and to successfully use a unique interface during first and early encounter” (Reddy, Blackler, Popovic, & Mahar, 2013).

More complex LMS design could include design aspects that empower navigability by introducing users to more design elements as a user successfully, over time, engages with the interface. This design concept is sometimes referred to as progressive disclosure or adaptable interfaces, and although it can have significant positive impact on user experience, it also can be time-consuming and costly to create (Polyuk, 2019).

4. Support

4.1 Encouraging instruction

Research has consistently found that “when older adults notice personally relevant usefulness of technologies, and when, at the same time, they receive family support, they will regularly use and adopt [computer and Internet-based technologies]” (Martínez-Alcalá, 2018). Older adults, with support from family or trusted computer and Internet-based technology users, often have more success interacting with new technologies, learning complex digital skills, and using adopted technologies with more frequency. Accessible family or friend support in technology adoption or use is successful, in part, because the support can provide explained usefulness, act as a translator of content or metaphors, and assure older adult users that they are successful and safe in their use.

While “good support and training [leads] to higher levels of self-efficacy, confidence, attitudes, and reduced anxiety” for older adults, it may not always be available or accessible (Wagner, Hassanein, & Head, 2010). Older adult users may need or desire support or training that isn’t available with family or friends, and isn’t an option within digital technology design. Navigating to external sites, perusing online forums, and/or using non-embedded mechanisms to email technical support may be above the comfort or skill level of older adults who need additional support.

In one study, there was “identification and lived experience of a digital divide whereby those older adults without [digital technology] are unable to access information nor are they able to participate in certain communities and activities. This is seen by participants as a cumulative, self-propelling spiral of isolation whereby the digitally rich continue to become included and the digitally poor continue to become isolated” (Hill, Betts, & Gardner, 2015). Older adults without access to family support or in-design training may perceive that they are not the intended demographic for new or adopted technologies, and without the support, perceptions of usefulness and ease of use may decline.

Integrating encouraging instruction in LMS design includes offering several highly visible pathways to live technical support – “older adults want to know that they can contact real people when necessary” (Johnson & Finn, 2017) – and training materials such as embedded videos that are able to be paused, slowed down, or replayed. To replicate the usefulness of family support, it is suggested that videos or other training materials use casual language, role model successful use, and use clear, concise phrases (Polyuk, 2019).

Training materials also could potentially benefit from a singular representative face – whether through an avatar, a persona, or a consistent live actor. In a study conducted by Castilla, et al., where they introduced 46 older adults with an average age of 65.4 to a new social media software system, they found that “the elderly attributed an important emotional component to the use of the system, including...an emotional relationship with the system avatar” (Castilla, et al., 2018). This research shows that system design can find ways to connect with members for more impactful training through fostering emotional relationships in training.

Training can also be used to explain digital metaphors or make comparisons to experiences more familiar to older adult users than to younger users. “Older adults often possess greater task-domain knowledge than

younger adults...where appropriate, design can take advantage of this difference by giving older adults a way to use their domain knowledge” (Johnson & Finn, 2017). Taking time to understand how older adult users can translate their domain knowledge to new technologies can be rewarding for both trainers and users alike as users begin to celebrate their strengths and lean into their prior experiences.

Because “the social context of use and availability of technical support” affects the rate at which an older adult user adopts technology (Hargittai, 2018), sociology and cyberpsychology should be considered when designing training materials; highlighting the skills and past successes of older adults in technology usage can boost confidence and support digital learning.

Beyond focusing on the unique challenges of designing digital technologies for older adult users, designers can also celebrate the advantages older adults have in design navigation, both in design and with users. Training can celebrate generalized positive traits that are found in the patterns of older adult users; for example, older adults “tend to have better vocabularies and can draw from more real-world knowledge and experiences. Perhaps because they tend to be less impulsive and more risk-averse, they often use fewer mouse clicks to complete a task” (Johnson & Finn, 2017). Training that uses uplifting and affirming language to encourage users, and direct affirmations (eg. “I know you want to be sure you’re using technology correctly, and I think it is great you can use your past experiences to inform your decisions online”) can mimic family support that may not be available for all users.

4.2 Confidence and dignity

Similar to users of all ages, older adult users want to feel confident, dignified, valuable, and worthy during their new technology or adopted technology experiences. Having confidence to take risks and make mistakes while learning technology is often an experience of younger users that is taken for granted; “many modern societies – particularly in the industrialized western world – place a high value on youthfulness and much less value on age and experience” (Johnson & Finn, 2017). If older adults don’t feel confident, trusted, or considered when interacting with new or adopted technologies, this can be disempowering – older adult users have less positive perceptions of usefulness and ease of use when it is easily detectable that the technology was either not created with older adult users in mind or that considerations for older adult users do not seem dignifying.

“Seniors often correctly [feel] that websites and apps were not designed with consideration for their needs and interests” (Kane, 2019); LMS design can consider this by not only structuring support and training in ways that provide affirmation of dignity, but also by avoiding content, functionality, or assumptions that users are at specific life stage (Johnson & Finn, 2017). Security questions that ask users to recall their “firsts” may be difficult for cognition or the emotional state of older adult users, and assumptions of careers or maiden names can be frustrating for users who may be retired, have been lifelong homemakers, or who did not marry.

Training through LMS design can support older adult users by not patronizing or stigmatizing older adult users and creating “educational environments that recognize and support all types of learning and all types of previous experience,” including informal learning through digital technologies (Martínez-Alcalá, 2018). Through encouraging autonomy and placing control of experience and decisions into the hands of the older adult user, design can instill more confidence in users. “The fact that older people are often considered dependent and lacking initiative and determination can lead to education programs being conceived in a condescending manner...without giving learners any opportunity to set their own priorities and make their own decisions” (Martínez-Alcalá, 2018).

LMS design can also encourage collaborative learning among users through training created by older adult users or a moderated, embedded Frequently Asked Questions section. “Content written for and by older people is difficult to find — when this content is available, it often treats seniors as a niche interest group rather than a diverse and growing demographic. By embracing both accessible design and an inclusive content strategy, online businesses can vastly expand the amount of business that they generate from this population” (Kane, 2019).

4.3 Motivation to learn

Older adult users may have varying levels of motivation to learn new or adopted technologies, which may fluctuate over time based on experiences and exposure – this motivation comes from perceived usefulness, perceived ease of use, user comfortability with design, user confidence in skill, and the user’s mental health. “Some fundamental aspects for the learning process in older adults are: motivation, experience, need, self-concept, learning usefulness, and orientation to learn” (Martínez-Alcalá, 2018). LMS design should find ways to motivate older adult users through explaining benefits, celebrating successful digital interactions, and providing affirming support for learning the technology.

Highlighting benefits for older adult users within LMS design may create motivation for older adult users to continue to engage with the interface consistently. Consistent use of new or adopted technologies increases skill and successful use of new or adopted technologies, which may increase motivation and confidence within users.

Beyond the expansion of available tasks and connections through technology adoption, older adults can have many other psychological, social, mental, and emotional benefits from interacting with new or adopted technologies. The article *Attitudes Towards and Limitations to ICT Use in Assisted and Independent Living Communities: Findings from a Specially-Designed Technological Intervention* states that empirical results from myriad studies identify a multitude of perceived benefits of Internet-connected technologies for older adults including “decreased feelings of loneliness, decreased levels of depression, decreased feelings of stress, increased feelings of growth and purpose in life, and an increased feeling of independence” (Berkowsky, Cotten, Yost, & Winstead, 2013). However, older adults tend to adopt these technologies at a lower percentage than other age cohorts.

Some of this low adoption rate could be linked to the idea that “digital technology can be a source of disempowerment for older adults, who need ever-increasing levels of digital know-how to maintain their sense of inclusion” (Hargittai, 2018). If older adult users feel as though they cannot maintain an understanding of new or adopted technologies, they may lose motivation to learn. A suggested LMS design element is to slowly introduce new interface functionality and to notify users of changes in look, feel, or functionality of design (Johnson & Finn, 2017). With non-digital or pre-Internet technologies, the design of the technology was static – users could continue to learn about new or useful features over time, without fear of the technology changing – however, in computer and Internet-based technologies, changes in interface or design can occur rapidly and without explanation, which may be disorienting to older adult users.

As older adult users continue to acquire new technological acumen, design for older adults should continue to motivate and encourage them. Older adults want to be able to engage in meaningful conversations – “like people of any age, we older adults want to be independent, well informed, current, and relevant” (Janzen, 2018). Careful considerations of how and why older adult users engage with technology can overcome potentially harmful generalizations about this user group. “One of the most damaging stereotypes of older adults is that they are rigid and do not want to learn...rigidity ‘is less a factor of age than of personal history, pressure, and predisposition’” (Githens, 2007).

Impact of Literature Review

Not only are more users of all ages accessing the Internet every year, but they are also engaging with technology through online classes at staggering rates. Some statistics on Internet usage, and specifically online classes, highlight this astounding growth:

- “In December 2000 there were 360 million Internet users worldwide, and in just 17 years (August 2017) this number rose to 3.83 billion Internet users worldwide” (Castilla, et al., 2018).

- “A recent study in the US...indicates that during fall 2005, about 3.2 million students were enrolled in at least one online course in the US, approximately a million more than in the previous year” (Vovides, Sánchez-Alonso, Mitropoulou, & Nickmans, 2007).
- “According to the National Center for Educational Statistics (NCES), the percentage of undergraduates receiving a part or all of their education via online platforms increased by nearly a factor of four between 2000 and 2015, from 8% to 29%” (Hansen, Talmage, Thaxton, & Knopf, 2019).

In a similar fashion, lifelong learning institutes and adult education programs, such as Osher Lifelong Learning Institutes (OLLIs), are not only growing in the number of institutes and programs available, but also in membership and in types of offerings. “The number of lifelong learning institutes serving older adults in the U.S. has increased in the last few decades. To date, these institutes have functioned primarily in traditional, in-person classroom, and seminar formats; however, technology-enhanced methods may help provide greater access to high-quality lifelong learning experiences” (Hansen, Talmage, Thaxton, & Knopf, 2019).

The significant cumulative growth in technology users and online post-secondary course offerings led to an influx of education software programs and digital systems, including many LMS. Over time, the capability, flexibility, and expansion of the Internet allowed those who once developed online learning platforms for post-secondary capacities to develop platforms for primary education, secondary education, and professional purposes as well. However, adult education programs have not developed online learning platforms, and “best practices for using [technology-based instruction] methods for older adult lifelong learning have not been codified nor identified” (Hansen, Talmage, Thaxton, & Knopf, 2019).

Despite the delay in technological development of LMS for adult learning programs, some programs – such as OLLIs – are seeking ways to design LMS or other technology-based instruction, and “older adults appear highly ready for [technology based instruction] integration into OLLI” (Hansen, Talmage, Thaxton, & Knopf, 2019).

Preliminary research in this field asserts that “the combination of increased computer literacy, online education experience, and receptivity to blended courses suggest high potential for [technology based instruction] technologies to serve a substantial part of the current OLLI population and a larger portion in the future. In particular, experiences with [technology based instruction] technologies in workplaces will carry into retirement and lifelong learning programs by increasing numbers of individuals in the future” (Hansen, Talmage, Thaxton, & Knopf, 2019).

As technology design expands and LMS design becomes more engaging for users, it is important to consider the impact LMS design specifically for adults ages 50+ would have on older adult users, and how LMS design can provide opportunities for connection, growth, education, and personal impact in a growing part of the global population.

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Instructions and Notes:

- Depending on the nature of what you are doing, some sections may not be applicable to your research. If so, mark as “NA”.
- When you write a protocol, keep an electronic copy. You will need a copy if it is necessary to make changes.

1 Protocol Title

Include the full protocol title: Focus Group Study

2 Background and Objectives

Provide the scientific or scholarly background for, rationale for, and significance of the research based on the existing literature and how will it add to existing knowledge.

- Describe the purpose of the study.
- Describe any relevant preliminary data or case studies.
- Describe any past studies that are in conjunction to this study.

In researching best practices in the development of an online learning platform for adults ages 50+, I need to research target users as they test and interface with the prototype. Target users are adults ages 50+ and currently enrolled members of an adult learning program.

FOCUS GROUPS: For the collection of qualitative data, three focus groups will give a formative evaluation on the first published prototype of the platform and provide valuable insight into how to improve interface and usability. Focus groups better fit the mission and directed outcomes for the study than interviews because they “place participants in a situation that is both structured and quasi-naturalistic” (Eubanks and Abbott 31): this allows the moderator to guide participants through interior and exterior events and perspectives, similar to an interview, but in a setting where the goal is more easily defined and outcomes are developed by a group for an end-goal, instead of participants interacting one-on-one with potentially a blind understanding of the research goals.

This will build off of a study called “Online Learning Questionnaire” (STUDY00009851), which was approved on March 8, 2018. In the “Online Learning Questionnaire” study, target users were asked questions to gauge knowledge, interest, and reluctance to interacting with an online platform.

Eubanks, P., & Abbott, C. (2003, Winter). Using Focus Groups to Supplement the Assessment of Technical Communication Texts, Programs, and Courses. Retrieved from https://www.researchgate.net/publication/240519839_Using_Focus_Groups_to_Supplement_the_Assessment_of_Technical_Communication_Texts_Programs_and_Courses

3 Data Use

Describe how the data will be used. Examples include:

- | | |
|--|--|
| • Dissertation, Thesis, Undergraduate honors project | • Results released to participants/parents |
| • Publication/journal article, conferences/presentations | • Results released to employer or school |
| • Results released to agency or organization | • Other (describe) |

The data will be used for academic publications and conference presentations, and will be used in the development of a Masters of Science in Technical Communication applied project.

4 Inclusion and Exclusion Criteria

Describe the criteria that define who will be included or excluded in your final study sample. If you are conducting data analysis only describe what is included in the dataset you propose to use.

Indicate specifically whether you will target or exclude each of the following special populations:

- Minors (individuals who are under the age of 18)
- Adults who are unable to consent
- Pregnant women
- Prisoners
- Native Americans
- Undocumented individuals

I work for Osher Lifelong Learning Institute at ASU (OLLI at ASU), which is one of the largest adult learning communities in the Greater Phoenix Area. I will put out a “call for participation” to segmented Spring 2019 members, all of whom are 50+, current members, have an email address, and completed the “Online Learning Questionnaire.”

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5 Number of Participants

Indicate the total number of participants to be recruited and enrolled: Recruitment - 143 (respondents from the "Online Learning Questionnaire") | Enrolled – approx. 24

6 Recruitment Methods

- Describe who will be doing the recruitment of participants.
- Describe when, where, and how potential participants will be identified and recruited.
- Describe and attach materials that will be used to recruit participants (attach documents or recruitment script with the application).

I will put out a "call for participation" to participants from the online quantitative survey through an "email blast" in MailChimp, which is the standard way OLLI at ASU sends emails to members. Using the "button" function and hyperlinks, enrollment in the focus group study will be directly embedded into that email, for easy access.

I hope to gather responses from a minimum of 12 and maximum of 24 participants in less than one week from the date of the "call for participation." If the first email does not garner 12-24 participants within the desired timeline, a secondary email will be sent, reminding members about the opportunity to participate in the study.

Enrollment in the focus group study will require members to have an email address. All members who receive the "call for participation" have previously participated in the online quantitative survey, so no recruited participants will have a barrier to participation based on lack of access to email. If members have questions, comments, or concerns about the study, they can either respond to the email directly, or my contact information will be listed in the email.

Email for recruitment:

Hello OLLI at ASU members,

My name is Abby Baker and I am in a master's degree program studying Technical Communication at Arizona State University. Thank you very much for completing the short survey I sent about your learning style and perceptions of online learning!

Here's some more information about my master's degree project: I am developing an online learning prototype specifically designed for people born or brought up before the widespread use of digital technology. This prototype is designed to connect lifelong learning peers and instructors through digital communication and provide access to resources that enhance deep-impact education. I am hoping that this project will fill a current gap in digital learning spaces!

The next step of my study includes asking YOU to "beta-test" the prototype and hosting focus groups to gather feedback about areas for celebration and improvement.

I am looking for participants with varied knowledge of and interest in online learning. Meaning, even if you're opposed to it or have no experience, I'd love to receive feedback from you! Or, if you are stoked about it and have tons of experience, I'd love to receive feedback from you! If you find yourself somewhere in the middle... You guessed it, I'd love your feedback too!

Who:	YOU!
What:	Provide honest and helpful feedback about an online learning prototype
When:	August 30, 2019 Focus Group A: 10 – 11 AM Focus Group B: 12 – 1 PM Focus Group C: 2 – 3 PM
Where:	ASU Downtown Phoenix campus Mercado, Bldg. C Classroom 135 502 E. Monroe St., Phoenix 85034

(continued below)

SOCIAL BEHAVIORAL INSTRUCTIONS AND TEMPLATE

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It's going to be fun! Here's how your participation will work:

1. Enroll in the focus group study (click the big "ENROLL IN THE STUDY" below).
2. I'll assign you to Focus Group A, B, or C (each group will have 4-8 OLLI at ASU members)
3. I'll send you a confirmation email, which will include the date, time, and location of the focus group meeting.
4. In the confirmation email, I'll provide the prototype and ask that you peruse it prior to arriving.
5. Arrive to the focus group!

All you'll need to enroll is an email address. Although there is no benefit to you (besides snacks and coffee – I did mention that, didn't I?), your participation will aid in the development of technology for lifelong learning programs.

ENROLL IN THE STUDY

Thank you very much for your interest in my study!

Abby Baker
albaker6@asu.edu
623.866.8384

NOTE: The study has been approved by the Arizona State University Institutional Review Board for Research Involving Human Subjects (the IRB). Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time or for any reason, there will be no penalty. You have the right not to answer any question, and to stop participation at any time. You must be a current OLLI at ASU member, over 18 years of age and have access to an email address to participate in the study.

Your involvement in this study will take approximately two hours. There are no foreseeable benefits, risks, or discomforts to your participation. If you participated in the Online Learning Questionnaire, data from the two studies may be linked to provide further insight into feedback. Complete confidentiality or anonymity of participation in the study cannot be guaranteed because of the participation of others in the focus group.

At the time of consent you will be asked for permission to record the focus group (only the moderator will have access to the recordings). The recordings will be deleted immediately after being transcribed and any published quotes will be anonymous. To protect your identity, it is advised to refrain from using last names or other identifying information during the focus group. If, at any time, you do not want to be recorded, you may ask for recording to stop.

If you have any questions concerning the research study, please contact me at albaker6@asu.edu or 623.866.8384, or Dr. Claire Lauer at Claire.Lauer@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at 480.965.6788.

7 Procedures Involved

Describe all research procedures being performed, who will facilitate the procedures, and when they will be performed. Describe procedures including:

- The duration of time participants will spend in each research activity.
- The period or span of time for the collection of data, and any long term follow up.
- Surveys or questionnaires that will be administered (Attach all surveys, interview questions, scripts, data collection forms, and instructions for participants to the online application).
- Interventions and sessions (Attach supplemental materials to the online application).
- Lab procedures and tests and related instructions to participants.
- Video or audio recordings of participants.
- Previously collected data sets that that will be analyzed and identify the data source (Attach data use agreement(s) to the online application).

Meeting Location, Time, and Arrangement

Meetings will take place in a classroom participants have taken OLLI at ASU classes in, on the ASU Downtown Phoenix campus. This will allow participants to feel comfortable interacting with each other in a space they are familiar with, is a "central" location for participants, and may encourage more frank conversation. The meetings will last about an hour and will be structured with a moderator.

The three focus group meetings will take place at separate times on the same date, in order to have a consistent moderator present.

(continued below)

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In an attempt to glean the most data possible, the three focus groups will be broken down as such:

- Focus Group A (10-11 AM): A homogenous group of 4-8 OLLI at ASU members who expressed knowledge of or interest in online learning and sharing platforms, moderated by Abby Baker.
- Focus Group B (12-1 PM): A homogenous group of 4-8 OLLI at ASU members who expressed no knowledge of or interest in online learning and sharing platforms, moderated by Abby Baker.
- Focus Group C (2-3 PM): A heterogeneous group of 4-8 OLLI at ASU members, some of whom expressed knowledge of or interest in online learning and sharing platforms, and some of whom did not, moderated by Abby Baker.

Tools for Collecting Data

Each focus group will be audio recorded, with the consent of the participants, and will be transcribed and coded no more than 48 hours after each meeting. Transcription will provide only factual recounting of conversations, and no interpretation or analysis by the moderator/researcher.

Protocol for Collecting Data

After participants opt-in to the focus group, the following items will happen:

1. Participants will be emailed a follow-up email, confirming their participation and outlining the details of the meeting and asking them to complete a guided beta-test of the online learning platform prototype (this beta-test will take approx. 20 min.).
2. Participants will be asked to write or type a list of five plusses and five minuses about the prototype that they would be willing to share with the focus group (this will take approx. 20 min.).
3. Upon arrival, the moderator will ask for introductions and gauge participant mood.
4. Participants will be read introductory "Guiding Language"
5. The moderator will ask participants if they have any questions before the recording begins.
6. At the end of the meeting, the moderator will thank the participants for their involvement.
7. The moderator will follow-up the meeting with a "thank you" email.

Questions

The moderator will use the following nine questions to facilitate an open discussion about the usability and accessibility of the online learning prototype, attempting to glean feedback that would further development and implementation to enrich user experience. The moderator's goal should be to keep the discussion focused and on-topic, without interjecting commentary, analysis, or aiding in discussion.

1. Have you used any online learning tools before?
 - a. Were you involved in creating them, maintaining them, or using them?
2. Is this website different or similar to what you expected? How?
3. Would you share one "plus" from your experience beta-testing the website, starting with [name]? Feel free to respond to each other.
 - a. If responses are not organic, moderator may ask, "did anyone else have a similar experience or feeling as [name]?"
4. Would you share one "minus" from your experience beta-testing the website, starting this time with [name]?
 - a. If responses are not organic, moderator may ask, "did anyone else have a similar experience or feeling as [name]?"
5. In what ways do you think the website could provide more opportunities for engagement?
 - a. The moderator should allow each group to decide if engagement refers to with the content, with the instructor, or with member-peers.
6. What is one way you think the website could be improved to fit your needs and wants?
7. How do you think the website could be improved to encourage communication among members?
8. Would you pay for access to this website, based on its features?
9. Do you think OLLI at ASU members would enjoy using this website?

8 Compensation or Credit

- Describe the amount and timing of any compensation or credit to participants.
- Identify the source of the funds to compensate participants
- Justify that the amount given to participants is reasonable.
- If participants are receiving course credit for participating in research, alternative assignments need to be put in place to avoid coercion.

The participants will receive snacks and coffee during their study participation, which will be purchased using personal funds. At the end of the study, participants will receive a "thank you" email for participation. No compensation will be offered.

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9 Risk to Participants

List the reasonably foreseeable risks, discomforts, or inconveniences related to participation in the research. Consider physical, psychological, social, legal, and economic risks.

There are no foreseeable risks, discomforts, or inconveniences related to participation.

10 Potential Benefits to Participants

Realistically describe the potential benefits that individual participants may experience from taking part in the research. Indicate if there is no direct benefit. Do **not** include benefits to society or others.

No benefits will be listed to the participants ("Although there is no benefit to you, your participation will aid in the creation of a new technology for lifelong learning programs.")

11 Privacy and Confidentiality

Describe the steps that will be taken to protect subjects' privacy interests. "Privacy interest" refers to a person's desire to place limits on with whom they interact or to whom they provide personal information. Click here for additional guidance on [ASU Data Storage Guidelines](#).

Describe the following measures to ensure the confidentiality of data:

- Who will have access to the data?
- Where and how data will be stored (e.g. ASU secure server, ASU cloud storage, filing cabinets, etc.)?
- How long the data will be stored?
- Describe the steps that will be taken to secure the data during storage, use, and transmission. (e.g., training, authorization of access, password protection, encryption, physical controls, certificates of confidentiality, and separation of identifiers and data, etc.).
- If applicable, how will audio or video recordings will be managed and secured. Add the duration of time these recordings will be kept.
- If applicable, how will the consent, assent, and/or parental permission forms be secured. These forms should separate from the rest of the study data. Add the duration of time these forms will be kept.
- If applicable, describe how data will be linked or tracked (e.g. masterlist, contact list, reproducible participant ID, randomized ID, etc.).

If your study has previously collected data sets, describe who will be responsible for data security and monitoring.

Only I will have access to the data, and it will be stored first in the Google Cloud (no demographic data will be present in this data, as only the participant's name and email address will be stored). After the focus group study, data will be stored on an ASU secure server – in the secure server, the data will be transcribed, coded, and analyzed. The raw data and aggregate forms will both be stored in the ASU secure server, and the raw data will be deleted August 9, 2020 (one year after the focus group study). Audio recordings will be deleted immediately after they are transcribed (transcription will happen within 48 hours of study completion). The secure server is a network drive on the ASU server. Consent will be given within online enrollment for the focus group study (for participation in the study, for allowing audio recordings of the study, and for data from the "Online Learning Questionnaire" study to be linked to feedback they provide) and be held on file separately for instances of participant retraction of participation.

12 Consent Process

Describe the process and procedures process you will use to obtain consent. Include a description of:

- Who will be responsible for consenting participants?
- Where will the consent process take place?
- How will consent be obtained?
- If participants who do not speak English will be enrolled, describe the process to ensure that the oral and/or written information provided to those participants will be in that language. Indicate the language that will be used by those obtaining consent. Translated consent forms should be submitted after the English is approved.

I will be responsible for consenting participants. The consent process will take place within enrollment in the study, and it will be a mandatory check-box the participant has to opt-in to along with an electronic signature. A copy of the consent will be emailed to the participant automatically through Google Forms.

13 Training

Provide the date(s) the members of the research team have completed the CITI training for human participants. This training must be taken within the last 4 years. Additional information can be found at: [Training](#).

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Abby Baker - Jan. 17, 2019
Claire Lauer – Mar. 7, 2015

Hello OLLI at ASU members,

My name is Abby Baker and I am in a master's degree program studying Technical Communication at Arizona State University. Thank you very much for completing the short survey I sent about your learning style and perceptions of online learning!

Here's some more information about my master's degree project: I am developing an online learning prototype specifically designed for people born or brought up before the widespread use of digital technology. This prototype is designed to connect lifelong learning peers and instructors through digital communication and provide access to resources that enhance deep-impact education. I am hoping that this project will fill a current gap in digital learning spaces!

The next step of my study includes asking YOU to "beta-test" the prototype and hosting focus groups to gather feedback about areas for celebration and improvement.

I am looking for participants with varied knowledge of and interest in online learning. Meaning, even if you're opposed to it or have no experience, I'd love to receive feedback from you! Or, if you are stoked about it and have tons of experience, I'd love to receive feedback from you! If you find yourself somewhere in the middle... You guessed it, I'd love your feedback too!

Who:	YOU!
What:	Provide honest and helpful feedback about an online learning prototype
When:	August 30, 2019 Focus Group A: 10 – 11 AM Focus Group B: 12 – 1 PM Focus Group C: 2 – 3 PM
Where:	ASU Downtown Phoenix campus Mercado, Bldg. C Classroom 135 502 E. Monroe St., Phoenix 85034

It's going to be fun! Here's how your participation will work:

1. Enroll in the focus group study (click the big "ENROLL IN THE STUDY" below).
2. I'll assign you to Focus Group A, B, or C (each group will have 4-8 OLLI at ASU members)
3. I'll send you a confirmation email, which will include the date, time, and location of the focus group meeting.
4. In the confirmation email, I'll provide the prototype and ask that you peruse it prior to arriving.
5. Arrive to the focus group!

All you'll need to enroll is an email address. Although there is no benefit to you (besides snacks and coffee – I did mention that, didn't I?), your participation will aid in the development of technology for lifelong learning programs.

ENROLL IN THE STUDY

Thank you very much for your interest in my study!

Abby Baker
albaker6@asu.edu
623.866.8384

NOTE: The study has been approved by the Arizona State University Institutional Review Board for Research Involving Human Subjects (the IRB). Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time or for any reason, there will be no penalty. You have the right not to answer any question, and to stop participation at any time. You must be a current OLLI at ASU member, over 18 years of age and have access to an email address to participate in the study.

Your involvement in this study will take approximately two hours. There are no foreseeable benefits, risks, or discomforts to your participation. If you participated in the Online Learning Questionnaire, data from the two studies may be linked to provide further insight into feedback. Complete confidentiality or anonymity of participation in the study cannot be guaranteed because of the participation of others in the focus group.

At the time of consent you will be asked for permission to record the focus group (only the moderator will have access to the recordings). The recordings will be deleted immediately after being transcribed and any published quotes will be anonymous. To protect your identity, it is advised to refrain from using last names or other identifying information during the focus group. If, at any time, you do not want to be recorded, you may ask for recording to stop.

If you have any questions concerning the research study, please contact me at albaker6@asu.edu or 623.866.8384, or Dr. Claire Lauer at Claire.Lauer@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at 480.965.6788.

Focus Group Enrollment

This focus group takes place in-person and will be 60 minutes in length. This focus group study has been approved by the Arizona State University Institutional Review Board for Research Involving Human Subjects (the IRB).

Date: August 30, 2019

Time (assigned in your confirmation email): 10-11 AM | 12-1 PM | 2-3 PM

Location: ASU Downtown Phoenix campus (502 E. Monroe St., Phoenix 85034), Mercado Bldg. C Classroom 135

I understand that my participation in this study is voluntary, and that if I choose not to participate or to withdraw from the study at any time and for any reason, there will be no penalty. I understand that I have the right not to answer any question, and that I can stop participation at any time.

I am a current OLLI at ASU member and am over 18 years of age. There are no foreseeable benefits, risks, or discomforts to my participation, but that my participation will aid in the creation of a new technology for lifelong learning programs.

If I completed the Online Learning Questionnaire previously sent out by this research team, I give permission to link my feedback in the focus group to my questionnaire responses.

I understand that my participation in this focus group may not be completely confidential or anonymous (because we can't control what other participants share after the focus group), but that if results of this study are used in reports, presentations, or publications my name will not be used.

By consenting to participate in this focus group, I am giving permission to record the focus group (only the moderator will have access to the recordings). The recordings will be deleted immediately after being transcribed and any published quotes will be anonymous. To protect my identity, I will attempt to refrain from using last names or other identifying information during the focus group. If, at any time, I do not want to be recorded, I know to notify the moderator and they will stop.

If you have any questions concerning the research study, please contact Abby Baker at albaker6@asu.edu or 623.866.8384, or Dr. Claire Lauer at Claire.Lauer@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at 480.965.6788.

* Required

1. Email address *

2. I consent *

Check all that apply.

Yes

3. My full name *

Typing my name in the box below will serve as my e-signature and signifies my agreement to participate in the study.

4. Describe your relationship with online learning: (please select all that apply) *

Check all that apply.

- I have knowledge of online learning
- I do not have knowledge of online learning
- I have interest in online learning
- I do not have interest in online learning

A copy of your responses will be emailed to the address you provided

Focus Group Preparation: Guided Beta-Test

Hello,

Thank you for agreeing to participate in a beta-test of an online learning prototype and a focus group. I am looking for participants with varied knowledge of and interest in online learning to provide honest and helpful feedback about the online learning prototype I am developing. The first thing I want to state is that I'm testing the site, not you. Also, please don't worry that you're going to hurt my feelings. I'm doing this to improve the site, so I need your honest reactions!

The beta-test will take about 20 minutes, and the short worksheet will take about 20 minutes.

Thank you,

Abby Baker

Beta-Test Tasks (maybe print this out, if you have a printer!)

1. Look at the homepage:
 - What strikes you about it?
 - Whose site do you think it is?
 - What can you do here?
 - What is it for?
2. You are brand new to the site, and you'd like to learn more about how you can use the home page. Find the navigation instructions.
3. You took "The Beginner's Survival Guide" over Summer 2019 and want to download the instructor's presentations. How would you do that?
4. A friend in class said they sent you an email through MyTribe about meeting for lunch. What is their name?
5. You are having difficulty finding materials or "posting" in discussions in my classes. How could you troubleshoot this?
6. You like when, in class or in email, others can see your profile. It makes it easier for new friends to call you without you having to share your phone number. But, you don't want your email address or your mailing address visible to others.

Plusses and Minuses

Please fill out the following short worksheet by identifying five “plusses” (positive things) and five “minuses” (negative things) about the prototype that you would be willing to share with the focus group. Put in order from most important to least important.

+1	
+2	
+3	
+4	
+5	
-1	
-2	
-3	
-4	
-5	

Focus Group Guiding Language and Questions

Hi, Focus Group A | B | C! My name is Abby Baker, and I'm going to be moderating this session today.

Before we begin, I have some information for you, and I'm going to read it to make sure that I cover everything.

You probably already have a good idea of why I asked to meet with you today, but let me go over it again briefly. I'm asking people to try using a prototype website that I'm working on so I can see whether it works as intended, then to talk with each other about it. The session should take about an hour.

The first thing I want to make clear right away is that I'm testing the site, not you. You can't do anything wrong here, and there are no "wrong" experiences or opinions.

Also, please don't worry that you're going to hurt my feelings. I'm doing this to improve the site, so I need your honest reactions and contributions to the conversation.

If you have any questions as we go along, just ask them. I may not be able to answer them right away, since I'm interested in how people think when they don't have me there. But if you still have any questions when we're done I'll try to answer them then. And if you need to take a break at any point, just let me know.

You may notice that I take notes during the session, and you might remember that at the time of signing up for this focus group, you gave consent for me to audio record this focus group. These will only be used to help me figure out how to improve the site, and they won't be seen or heard by anyone except me. The recordings will be deleted immediately after being transcribed and any published quotes will be anonymous. To protect your identity, it is advised to refrain from using last names or other identifying information during the focus group. If, at any time, you do not want to be recorded, you may ask for recording to stop.

Do you have any questions so far?

Great! Let's get started. I'm going to ask around 8-9 questions to generate a dialogue between you about the site. Other than asking the questions, I will not be participating in your discussion.

1. Have you used any online learning tools before?
 - a. Were you involved in creating them, maintaining them, or using them?
2. Is this website different or similar to what you expected? How?
3. Would you share one "plus" from your experience beta-testing the website, starting with [name]? Feel free to respond to each other.
 - a. If responses are not organic, moderator may ask, "did anyone else have a similar experience or feeling as [name]?"
4. Would you share one "minus" from your experience beta-testing the website, starting this time with [name]?
 - a. If responses are not organic, moderator may ask, "did anyone else have a similar experience or feeling as [name]?"
5. In what ways do you think the website could provide more opportunities for engagement?
 - a. The moderator should allow each group to decide if engagement refers to with the content, with the instructor, or with member-peers.
6. What is one way you think the website could be improved to fit your needs and wants?
7. How do you think the website could be improved to encourage communication among members?
8. Would you pay for access to this website, based on its features?
9. Do you think OLLI at ASU members would enjoy using this website?

Thank you very much for the feedback! I appreciate the time and energy that you've spent on this exciting project. Do you have any questions for me, now that we're done?



EXEMPTION GRANTED

[Claire Lauer](#)
[CISA: Interdisciplinary Humanities and Communications](#)
480/828-3881
Claire.Lauer@asu.edu

Dear [Claire Lauer](#):

On 8/2/2019 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Focus Group Study - Online Learning Platform
Investigator:	Claire Lauer
IRB ID:	STUDY00010129
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none">• IRB 2 Protocol.pdf, Category: IRB Protocol;• IRB 2 Instructions.pdf, Category: Participant materials (specific directions for them);• IRB 2 Recruitment.pdf, Category: Recruitment Materials;• IRB 2 Enrollment Form.pdf, Category: Consent Form;• IRB 2 Questions.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 8/2/2019.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

