Tutor-Facilitated Digital Literacy Acquisition in Hard-to-Serve Populations: A Research Project

4-2015

Operationalizing Success in a Digital Learning Environment Designed to Support Vulnerable Adults

Elizabeth Withers
Portland State University, elizabew@pdx.edu

Jill Castek
Portland State University, jcastek@pdx.edu

Robert Fountain
Portland State University

Drew Pizzolato
Portland State University, apizzola@pdx.edu

Kimberly D. Pendell
Portland State University, kpendell@pdx.edu

See next page for additional authors

Let us know how access to this document benefits you.
Follow this and additional works at: http://pdxscholar.library.pdx.edu/digital_literacy_acquisition_findings
Part of the Applied Linguistics Commons, and the Information Literacy Commons

Recommended Citation

This Presentation is brought to you for free and open access. It has been accepted for inclusion in Presentations and Publications by an authorized administrator of PDXScholar. For more information, please contact pdxscholar@pdx.edu.
Authors
Elizabeth Withers, Jill Castek, Robert Fountain, Drew Pizzolato, Kimberly D. Pendell, Gloria Jacobs, and Stephen Reder
Operationalizing success in a digital learning environment designed to support vulnerable adults

Elizabeth Withers elizabew@pdx.edu (Graduate Student in Sociology)
with Jill Castek, Robert Fountain, Andrew Pizzolato, Kimberly Pendell, Gloria Jacobs, and
Stephen Reder
Literacy, Language, and Technology Research Group, Portland State University

This research was supported by grants from the Institute of Library and Museum Services (LG-06-11-0340-11) and the Broadband Opportunities Technology Program (41-43-B10593) of the U.S. Department of Commerce.

Abstract

This study seeks to examine patterns of successful learning identified when economically vulnerable, underserved, and high-need adults engaged in self-access, tutor facilitated learning to acquire digital literacy. In large part, this diverse population of learners has been left behind in the digital revolution, thus compounding their social, economic, and educational disadvantages. These individuals have unique patterns of engagement within educational endeavors, at times dropping in and out of programs as a result of social and economic impediments that permeate their lives. Traditional means of identifying success in their learning endeavors inadequately describe the paths these learners take on the road to acquiring digital literacy. This research explores ways to operationalize the success of adult learners who come to public access computer labs in libraries, adult education, and community organizations for tutor-facilitated support to acquire digital literacy. Findings suggest that adults’ digital literacy learning, and the programs that support this learning, are best explored using aspects of goal directed learning that consider dimensions of the learners’ self-directed goals as a means of learner and program success.

Rationale

Digital literacy is fundamental to participation in today’s digital world (U.S. Department of Education, 2010). It encompasses the cognitive and technical abilities needed to use digital technologies for finding, evaluating, creating, and communicating information (American Library Association, 2012). This ever-developing skillset requires cognitive flexibility as the digital technologies and the literacies needed to navigate them constantly evolve (Leu, Kinzer, Coiro, Castek, Henry, 2013). Being digitally literate plays a central role in our workplace and social lives, and being online connects us to educational and employment opportunities, public services, healthcare, civic participation, and entertainment. It allows us to stay connected in a world where interactions among friends, family and acquaintances are often sustained digitally.

Ensuring all citizens acquire digital literacy skills is a national priority, supported by federal agencies such as the Department of Commerce and the Department of Education. It is
also a primary mission of the nation’s public libraries (Public Library Association, nd). Because so many aspects of work and social life depend on digital participation, adults who lack fundamental digital literacy skills are marginalized in terms of limited opportunities to take part in our participatory democracy. Also limited are abilities to engage in educational experiences, find and use health care, find and use online information, find and keep a job, and engage with family, friends, and the community (Jimoyiannis & Gravani, 2010). Those who are low income, seniors, English language learners, immigrants, incarcerated, or who have limited educational experience are often those who lack digital skills (Wei & Hindman, 2011) and are particularly vulnerable to social exclusion (Zickuhr, 2013). While these individuals are capable of acquiring these skills, their individual and unique needs are often not considered when it comes to public educational programming. Castek, et al. (in preparation) interviewed individuals who were developing digital literacy skills. Interviewees reported having few school experiences that made them feel successful. Many reported a lack of confidence in their own learning and few indicators marking their success. Some reported having exited formal schooling with a feeling that they were not successful and could not learn. These individuals came into the digital literacy program with limited knowledge about computers, low self-confidence about learning, and anxiety that they would break the computer, as well as at times a feeling of embarrassment associated with having low digital literacy skills. Their lack of familiarity was compounded by the numerous terms and new vocabulary that surround using a computer skillfully. All learners who took part in the program were offered opportunities to learn and were provided access to a tutor who aided them in grasping the program’s design and structure and supported their learning by answering questions and demonstrating and guiding application of the concepts introduced in the self-pace learning management system. In addition, tutors aided in goal setting, offered opportunities to review and practice the skills learned, and encouragement to continue learning.

Purpose

While research has demonstrated adults’ need digital skills (Kambouri, Mellar, & Logan, 2006), little work has been directed at describing the ways vulnerable adult learners successfully engage in learning these skills. This is a critical and significant gap in the literature because success can and should be defined uniquely when referring to the acquisition of digital skills among vulnerable populations. Success for these individuals is often based on discrete life goals such as being able to share emails and photographs with geographically distant family or using the online bus schedule and Google maps to get from point A to B efficiently, or comparison shopping online without needing to travel to several different stores. What becomes clear is that success cannot be measured using results of standardized tests that compares all learners on the same metric because their path to digital literacy is motivated by the goals they self-identify and set out to learn, not by a prescribed scope and sequence with a determined end point and sequenced by a fixed set of curriculum materials. As a result, approaches that examine outcomes in relationship to learners’ individual goals are needed to explore vulnerable adult learners success in acquiring digital literacy.
The purpose of this paper is to examine ways to operationalize success such that these measures take into consideration learners’ steps along the way of becoming skilled in digital literacy, and not simply the end result. This approach stems from the construct of digital literacy, which can be highly individual and dependent on the goals and purposes learners set for themselves. As a result, determining when, how, and under what conditions digital literacy skills are achieved requires careful consideration.

To be able to look at these constructs in a mixed-method framework, we needed to construct valid and reliable ways to operationalize success for this vulnerable population so that we could describe the models and environmental supports put in place within those learning settings that are associated with learners’ success. If these aspects can be reliably operationalized and examined, factors that contribute to learners’ success can then be carefully considered when designing instructional programs seeking to achieve similar aims.

**Research Question**

This study investigated the following research question: What characteristics predict learners’ success in a self-access, tutor-facilitated digital literacy program as measured by a) goal achievement, b) resource engagement, and c) completing knowledge checks?

**Theoretical Framework**

The lens through which we viewed this research was informed by theories of self-directed adult learning (Brookfield, 1984; Knowles, 1975; Moore, 1980) and andragogy (Merriam, 2001). We adopted these perspective because we recognize that digital literacy acquisition is a personally meaningful, goal driven process that does not unfold in a linear way. When a vulnerable adult learner proceeds on a goal-driven path toward achieving digital literacy, detours, doubling back, and occasional dead ends are common. As recognized by Tough (1989) self-planning and deciding are key aspects of learning. Knowles (1975) complements this with the suggestion that, "In its broadest meaning, ‘self-directed learning’ describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes." (p. 18). Adopting a self-directed learning frame for viewing our data lead us to consider the role that learning behaviors, demographic characteristics, and lab environments can play in predicting goal-driven digital literacy acquisition among vulnerable adult learners.

A second lens we viewed our data through is one of andragogy defined as the art and science of helping adults learn (Knowles, 1975; Merriam, 2001). Merriam (2001) asserts five assumptions that underlie the concept of andragogy. These assumption describe the adult learner as someone who (1) has an independent self-concept and who can direct his or her own learning, (2) has accumulated a reservoir of life experiences that is a rich resource for learning, (3) has learning needs closely related to changing social roles, (4) is problem-centered and interested in immediate application of knowledge, and (5) is motivated to learn by internal rather than external factors. As such, an andragogy approach comes from a perspective that recognizes adults innate capability to learn, not their deficits. Implementation of the digital literacy learning...
environments studied here held true to these principles, and undergirded our interpretation of the data we analyzed.

**Background**

The research described in this paper is a part of a larger three-year study “Tutor-facilitated Digital Literacy Acquisition in Hard-to-Serve Populations” funded by the Institute for Museum and Library Services (IMLS). The study’s purpose was to examine the digital literacy acquisition process among vulnerable adult populations and focused on the experiences of adult learners participating in a Broadband Technologies Opportunities Program (BTOP), which was funded by the U.S. Department of Commerce.

In partnership with Portland State University (PSU), this BTOP service project was designed to address digital literacy barriers to broadband access and use among marginalized adult populations in the United States by providing digital literacy training using a self-paced, tutor-facilitated, learning model supported by the online learning platform, the Learner Web. The Learner Web is a self-access, learner-centered, online learning platform that organizes goals into learning plans, tracks learners’ progress, and provides a coordinated set of online resources to help learners achieve their goals. Working with six national partners sites across five states, as part of the PSU-BTOP project, a customized learning approach that held true to aspects of self-paced tutor facilitated learning, but was uniquely implemented to meet the needs of learners in each context. Within the service project, computer labs were established in a wide variety of community settings, from libraries to jails to churches to more traditional adult basic education classrooms. Participation in the project was considerable, with over 12,000 learner-participants and over 500 tutor-participants. Tutors (which included both volunteers as well as paid staff) logged over 50,000 hours in over 160 different local computer labs.

This PSU-BTOP project provided a multiple settings to examine the digital literacy acquisition process for vulnerable adult learners. This larger mixed-methods descriptive study (of which the research described in this paper is a part) examined the experiences of participants including program administrators, tutors, and learners. The study utilized qualitative interviews, and lab observations, as well as quantitative data collected from the Learner Web online management system to collect data and examine the tutoring approach, and the learning environment within computer labs serving vulnerable adult learners. These data were then used to better understand how digital literacy was acquired by vulnerable adult learners.

This research focused on experiences within a self-paced, tutor facilitated educational program. Vulnerable adults who took part were individuals who were economically disadvantaged and those who are often marginalized or socially excluded including recent immigrants and English language learners, senior citizens, incarcerated individuals, persons with disabilities, unemployed, homeless, adults with few years of formal schooling, and others who lack digital skills and access.
Methods

Data Sources

This research utilizes data collected through the online learning platform, the Learner Web, as it was used during the PSU-BTOP project. This system tracked the participants’ interactions with the online learning content including information regarding learner behaviors in terms of selection, activation, and completion of learning plans, use of online resources, as well as their self-reported demographic information. Learners who participated in the program completed over 37,000 learning plans within the Learner Web system.

The initial sample size was N= 12,126. However, the implementation of the PSU-BTOP project, from which these data were collected, occurred in such a way that not all of the initial computer labs were able to offer sustained services to learners in their community. While there were a total of 160 computer labs established at some point during the project, there was a large degree of variation regarding the number of learners they served as well as the overall time and consistency of their hours of operation. As such, for the purposes of this research, only established labs were included in the analytic sample. A lab was considered to be established if it met the following criteria. A lab was established if it was both open for 30 days or more and had a ratio of total calendar days between the first day and last day open to actual number of days open to learners, was less than or equal 9.8 (a level that indicated the lab was up and running and had procedures in place for service learners). A lab was also considered established if it served 50 or more learners regardless of the number of days it had been open. Our final sample, N= 10,961 was limited to just those learners from the 77 established labs.

Measures

To examine learners’ progress on their path to digital literacy, three measures of success were created. These were (1) goal achievement, (2) resource engagement and, (3) completing knowledge checks. These derived variables were created using data that was consistently and systematically collected from the Learner Web learning management system using valid and reliable procedures of logging and tracking learners’ activities.

Goal achievement. The goal achievement variable was designed to gauge learners’ follow through on completing their self-selected goals. When learners entered the learning environment, they were provided an opportunity to set their own goals during an intake process initiated by their first log-on to the Learner Web. They could track their own progress toward meeting their goal targets and could add additional goals beyond those originally chosen. This variable measured how successful a learner was in terms of completing the learning plans they selected for themselves. The variable was coded as follows: completion of none of the learning plans they selected (0), completion of some of the learning plans selected coded (1), completion of all of the learning plans selected (2), and completion of more than the learning plans initially selected (3). Examining success as a means of follow-through is consistent with aspects of self-paced, self-directed adult learning (Knowles, 1975; Merriam, 2001).
**Resource engagement.** The resource engagement variable was created in order to examine learners’ participation in the learning process in terms of their utilization of online resources offered as part of the curriculum in the Learner Web. Online resources play an integral role in the Learner Web curriculum on digital literacy as they provide learners with experience navigating the Internet outside of the learning platform. Additionally, online resources offer multi-media learning support, which can be especially important for learners with low levels of traditional literacy. Each resource is meant to help learners gain the knowledge needed to meet the objectives of the learning plans within which they are included. The variable was measured as the percent of resources visited out of the total number of resources provided within the learning plans that the learners began working on at some point in time.

**Knowledge checks.** The third measure of success was created in order to examine a learner’s ability to complete knowledge checks. This variable was measured using the learner’s interaction with quizzes in the Learner Web system where each learning plan is comprised of multiple steps. Quizzes are given as the final piece to each learning step and are designed to test the learner’s comprehension of the material covered in the step. Learners are unable to advance onto next steps without receiving a 100% on their quiz and are able to retake the quiz as many times as they need in order to achieve this outcome. This variable measured success in terms of the number of quizzes the learner achieved 100% out of the total number of quizzes associated with steps in the learning plans that they activated at some point.

**Examination of the Learner Path**

The construction of these three variables were informed by a grounded theory analysis of learner, tutor, and program administrator interviews that we analyzed in conjunction with the quantitative data from the learning management system. These companion qualitative analyses described aspects that define the learner path toward digital literacy acquisition. A brief description of the learner path follows.

Learners begin their path to acquiring digital literacy by finding out about the program either through advertising, a personal invitation, or word of mouth. Their participation was typically driven by their life goals and what they were seeking to do with the skills acquired. Throughout the program interaction phase, the learners’ motivation and practice (in tandem with tutor support, the online learning management system, and the lab environment) was shown to be geared toward completion of their self-selected learning goals. Several elements interacted to propel successful learners forward in their learning. These aspects include a feeling of success, which was often achieved by tracking their own progress, and successfully completing knowledge checks that demonstrate they have met target objectives.

Often, learners worked at their own pace with the aid of a tutor as needed. During this time, they frequently experienced a growing sense of confidence and self-efficacy and moved through periods of discovery and goal setting, uncovering new content and skills that prompted them to reassess their understanding of what is possible in the digital world. As learners’
understanding, skills, and goals broadened, they were guided to explore a wide range of digital spaces (information gathering, social networking, career enhancement, etc.).

At times, learners experienced roadblocks in their learning. For successful learners, roadblocks could be overcome with support from tutors, other learners, family and friends, along with their growing sense of confidence and self-efficacy. When learners approached roadblocks and experienced frustration, the tutors stepped in to provide support as needed. After learners left the program, they continued moving through the discovery and goal setting process with support from family, friends, and community resources (such as the library or community based organizations).

Learners also began to integrate skills and recognize the impact their newly acquired digital skills had on their lives. They learned to find help on their own through resources such as Google, tutorials, help menus, or by experimentation/trial and error. They also experienced for the first time the ability to email with family and friends to share pictures or find a job through an online posting that they would not otherwise have known about.

These aspects of the learner path can be understood as developing in terms of three pivotal moments, best described as the, “I’m not going to break it”; “I can do it,”; and “This is important to me,” thresholds. Though non-linear by nature, figure 1 attempts to capture events in the learner path graphically. By examining the learner path in tandem with the three success measures described below, we were able to triangulate findings from data sources and ensure that the qualitative aspects of the study were informing the construction and interpretation of quantitative variables.

Figure 1. A graphic depiction of the learner path gleaned from qualitative data analysis.

**Learner Path**

**Phases of Learner Interaction**

**Skills Integration & Impact**

**Program Interaction**

**Entry**

Pivotal Moments for Learners

This is important to me!

I can do it!

I’m not going to break it!
Predictors of Success

In order to examine our three qualitatively informed measures of success and determine both their relationship to characteristics of the learners and their learning environments, as well as their usefulness in highlighting effective learning strategies, we included a number of predictive variables in our multiple linear stepwise regression analyses. Variables used to measure learners’ success were grouped into the following categories: learning behavior (engagement, persistence, review and practice with resources); learner demographics (level of education, age, predominant language, and race and ethnicity), region (six regional locations where the program was implemented, and lab setting (learners per tutor, maximum learners per lab day, and type of lab setting such as workforce center, library, K-12 school, etc.).

First, in terms of learning behavior, we included measures of engagement, persistence, review and practice, and number of sessions learners attended in the lab. As a predictor, the log of the success measure of engagement with online resources was used. Persistence was measured in terms of how many times learners had to take a quiz before they achieved 100%. The log of this measure was included. Review and practice was measured in terms of the number of times learners went back to material they had previously completed. The log of this measure was also included. The number of sessions a learner engaged in was included and was measured in terms of total number of times the learner logged on to the Learner Web. Finally, in terms of learning behaviors, active plans max, which captured the maximum learning plans a learner had simultaneously activated at any given time throughout their learning path. This measure was created in order to interrogate different learner strategies and whether or not there were benefits or downfalls associated with either working through the material in a linear way or in a more integrated manner.

Because one of the primary objectives of the PSU-BTOP project was to provide underserved adult populations with digital literacy instruction, computer labs were implemented in a variety of settings offered through partnerships with a diverse number of institutions. The idea was to offer these services where people who needed them were already present (e.g., library programs offering GED classes, one-stop social service agencies, workforce centers, etc.). The structure of these labs was fluid and were shaped entirely around the needs and wishes of the community, both providing and utilizing the services. As such, there existed a diverse range in lab settings, from what kind of institution they were located within and supported by, to how many learners their infrastructure was designed to support, to the tutor per learner ratio.

Variables were designed to capture the impact that different lab environments may have on the learning experience. The learner per tutor variable was designed to capture the average learner-tutor ratio at a given lab and was measured in terms of the total number of learners per total number of tutors at that lab during the program. Also, total learners served by lab and max number of learners, which measured the total number of learners served at a lab on its busiest day, were included in regression models. As computer labs were implemented in a variety of different settings as part of the PSU-BTOP program, lab types were coded in terms of six different categories. These included, adult basic education settings, community based
organizations, public libraries, reentry program for incarcerated learners, workforce centers, and labs in K-12 school settings. Finally, we examined the impact and variation due to regional differences based on the 6 geographic regions where the program was implemented: Richmond, CA, New Orleans, Louisiana, Central and South Texas, Minnesota, and New York.

Analyzes

Descriptive analyses were conducted in order to examine whether distributions were normal. These analyses revealed that engagement, persistence, and review and practice variables were highly skewed to the right. Capping the upper limits of these variables did not fix their skewness. Logs of the values were used instead which resolved the issue of distribution.

Multiple linear stepwise regression analyses were used to assess how well learner success, in terms of goal achievement, resource engagement, and completing knowledge checks, could be explained by learning behaviors (e.g. sessions attended, time logged in system), learner demographics (e.g. race, age, gender, ethnicity, level of education, predominant language), and lab environment (e.g. lab setting, number of tutors in lab). These models were run separately and while resource engagement was included as an independent variable in models 1 and 3, it was only included as the dependent variable in model 2.

Results and Discussion

Results for model 1 show that a total 19 of the independent variables included were statistically significant predictors of goal achievement and that these variables explain roughly 33% of the variance in goal achievement. Results for model 2 indicate that a total of 21 of the independent variables included were statistically significant predictors of engagement with online resources and that these variables explain roughly 31% of the variance in engagement. Results for model 3 show that a total of 14 independent variables were statistically significant predictors of success in completing knowledge checks and that these variables explain around 17% of the variance in completing knowledge checks. While the results of each of the 3 models do provide interesting findings which will be discussed in detail, they also point to a limitation. The model fit for each of the 3 models only explain a small portion of variation. As such, we recognize that the picture of success is more complex than the three measures we have derived and the predictors included. Table 1 provides unstandardized coefficients, standard errors, and significance levels for the three models.

Table 1. Stepwise Regression Measuring Learner Level Predictors of Success Measures (see table on last page of this paper).

Learning Behavior

Results from models 1 and 3 show that while engagement with resources and persistence are positively associated with goal achievement and completing knowledge checks, review and practice is negatively associated with both measures of success. These results suggest that being persistent in one’s learning as well as engaging with the online resources available through the
Learner Web, supported learners in their ability to master the content of each learning plan and therefore pass the quizzes. These successes may have had a positive impact on the learner’s level of motivation and confidence leading to higher levels of overall goal achievement. However, the negative association between the review and practice variable and these two measures of success may indicate that learners who spend a lot of time reviewing material and practicing their skills do so because they have not fully mastered the materials and are not ready to move on. Engagement was not included as an independent variable in model 2 and neither persistence nor review and practice were significant predictors of engagement in model 2. While number of sessions did not have a significant effect on goal achievement or completing knowledge checks, it was positively associated with engagement. This finding may indicate that learners who had more sessions working with the Learner Web engaged more freely and thoroughly with the content. In contrast, active plans max, was negatively associated with engagement, which may suggest that learners who worked through multiple learning plans simultaneously were engaging with the material on a more superficial level and not accessing the online resources portions of the curriculum.

**Education**

In general, our results suggest that having higher levels of education may be an asset in acquiring digital literacy skills. For example, having only an elementary school level of education was negatively associated with goal achievement and completing knowledge checks. However, having completed some college was positively associated with goal achievement and resource engagement, and having graduated from college was positively associated with goal achievement. These results suggests that learners with fewer years of formal schooling need more support to set goals, and persevere to master the learning material they engage with. Those with more years of formal schooling may not only have the skills and persistence to set and achieve goals, but also to engage with resources to expand their knowledge base. Initiating peer assistance across these groups might serve both groups well in terms of building confidence in learning and follow-through with goal setting.

**Lab Environment**

**Regions.** Labs in different areas of the country utilized different methods to meet their learners digital literacy needs. The labs in the New York region appeared to spend time focusing on goal setting and goal attainment with their learners and the region was positively associated with this measure of success. Being a learner in Richmond was positively associated with resource engagement. South Texas, provided an environment and tutor support where learners were nurtured in goal setting, motivated through resource engagement, and encouraged to complete knowledge checks. Being a learner in South Texas was positively associated with all three of these measure of success. Being a learner in New Orleans was positively associated with goal achievement and resource engagement.
**Lab Setting.** Attending a lab within a K-12 school was negatively associated with goal achievement. This may have been a case of limited time to achieve goals due to constraints present within the learning environment. For example, many learners attended these labs with their children and spent time monitoring their activities in addition to engaging in the learning activities designed for them. However, attending a lab in a K-12 school was positively associated with engagement. This suggests that learners at these labs were taking time to explore resources within the learning plans they completed to fully explore the aspects of the learning plans they had selected to work on.

Being a learner within the re-entry lab was positively associated with goal achievement and negatively associated with engagement. We interpret this finding to indicate that a learning environment that places time limits and restrictions to resources, as was the case in the re-entry lab, may limit what goals participants can achieve and the amount of review they can engage in. This interpretation was further supported by interviews with participants and program managers in those settings.

Attending a lab in a library was positively associated with goal achievement and completing knowledge checks. These findings may be a result of learners and their tutors who worked together in library settings taking time specifically for goal setting. By exploring the content offered with each learner, and discussing what each learner intended to learn, a good match was made between program offerings and learner goals. This interpretation was supported by interviews with participants and program managers in those settings conducted as part of the qualitative portion of the larger research project.

While being a learner within a workforce center was positively associated with resource engagement it was negatively associated with completing knowledge checks. This suggests that learners in this environment took the time to explore resources provided to them. The negative association with completing knowledge checks may indicate that learners in these setting were more interested in viewing the content and accessing the resources than they were with interacting with assessment tools.

Attending a lab in a community-based organization was shown to have a negative association with resource engagement. Perhaps, this was due to the challenges CBOs had with managing open lab times. Some labs had learners wishing to complete self-selected activities (e.g., viewing YouTube videos, listening to music) during open lab times that were not related to the digital literacy acquisition program. Due to competing space within the lab environment, limitations on lab time may have limited time that learners in the lab to engage with resources.

**Demographics**

**Age.** Age has been shown to have a significant impact on levels of digital access and especially on digital literacy skills (Eshet-Alkalai & Chajut, 2009). This research highlights some of the age related differences in learner acquisition path to digital literacy. Being under 18 or between 18-24 were negatively associated with resource engagement, while being between the ages of 45-64 or 64 and above was positively associated. These findings suggest that those
within the older age brackets were more likely to utilize the online resources portion of the learning content than their younger counterparts, who may not have found the resources as interesting, relevant, or necessary. Additionally, in terms of goal achievement, being between the ages of 18 and 24 was shown to be positively associated with goal achievement while being between the ages of 45 and 64 was negatively associated. This finding could be interpreted a number of ways including that younger learners found that they could acquire the skills more easily, or that older learners put more focus on taking their time and engaging with the materials than with completing goals.

Race and ethnicity do not appear to have much effect on goal achievement or on completing knowledge checks. Although, being Hispanic was found to be negatively associated with goal achievement and completing knowledge checks. This may have been due to a difficulty with providing a good understanding of goals offered and matching resources to goals and outcomes expressed through knowledge checks. More attention needs to be paid to the needs of Hispanic learners. However, being, Hispanic, Biracial, Black, White, Native American, and Asian were all shown to be positively associated with engagement. This finding suggests that individuals from all backgrounds were supported to engage with the resources provided within the learning plans. Multimedia resources may well have supported engagement.

**Scholarly Significance**

The tremendous growth of new technologies is considered a driving force that had transformed our world into a global, universal society (Jimoyiannis & Gravani, 2010). The ability to connect digitally affects our lives and everyday relationships as well. These skills make it possible to access a range of information, interact with public services, communicate with friends, engage in politics, gain employment, and participate in ongoing education. Without these skills, adults are less likely to fulfill their life goals participate fully in all aspects of society.

Proficiency with digital literacy is the driving force for widening adults’ participation in everyday activities, the workplace, and engagement lifelong learning (Gorard, Selwyn, & Madden, 2003). The examination of different measures of success presented in this research offers a distinctive approach to thinking about educational opportunities focused on increasing digital literacy among highly vulnerable populations of adults. By providing an expanded model of how to determine success for this population, we have targeted important areas of focus for program implementation. For example, recognizing the common markers that exist in a learners path, marking learners’ progress toward their self-identified goals, and looking for patterns within resource engagement and success with knowledge checks appears to offer a valid and reliable view of successful progress. Examining these aspects in relation to learning behaviors, lab environments, and demographic characteristics offers us opportunities to provide more support by taking into consideration and being responsive to, the specific needs different populations of learners given their age, location, language, gender and educational background.
This study will help libraries, adult education programs, community based organizations, and other stakeholders advance the charge of supporting digital literacy for all by offering approaches that help learners identify their goals and work toward meeting them. It also identifies the unique aspects of learner support that help build toward individualized goal attainment, including characteristics of the learning environment and self-managed features that can be built into a learning management system. Because digital literacy is not a linear process of acquisition, understanding success as a multifaceted construct that is correlated with certain variables may support program designers in building in more individualized supports for target learners.

Findings add to the limited existing research literature on effective learning and teaching strategies for varied non-traditional adult populations, including low-income, low-literate, elderly, and English Speakers of Other Languages (ESOL) groups who are new to, or with limited access to, technology. The resulting knowledge will enable libraries and other providers to tailor service strategies more effectively to diverse audiences and prepare many more individuals to cross the digital divide and participate in an increasingly digitalized world.
References


Public Library Association (n.d.) Website materials available at http://www.ala.org/pla/


Table 1. Stepwise Regression Measuring Learner Level Predictors of Success Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Goal Achievement</th>
<th>Engagement</th>
<th>Completing Knowledge Checks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning Behavior</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engagement</td>
<td>.646 (.036)***</td>
<td></td>
<td>.226 (.012)***</td>
</tr>
<tr>
<td>Persistence</td>
<td>.211 (.019)***</td>
<td>.146 (.006)***</td>
<td></td>
</tr>
<tr>
<td>Review and Practice</td>
<td>-.272 (.030)***</td>
<td>-.177 (.010)***</td>
<td></td>
</tr>
<tr>
<td>Number of Sessions</td>
<td></td>
<td>.016 (.001)***</td>
<td></td>
</tr>
<tr>
<td>Active Plans Max</td>
<td></td>
<td>-.031 (.003)***</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary School</td>
<td>-.095 (.046)*</td>
<td></td>
<td>-.044 (.015)**</td>
</tr>
<tr>
<td>Some College</td>
<td>.050 (.022)*</td>
<td>.014 (.006)*</td>
<td></td>
</tr>
<tr>
<td>University graduate</td>
<td>.076 (.031)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>.219 (.026)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Texas</td>
<td>.279 (.036)***</td>
<td>.136 (.008)***</td>
<td>.088 (.011)***</td>
</tr>
<tr>
<td>New Orleans</td>
<td>.573 (.024)***</td>
<td>.048 (.007)***</td>
<td></td>
</tr>
<tr>
<td>Central Texas</td>
<td>-.221 (.034)***</td>
<td>-.067 (.011)***</td>
<td></td>
</tr>
<tr>
<td>Richmond</td>
<td></td>
<td>.024 (.007)***</td>
<td></td>
</tr>
<tr>
<td><strong>Lab Setting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learners per Tutor</td>
<td>.001 (.000)**</td>
<td></td>
<td>.000 (.000) *</td>
</tr>
<tr>
<td>Total learners</td>
<td></td>
<td></td>
<td>9.885E-5 (.000)***</td>
</tr>
<tr>
<td>Max learner/lab days</td>
<td>.006 (.001)***</td>
<td>-.001 (.000)***</td>
<td></td>
</tr>
<tr>
<td>K-12 lab</td>
<td>-.072 (.033)*</td>
<td>.023 (.009)***</td>
<td></td>
</tr>
<tr>
<td>Re-entry lab</td>
<td>.688 (.041)***</td>
<td>-.220 (.009)***</td>
<td></td>
</tr>
<tr>
<td>Library lab</td>
<td>.196 (.042)***</td>
<td></td>
<td>-.065 (.014)***</td>
</tr>
<tr>
<td>Workforce</td>
<td></td>
<td>.044 (.006)***</td>
<td>-.029 (.006)***</td>
</tr>
<tr>
<td>CBO lab</td>
<td></td>
<td>-.063 (.007)***</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 18</td>
<td></td>
<td>-.039 (.017)*</td>
<td></td>
</tr>
<tr>
<td>18 - 24</td>
<td>.078 (.023)***</td>
<td>-.032 (.006)***</td>
<td></td>
</tr>
<tr>
<td>45 - 64</td>
<td>-.092 (.016)***</td>
<td>.010 (.005)*</td>
<td></td>
</tr>
<tr>
<td>64+</td>
<td></td>
<td>.030 (.008)***</td>
<td></td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>.126 (.025)***</td>
<td>-.070 (.007)***</td>
<td>.028 (.008)***</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.214 (.078)**</td>
<td>.045 (.011)***</td>
<td>-.033 (.008)***</td>
</tr>
<tr>
<td>Biracial</td>
<td>.069 (.022)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>.066 (.010)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>.064 (.010)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>.073 (.024)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>.032 (.015)*</td>
<td>-.050 (.015)***</td>
<td></td>
</tr>
<tr>
<td><strong>(Constant)</strong></td>
<td>.207 (.039)***</td>
<td>.274 (.012)***</td>
<td>.736 (.012)***</td>
</tr>
<tr>
<td>Model Fit</td>
<td>Adjusted R squared</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.330 (.655)</td>
<td>.310 (.204)</td>
<td>.173 (.221)</td>
</tr>
</tbody>
</table>