The objective of the study explored community college leaders’ perceptions of learning technology (LT) and digital literacy (DL) on their campuses and to understand the leadership approach of transformation theory might address these concepts at two rural community colleges located in the Southeastern United States. The study reveals institutions have certain DL standards and guidelines for the faculty. The leadership is aware of the need for digital learning development and continuous faculty and personnel DL training. Moreover, digital learning and DL are no longer an option; institutions have to prepare students for today’s business and commercial community that work in a digital technology environment. Keywords: digital learning, digital literacy, transformational leadership theory, digital literacy self-efficacy, dimensions of digital learning, digital learning benchmarks.

Digital technologies serve those who use the devices and whose behavior is consequently changed (Bennett, 2010). Advances in technology are changing the way faculty teach and students learn (Prior, Mazanov, Meacheam, Heaslip, & Hanson, 2016). Technology affects leadership and faculty learning technology (LT) interpretation, altering the type and degree of adoption used during instruction. The format of information delivery changed with the emergence of digital learning, digital literacy (DL), and digital information literacy (Selwyn & Facer, 2014).

Digital learning is a method of information delivery using technology to convey instruction for learning experiences (e.g., a learning management system [LMS], curation tools, web browsers,
and Google Cloud Docs), where information exchange and learning are ubiquitous and occur in real time. Such technology leverages web-enabled devices and embodies digital learning (Brown, Dehoney, & Millichap, 2015; Velev, 2014). While DL is the ability to use technologies to find, evaluate, create, and communicate information, requiring noncognitive and technical skills (Digital Literacy Taskforce, 2013, p. 2). DL self-efficacy is distinct from computer competence because of the need for both technical self-efficacy and cognitive skills to understand the information the technology provides to achieve a learning result (Adam-Turner, 2017; Belshaw, 2014).

Disruptive innovation occurs when new technologies attempt to replace standard and traditional methods bringing unforeseen consequences (Christensen & Eyring, 2011). Perceptions still linger where technology inclusion is disruptive (e.g., transitory software and hardware are constant disruptors in higher education) (Flavin, 2012). Placed in a context of strong leadership, the disruptive introduction of new technology supports and enhances teaching, learning, and management in higher education (Allen, Seaman, Lederman, & Jaschik, 2012).

Postsecondary leaders need digitally literate personnel to manage constant, rapid changes in technology designed to support administration and teaching. The limited research available assesses rural community college personnel’s degree of digital learning and the scope of DL incorporated in curricula. Determining metrics is the first step for community college leaders interested in achieving digital learning and DL for faculty and students, and thus remaining competitive in rapidly changing technological environments.

Politicians and college leaders agree incorporating technology into learning and teaching provides data for better decision-making and performance management (McMillen, 2010). Research on government policy and public demand suggests higher education should be prepared to adapt to and adopt digital learning (McGoldrick, Watts, & Economou, 2015). Institutional leaders expect faculty and staff to adopt digital learning for teaching, research, and support services. LT adoption is more than providing hardware and computer skills; incorporating digital learning into daily routines includes changes to attitudes and behaviors (Prior et al., 2016). Administrators and faculty attitudes toward digital learning and DL encourage continued pedagogical research because some people embrace the challenge and others struggle.

Digital learning and DL add value, strengthening academic programs, increasing access, and improving curriculum development and delivery.
Beetham and Sharpe (2013) argue that digital learning helps educators understand how students learn. Technology offers rapid responses and immediate student feedback, but digital learning adoption, and understanding DL beyond learning outcomes, influences an institution’s technology infrastructure (Selwyn, 2014, p. 20). Linder-VanBerschot and Summers (2015) advocate the adoption of digital learning in the classroom, suggesting that academic members should accept that people exist in a culture of change, and difficulties arise when an unstable digital learning environment exists. Disruptions represent a means to address issues in college members’ daily routines. When technological innovation occurs, updates and revisions become normal, and administrators, faculty, and students must learn to cope with and look for the benefits of such changes (Linder-VanBerschot & Summers, 2015).

**Disruptive Innovation Leading Technological Change**

Bates (2000) ascertained that for colleges that approach these issues “where technology was being used successfully for teaching, strong leadership was a critical factor. Without leadership and a sense of support for changes in an organization, the barriers of inertia can be great” (p. 43). Personal attitudes determine an initial decision to engage in the behavior, and self-efficacy is a powerful determinant of behavior transformation that influences the effort a person expends and the persistence applied to the action (Bandura, 2001). The ability to apply digital learning and DL resources is a critical skill in an academic environment. Digital learning and DL self-efficacy enable one to understand digital technology and its applications (Adam-Turner, 2017; Adams Becker et al., 2017).

**Using Adaptive Leadership to Lead to Inevitable Change**

The way people teach and learn with LT applications enables them to understand the multiple dimensions of DL (Alexander, Adams Becker, Cummins, & Hall Giesinger, 2017). A major challenge for post-secondary leaders is developing digitally literate faculty and staff who manage the constant rapid changes in technology designed to support both administration and teaching. Leaders should consider what issues emerge for an institution challenged by technological change. Such questions include (Northouse, 2016, p. 313):

1. What types of support do group members need so that they use the changes effectively?
a. Are the challenges experienced, or likely to be experienced, technical or adaptive?

b. Does a lack of expertise hinder understanding of how new digital LT works or does the challenge stem from normal resistance to change?

c. How can people focus on the hard work needed to employ digital learning and DL across a curriculum?

An adaptive leader provides a perspective and the support necessary for a group to navigate environmental changes, which might otherwise disable the ability to achieve goals (Northouse, 2016). The ability to apply LT resources is a critical contemporary skill in an academic environment. Determining metrics is the first step for community college leaders interested in addressing Northouse’s questions regarding the introduction of digital learning in an academic environment (Adam-Turner, 2017), especially to consider what type of support provides faculty and staff with effective use of digital learning that results in positive change. Rural community college studies that explore the scope of LT adoption and issues that prevent full incorporation of digital learning and DL adoption are nascent. This study fills that gap by exploring transformational leadership that assists community college personnel’s epistemological perceptions (i.e., understanding) and capability of adopting digital learning and DL. Using leadership theory, it investigates faculty and staff members' perceptions of digital learning and DL inclusion at two rural community colleges. Questions that guided the study included:

1. What are institutional leaders’ perceptions of institutional LT and DL adoption?

2. What are humanities faculty’s perceptions (i.e., attitudes of learning) when using digital learning tools?

3. What are faculty perceptions of the degree of DL on their campuses and in their discipline?

Across the literature, perceptions of digital learning and DL are inconsistent. Belshaw (2014) argues that education should be proactive, but multiple digital learning and DL terminologies are sources of the problem. Terms used in a digital environment vary, representing a dilemma of jargon found in information/computer sciences and elsewhere (Virtue, Dean, & Matheson, 2014). With no consensus regarding what constitutes LT literacy and DL, perceived competencies are insufficient to incorporate digital learning into curricula (Voogt, Erstad, Dede, & Mishra, 2013). The ambiguity of terms such as DL, e-learning, and virtual
Learning makes lack of consensus and definition confusion and complexity common (Virtue et al., 2014). Some researchers view digital competencies as computer skills and others as learning/knowledge applications (Badke, 2012; Gallardo-Echenique, de Oliveira, Marques-Mollas, & Esteve-Mon, 2015). Rogers (2003, pp. 224–246) argues that individuals pass through four stages at varying rates during the adaptation of new digital technology:

- knowledge of an innovation—an awareness that a technology exists;
- persuasion (i.e., attitude formation and change)—learning how the technology could enhance our professional and personal lives;
- decision (i.e., adopt or reject)—deciding that a technology is feasible, relative advantages, compatibility, complexity, trialability, and observability, and worth the investment of resources necessary to obtain it and time necessary to master it; and
- confirmation—where technology is the main institutional or individual’s preferred delivery tool for the action or learning purpose.

Freire (2000) suggests that the mind makes concurrent connections to and with information and experiences through cognitive thought and critical thinking. Bandura (2001) and Saracevic (2007) argue that cognitive, noncognitive, and environmental relationships overlap as nonlinear, dynamic influencers of learning capacities. Industry-sponsored research and student opinions express expectations of LT methods of teaching and provision of services in education (Bertrand, 2010; Gates Foundation, 2015).

Bertrand (2010) criticized academia, challenging it to become more technologically applied, emphasizing what Bates (2000) refers to barriers of inertia as the “techno-sclerosis of higher education” (p. 1). National research from four-year public and private institutions suggests that 40 to 60% of faculty use administrative technologies and are interested in digital learning, but only half use digital learning when teaching. One survey asked about new technology for teaching, with findings suggesting the inclusion of some types of DL, but the percentage was nonsignificant (Gates Foundation, 2015; Lumina Foundation, 2014). Consequently, digital learning and DL create barriers for faculty and administrative staff, mediated by an institution’s unique and diverse technology ecosystem and human capital demographics (Bailey, Jaggars, & Jenkins, 2015; Mansour, 2017).
For community colleges, leadership extends beyond campus boundaries to make DL possible, constituting unique environments. Katsinas and Hardy (2012) argue that rural students are at-risk from limited sustainable digital support, and students from rural and low-socioeconomic areas do not have access to digital technology (Bailey et al., 2015). Scott-Clayton (2011) points out those students from rural, underserved areas do not have adequate access to digital technology or sufficient sustainability (i.e., bandwidth) for digital LT programs (Kruger & Gilroy, 2013). Current research shows the dynamics of local practice are complex. When digital learning adoption occurs, layers emerge and highlight a number of extant influences at the level of individual educator and the school’s context of the classroom, and local communities and state initiatives (Selwyn & Facer, 2014).

**Method**

A mixed-methods approach allowed an in-depth understanding of the extent of administrators’, academic leaders’, and the faculty’s DL at two rural community colleges located in the southeastern United States. The research design incorporated formative exploration centered on administrators’, faculty’s, and librarians’ LT affect (i.e., perceptions) and understanding of DL in pedagogy. Instruments addressed participants’ perspectives on the complex nature of digital learning with DL and the institution’s policies regarding digital LT pedagogy. The framework combined Bandura’s (2001) triadic reciprocal determinism model. Fruge and Ropers-Huilman’s (2008) philosophy on shared attitudes of learning (i.e., epistemological congruency), in which a person’s behaviors, cognitions, and environments simultaneously influence each other as interactive determinants, and Saracevic’s (2007) concept of behavior and effects that “relevance does not behave” (p. 2,127), in which a person’s subjective knowledge parallels the epistemic view. The three theoretical concepts offered a structured approach to anchor the study. The theory relevance to the study is the interconnectedness of an institution’s personnel and students through digital learning, including the teaching/inclusion of DL.

The new design is a Point of Reference Spectrum (PRS) framework, which assesses an environment’s effect on self and behavior variables used to explain administrations’, faculty’s, and librarians’ perceptions and activities (Adam-Turner, 2017). Figure A1 shows the schema; A is the predictor, B is a moderator, and C is the outcome to expose the issues these groups face when dealing with the incorporation of digital learning in community college programs (Mosley, 2010). The PRS model...
is indicative of a person’s behaviors, the environment, and personal responses that mutually influence one another. It provides a basis for recognizing participants’ digital learning cognitive and noncognitive issue levels, and correlations in areas in which clusters emerge during analysis. Results provide a starting point from which to offer constructive recommendations to build collaborative solutions.

Assessment included all personnel to assess barriers encountered when leading efforts to understand and incorporate digital learning in education programs at rural community colleges. Through investigation and learned understanding of the phenomenon, we examined underlying influences (Hays & Singh, 2012). There was an emphasis on a person’s control of actions, retaining the authority of whether to interact, so the individual defines the degree of importance and progression (Bandura, 2001). Institutions can use current findings and the study’s design during similar investigations on other campuses, and researchers can use conclusions as a background for studies with more participants from a broader range of institutions.

**Sampling**

Purposeful sampling was used (Rosenthal & Rosnow, 2008) since participants were representative of diverse perspectives on the issue investigated (i.e., attitudes of learning relevant to digital learning and DL inclusion) (Leedy & Ormrod, 2013). A purposive sample was drawn from participating institutions’ administrators, humanities faculty, and administrative staff. Participant identification was guided by Rogers’ (2003) four stages that individuals experience during innovation-decision processing (Figure A2). Forty-one participants completed surveys and focus group interviews. We performed a pilot test at a comparably sized peer institution to assess instrument content validity (Leedy & Ormrod, 2013). An inter-rater tested content accuracy for the questionnaire and interviews and evaluated the instruments’ relevance (Charmaz, 2000).

**Data Collection**

Three instruments were used to collect data: 1) a brief online survey over email offered direct, personal connection and a faster response time for maximum distribution. Quantitative data offered participants individual digital learning perceptions and DL self-efficacy; 2) one-on-one interviews collected cognitive and noncognitive data regarding interviewees’ understanding of digital learning and attitudes of DL through self-efficacy
perspectives; and 3) an on-site, face-to-face focus group with administrators and faculty designed to assess participants’ understanding of digital learning and attitudes regarding DL efficacy. Since abstract human perceptions were involved to find meaning in participants’ actions, and individual experiences regarding a phenomenon, a qualitative approach was used (Creswell, 2009). Data permitted discovery of hidden meanings from participants’ expressions of digital learning perceptions and DL expectations. This method of gathering data uses descriptive textual data rather than pure empirical evidence (Carter & Little, 2007).

**Institutional and Sample Participant Profiles**

College A was a public two-year coeducational community college accredited to award associate’s degrees and other certificates and diplomas. Faculty qualifications ranged from master’s to doctoral degrees, and the professional experiences that support those qualifications. Twenty-four participants returned emailed surveys, with an 87.5% response rate. Seven administrators, 13 humanities faculty, and two librarians participated in focus groups. College B was a public two-year community and technical college that is one of nine publicly supported two-year institutions of higher education in the state. Faculty credentials include master’s and doctoral degrees, and the professional experiences that support those qualifications. Thirty-five participants returned emailed surveys, with a 75% response rate. Six administrators, 11 humanities faculty, and two librarians participated in focus groups.

**Results**

Findings aligned with Rogers’ (2003) diffusion of technology innovation bell curve, in which a phenomenon under investigation surpasses the chasm (i.e., passing a 20% or 2.0 confirmation standard) and an overall DL tipping point is achieved (Table A1 and Figures A2 and A3). The standards for the institutions’ digital learning profiles included accreditation guidelines, and state and institutional policies. A common practice at both locations was the use of digital technology (e.g., LMS). Participants’ identification stemmed from their professional position as natural selection. Self-efficacy perceptions of DL depended on an individual’s concept of digital literacy paradigms. Faculty were the primary contacts with students, and they were aware of rural students’ technology limitations to achieving learning success. The colleges’ administrative leadership considered faculty digitally literate if they incorporated technology during instruction, thus meeting a recognizable and basic degree of digital learning
adoption. DL actions included Blackboard-LMS for online classes, and Web 2.0 online catalogs and databases.

**Quantitative Data Analysis**

We collected participants’ years of teaching experience, professional development demographics, and individual digital learning and DL self-efficacy assessments. We triangulated data using three instruments to increase the reliability of findings. The PRS schema (Figure A1) (Adam-Turner, 2017) captured individual meanings and experiences regarding how an environment and behaviors related to respondents’ digital learning and DL perceptions and activities (Patton, 2002). Descriptive statistics suggested that each location’s personnel achieved basic DL (Table A1), with slight variance among DL self-efficacy score values. Analysis revealed a positive correlation between professional training and DL self-efficacy, and participants at location A reported greater DL adoption than those at location B. Figure A3 shows each location’s cumulative averages for descriptive statistics.

**Qualitative Data Analysis**

The research questions guided discovery of themes and a discussion of findings (Appendix). The themes and subthemes describe participants’ perceptions of digital learning and DL self-efficacy when included in the instruction. Table A2 shows the analysis and coding strategy used for qualitative data. These data describe participants’ perceptions of digital learning and DL self-efficacy instruction (Table A2).

**Understanding.** Participants reported that they are familiar with digital learning and some DL, and they comprehend the actions necessary to incorporate digital learning resources in instruction if warranted.

(1) Concept and meanings. How administrators and faculty interpreted digital learning as it applies to teaching and learning was the theme with the most varied perceptions and comprehension. Administrators believed that all personnel had a basic understanding of digital technology for academic learning and that a discipline influenced how confident faculty felt about their degree of digital learning and DL self-efficacy:

Digital literacy is a general education outcomes standard—there are actually learning standards, DL being one of them. From the aspect of the administrator, the technology is very useful in helping to gather a lot of data together in a timely fashion, to be able to organize it creatively by demonstrating descriptive data graphically. The generation
of assessment reports shows how the institution is meeting the state performance measures. So that is why I’m putting my money into the types of digital programs/training that fulfill this mission. After all, it’s because of the students that we are here. If we can’t take care of the students, then we might as well go home; students are why it says college on the sign. (Dean/faculty)

(2) Cognitive actions and learning. All administrators believed that they were digitally literate, citing that their institutions used technology as part of teaching administration and learning platforms. Administrators believed that faculty would follow institutional policies requiring the use of an LMS as evidence that faculty had some degree of digital learning. The administrators’ online survey reported 80% institution-wide adoption and good perceptions of digital academic learning comprehension. Humanities faculty reported the basic use of the LMS for class content learning at 40 to 60% comprehension in digital learning inclusion. English, history, and sociology faculty reported that digital learning activities should be DL subject-specific and incorporate critical thinking for learning outcomes. Math and science faculty considered DL skills an automatic proficiency from LMS use with online digital learning:

It’s a very demanding situation incorporating technology into their instruction process that ties into the specific learning outcomes they (the faculty) have written in their syllabus. The more of this they (the faculty) do, I think more higher learning will take place. Keeping the student engaged in the classroom regardless if online or face-to-face is an imperative. (President)

I am in favor of the incorporation of digital and think there needs to be a measured approach, baby steps to get those people (i.e., faculty who are technology driven) comfortable with using technology as a positive means of instruction. You bring them in small groups again to share with other faculty, it’s sort of like train the trainer, doing this on a small scale within the schools since each discipline has a need for different types of technology. (Provost/faculty)

(3) Professional development and training. Participants from each institution reported that faculty were encouraged to attend conferences for professional development, stay current with their fields, and gain understanding of new technologies to support digital learning and DL. Senior administrators at both institutions expressed that all personnel need to understand the implications of digital learning and DL implementation. Participants agreed on the need for ongoing training to support all staff, with the challenge of improving academic learning with DL
Leadership Perspectives

comprehension. College A was part of a group of colleges in which the state’s central community college governing department has a policy: all member institutions must have all class shells available through online LMS. College B’s state governing department does not have a policy for digital academic learning, but the institution’s administration is proactive at developing a strong digital academic presence:

To be able to have an online presence all faculty and instructors have to go through the course [provided by the college] and must pass the course to be able to develop and deliver online instruction. By doing this we have seen a difference in the class structure, there is consistency in the way classes are developed overall. Therefore, it is a requirement of all full-time faculty new or otherwise to complete the training course, whether or not they have taught online elsewhere since we may have different procedures. Faculty have to show that they are capable of navigating and making proper use of Bb functions to the fullest advantage of the class content. (Administrator/Dean)

Incorporation. Participants described going beyond a basic understanding of digital learning and incorporating applications of these concepts into instruction.

(1) Practical skills. Administrators and faculty members reported consensus regarding the importance of having appropriate labs, distance learning centers, instructor labs, a library, and technical support and mentoring available for faculty and students:

We just assumed that students are going to be digital learning ready, to go when they arrive in a freshman comp. That’s not quite true, of course, but it’s an assumption that’s shared. (Faculty/Senate committee chair)

From a practical standpoint, all personnel including myself have to keep up with the digital technology, especially any of the state or community college policies on information for digital learning administration. (Provost)

(2) Self-efficacy and personal confidence. Responses indicated wide variance among leaders and faculty for self-rated digital learning and DL self-efficacy. Administrators commented on an awareness of the fundamental behavioral traits and the perception that digital technologies permits multitasking and individualized, interactive learning. Such technologies accent group activity shared work with consumer learning content; there is also the plethora of digital media information (Levine & Dean, 2012; Noh, 2016). Comments from the interviews and focus groups shed
light on the reason for participants’ variance of DL understanding, including DL concept misunderstandings, LT time constraints, the degree of perceived support, and learning outcome priorities (Virtue et al., 2014):

Well, let me say it’s a mixed bag. We have a lot of faculty who really use it and some who don’t. A lot would really like to learn more about using technology and doing some digital literacy and research. I believe they (faculty/staff) don’t really have enough time to get comfortable with all that. I think as level of support increases they will become more comfortable. It’s all a factor of time and support to increase usage. That relates to funding, and still a learning curve there. (Provost/faculty)

(3) Benefits. All participants agreed that there were numerous benefits to the use of technology-supported education and administration, which they agreed took time to learn. Administrators and faulty concurred that digital technology provides better communication and access to information. Incorporating DL during instruction was most challenging because of a steep learning curve due to the variety of programs in use:

The work as an institutional administrator, student administration changed into being managed, provided and supported by the technology platform. I can set up and run queries (search questions) across the metadata in the databases. Provides me information, e.g., I can see how successful my developmental English students are as they progress through their other English classes. I’m able to see their grades, their attendance, etc., enables me to make informed decisions. (Dean/faculty)

One of the obvious benefits is that the digital technology provided more efficient accessibility for our faculty and students. We have quite a few faculty and instructors who teach full-time online completely. This allows either the instructor and the students to continue to study regardless of where they are geographically located. (President)

(4) Limitations. Participants reported that the training available was not always sufficient and expressed the need for more time to gain practical skills involved with incorporating digital learning and DL into methods of instruction. They agreed that limitations also related to students’ technological skills and the presence of access to sustainable technology off campus. Since the colleges serve rural, low-income areas, students might not own or have access to digital technology equipment, which might be a barrier to student learning and success.

Even though the digital learning tutorials are out there, I think it’s still kind of, learn as you need to know. Honestly, we probably don’t do as much of that as I would like. In regard to if they don’t have the
technology at home, most of our courses that utilize video lectures, we burn to DVDs for faculty and students to check out free of cost. If they don’t have reliable internet this is a viable alternative—no excuse allowed! Still, it doesn’t bridge the digital literacy gap. (Administrator/instruction/technical support)

In particular, by having classes online and available 24/7 is very beneficial. However, in our rural area, we do have to be cognizant of students’ personal digital sustainable access and limited digital literacy comprehension can be a challenge. That is why we make sure there are fully equipped labs and the library has plenty of hours or availability. (President)

**Adoption.** Beyond administrative technologies and LMS programs, administrators reported that most faculty and staff understand the importance of digital learning. Prior training, years of teaching, and professional development demonstrated the influence that digital learning adoption might bring, including its perceived influence on enhancing student learning outcomes.

(1) Self-efficacy and personal competence. Participants identified adoption of learning technologies as a significant challenge to the institution’s environment. They agreed that for positive adoption, institutional leadership must be present with an infrastructure of support and maintenance, and economic support for the purchase of new software and hardware. Extra compensation for adjunct faculty might be necessary for professional development related to digital learning to transform their courses to include DL techniques.

Also, the institution has worked with some faculty to use the Quality Matters as a professional development to support faculty in developing well-structured online classes. You know they haven’t talked about using Quality Matters for everyone. I would be interested in doing that. The problem for me is as a faculty member when I’m asked to update my courses using something as amazing as Quality Matters, I’m just not going to do it unless they compensate me to develop the course. (Adjunct faculty)

(2) Noncognitive value and content. Leaders and senior administrators reported that the use of learning technologies was critical to the institution’s long-term strategic plans. To set a strategic academic technology standard, one institution uses Quality Matters evaluation of online class content to achieve a consistent learning environment. Leaders also promoted faculty and staff digital learning understanding, and use of various administrative technologies (e.g., early alert programs). Different faculty
adopted various learning technologies as part of their instruction. Disciplines are updating their curricula with a requirement that all students achieve a minimal degree of DL self-efficacy to achieve student learning outcomes.

We look at the results and at the interaction from those things, we’ll see lots of students don’t have those digital literacy skills. So, I think those DL needs are going to become a whole lot more front and center because it’s going to pop up earlier. I think a natural thing to do with that is to incorporate some DL as soon as possible. I don’t know that we have room in a 1-credit course packed full with critical thinking. (Administrator/instruction/technical support)

Another digital technology program very useful is an early alert program called “Starfish”[that] alerts faculty or an administrator when a student [for] whatever the reason seems to be struggling with their class work. This program has made a great difference, allowing for direct contact between faculty and student. Also making the student aware, using email as the connection beyond what is considered regular class communication. Leading the student to know the faculty are there for them, faculty can reach out. I believe this helps with retention because of better communication. (Dean/faculty)

(3) Motivation. Leaders were aware that public consensus, and student perceptions from recent Gallup polls, points to expectations of use of digital technology during academic learning. Administrators expressed a desire to gain continued faculty commitment to developing online class instruction inclusive of greater academic digital learning and DL programs. Faculty reiterated that the institution should take the time and be sure that the entire digital technology infrastructure operates properly with consistent sustainability before providing it to students. Adjunct faculty from both locations commented that keeping current with digital learning and DL is continuous and stressful, and additional compensation would be a strong motivator for improved digital learning competency and DL proficiency.

For a leadership point of view, the high school students and younger adults are tech savvy. So, we have to come up to their level of digital technology and literacy competency.... Faculty and educators still need to learn how to transfer the digital technology expertise to the academic learning. Also for today’s career market digital technology is a big part of professional standards. (President)

My job as the Dean is to make sure the faculty have all the tools they need to make students successful in achieving the learning outcomes,
to make sure the faculty know how to make the best use of these different digital technology tools we have available. So that part of my job is a very good thing, whatever I can provide my faculty with that makes them more effective teachers with students. (Administrator/faculty)

2) Strategies: Each institution provided in-house training and dedicated days for all personnel to attend training workshops to improve academic digital learning adoption standards and DL self-efficacy. One college requires that all faculty/adjuncts complete an LMS course shell. Participants at College B reported that faculty are in the process of digital learning adoption across all instructional technical programs:

Even in the new strategic plan, being written digital technology is a big part of that. I think our current technology plan expires so we are having to figure out a new strategy/focus in trying to make best use of the limited amount of money we have to move forward. Beyond the training, support using the technology during class the learning curve is not just faculty, but administrators and staff. (President)

Using a combination approach, we encourage our faculty, instructors, and staff to stay current with the new digital technology. From in-house on-site training workshops to different institution-wide programs. e.g., Governance and Convocation day. Since apparently to be able to compete with other colleges for student enrollment the institution, programs and faculty are going to have to develop more academic learning and digital literacy services using the digital platform. Therefore, all of us are going to have to be more digitally adept. (Provost/faculty)

(3) Policy. State and institution DL policy have levels of expected digital learning and DL inclusion in instruction:

We have an online teaching policy, so every instructor teaching at [this] community college-adjunct or full time, is supposed to have a presence in our learning management system, its Blackboard, at least one course each semester. We instituted the online teaching policy so everyone can keep up their skills to a minimum degree of posting. It says posting grades, a syllabus, and announcements is the minimum required for utilization. (Administrator/instruction/technical support)

I think, the Chancellor of Community Colleges is partly responsible for this; they keep pushing students, faculty and staff toward “mobile apps.” They really want students to be able to take the entire gamut of online classes with technology. It is just not possible to do a composition class that way. (President)

Findings suggest all participants have basic DL literacy. Both institutions required all personnel to use digital learning through LMS
Faculty and staff were encouraged to incorporate digital learning to enhance online content, and agreed that technology promotes student learning outcomes at a fundamental level; students have greater accessibility and support through digital technology. Administrators considered the deans and school directors responsible for leadership when deciding the value and degree of digital learning in teaching and learning across disciplines. Analysis of survey responses in comparison with participants’ DL self-assessment indicated a lack of consensus. Emphasis on two elements when defining digital learning and DL included the ability to access information (i.e., proficiency) and evaluate it and its sources critically (i.e., competency). Faculty commonly framed this within the context of the pursuit of academic or scholarly research. English and sociology faculty had adopted DL as an extension of the academic digital learning paradigm, but math and general science faculty consider DL part of digital learning and not a separate concept for student learning outcomes. This accords with a Pew Research Center study that reported that 60% of experts forecasted that by 2020, DL will influence education positively (Poushter, Bell, & Oates, 2015). Both colleges attempted to provide infrastructure support, training, and professional development on the schools’ calendars. Challenges included the transience of technology and pressures to develop digital learning when, in the faculty’s judgment, subject content or students’ academic digital self-efficacy is insufficient for achieving student learning outcomes. Faculty support is crucial, but not all faculty are on board.

Discussion

Findings suggest that community colleges engage with digital learning, but the type of leadership direction and digital learning best practices to an academic community are unknown, including how leaders leading faculty who teach across majors benefit from DL. Digital learning has the potential to alter teaching and learning dynamics positively, and related digital devices alter people’s lives in profound ways (McGoldrick et al., 2015). The role of digital learning collaboration in education is an evolution in which principal functions are interoperability, allowing individuals to construct digital learning tailored to specific objectives (Adams Becker et al., 2017). Paradigm shifts define a schema of concepts, epistemologies, and practices that shape academic instruction and digital learning (Freire, 2000). An institution is an assemblage of agents, each with varying proficiencies that alter the course of events (Bennett, 2010). For everyone to gain optimum benefits from digital resources, institutional leaders should engage in a transformational role.
Digital Learning Collaborations to Bridge Digital Literacy Adoption

DL continues to transform, and new federal policies improve DL, indicating a need for more research. Northouse’s (2016, p. 313) adaptive leadership suggests that what emerges for institutional members challenged by LT changes is building on existing, on-site programs; the collaboration of interdisciplinary, shared digital learning knowledge for a learning center to demonstrate resources from in-house workshops and institutional training events (Collins, 2014); outreach with similar peer institutions to compare DL; and discussing, troubleshooting, and finding solutions to challenges. The feasibility of recommendations requires department deans'/directors’ support of actant members’ contributions (Bennett, 2010). The Association of Chief Academic Officers’ digital fellow program is a valuable resource for best-practice digital technology adoption and identification of local digital learning champions to assist with bringing colleagues on board and informing them about digital learning initiatives.

The American Association of Community Colleges (AACC) provides an organizational competencies framework of proficiencies that community college leaders need to assist personnel with progressing along the leadership continuum. One standard discusses personnel professional development and technology inclusion:

**Emerging Leader:** continued focus on process improvement for internal/external customers. If gaps exist in employees’ technical proficiency—requests professional development, acquire the needed skills that better serve customers.

**New Leader:** demonstrate technological competence. Strive to ensure students have access to cutting-edge technology—students master the 21st-century employee skills.

**Experienced Leader:** an evolved technophile customer, as a CEO important to embrace and understand how to communicate with technology. Continue to adopt changing technologies that impact student success. (American Association of Community Colleges, 2013, p.7)

In addition to the AACC leadership model are recommendations for understanding dimensions of digital learning and implementing DL adoption campus-wide. A comparative cross-reference of the most current literature, coupled with the current study’s results (shown in Table 3), explains cognitive dimensions of digital learning and implementing DL campus-wide, and provides a strategic guide and tangible measurable metrics to gauge advancement.
### Table 3. Dimensions of Digital Learning and Digital Literacy Self-Efficacy Achievement (Adam-Turner, 2017).

<table>
<thead>
<tr>
<th>Dimensions of Digital Learning (DL)</th>
<th>Instructional Challenges: Key campus tech issues</th>
<th>Criteria</th>
<th>Concepts</th>
<th>Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>State and accreditation policy</td>
<td>Overcome the fear of trying to foster innovation in instruction (Green, 2017, p. 2)</td>
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<tr>
<td>Address demand compared with reduced financial resources</td>
<td>Communicate the effectiveness, evidence of impact, and the need for DL</td>
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<td><strong>Learning systems framework: Human capital and institutional network platform, ICT hardware and software</strong></td>
<td>A focus on the institution’s infrastructure and knowing your stakeholders</td>
<td><strong>Provide reliable network accessibility and sustainability using Wi-Fi, broadband, and bring your own device (BYOD)</strong></td>
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<td></td>
<td>Understand the influence of new technology integration with institution legacy system</td>
<td><strong>Support for installation and troubleshooting, institution’s professional development, and training</strong></td>
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<tr>
<td></td>
<td>DL implementation success in which various stakeholders share a vision and work collaboratively to achieve it through sharing knowledge and resources</td>
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<tr>
<td><strong>Computational thinking: Data collection properties (Big Data)</strong></td>
<td>How data are represented and what data are collected</td>
<td><strong>Data Analytics—the ability to produce relevant data reports for administrative and academic programs</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>Interpretation of data in context and evaluation</strong></td>
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</table>
Leadership Perspectives

Design thinking: Policy implementation and formulation explores and identifies areas and reasons for adoption

Develop a digital learning strategic plan
Mapping the steps needed, who are the lead actors-trainers, and what to offer in-house compared with external resources
The foundations of DL knowledge should be responsive to the availability of existing and emerging DL technologies in which everyone benefits fully from use and participates
Group consensus achievable through collaborative partnerships and interdisciplinary partnerships

Digital Literacy levels for Digital Scholarship

**Novice**—introduction to digital awareness by understanding digital technology products (e.g., Internet, Google, social media, and mobile technology)

**DL Beginner**—basic skills of human-machine interaction; able to use administrative and learning technologies (e.g., Microsoft products, simple Internet and Google searches, and some Facebook and mobile technologies)

**DL Intermediate**—more skills, self-efficacy, and knowledge, including digital literacy concept comprehension and adoption (e.g., LMS online instruction and class development, Internet, Google program suite, distance education, and cloud technologies such as video streaming, media, e-learning, and open education resources)

**DL Advanced**—most skilled with more self-efficacy and knowledge, including digital literacies concept adoption, and innovation (e.g., meta-literacy or Transliteracy, courseware in context (CWIC) such as Internet of Things (IoT) tech networks with multiple access points and deep learning-transformation of human thought/activity through AI

Sources: Adam-Turner (2017); Adams Becker et al. (2017); Allen et al. (2012); Bury (2016); Chaouchi, Bourgeau, & Kirci (2013); Green, Cook, Niesen de Abruna, & Rogers (2017); Mansour (2017); Stordy (2015).

**Conclusion**

Change challenges leaders, and rewards occur when institutions and faculty align outcomes to promote learning. Leaders who promote the means for faculty and students to become digitally literate should prepare for the next generation of DL environments and associated services (Adams Becker et al., 2017). The leadership necessary to accomplish these disruptive goals supports those engaged directly in the change, and provides the means to regulate accompanying distresses from rapidly changing the technological
environment. Support could take the form of workshops designed to provide technical assistance. Consequently, adaptive support that incorporates negotiation and building interdisciplinary rapport is crucial, in which technical support is essential for effective DL adoption and requires empathetic leadership (Northouse, 2016). Expanding on DL in other disciplines provides opportunities to find holistic ways of making digital learning a catalyst for learning (Wesch, 2014). DL skills are plural, developed in context, and interpretation of DL varies with competing definitions of digital competencies found during application of information computer technologies (ICT) that are essential to a context (e.g., DL awareness, digital fluency, and digital information literacy). ICT advances now include meta-literacy, Deep Learning, and the Internet of things (IoT) (Belshaw, 2014). Research into these topics might reveal how community colleges can improve student retention and completion rates since the American Association of Community Colleges (2013) suggests that digital learning represents a cogent strategy to facilitate such improvements.

This study offers an attitude of learning or philosophy present among community college actors in identifying variables that affect digital learning, such as faculty and student interaction and DL outcomes. Delimitations of the study included a limited sample size (Yin, 2013). Maxwell (2012) argues that validity is a goal, not a product, and credibility lies in findings. The importance of this study is simple—recognizing the intrinsic value of leadership engagement and faculty collaboration to include digital learning as part of pedagogy (Wesch, 2014). More research is needed to understand this phenomenon longitudinally among larger samples to ascertain how institutions and faculty incorporate DL. How to bridge the gap of the digital divide, measure DL self-efficacy, and assess implications of lack of adoption are logical questions for subsequent research. LT literacy is no longer an option; institutions must prepare students for contemporary businesses and commercial communities to work in a digital technology environment. With leadership designed to help, faculty, students, and their institutions will adapt and all will benefit.

References


Appendix

**Figure A1.** Point of Reference Spectrum (PRS) model (Adam-Turner, 2017) similar to structuration theory (Giddens, 1991). The design research model’s name is a Point of Reference Spectrum (PRS) to show how an environment’s effect on self and behavior variables was used to explain administration’s, faculty’s, and librarians’ perceptions and activities regarding DL (Figure A1). The schema is A+B and B+C (shown in Figure A1), where A=technology skills (cognitive), B=participant epistemology (noncognitive interpretation and learning), and C=technology self-efficacy (cognitive learning techniques). Thus, A is the predictor, B a moderator, and C the outcome.

**Figure A2.** Diffusion of technology (Rogers, 2003).

**Quantitative Questionnaire Results Findings**

Simple linear regression indicated where positive correlations existed between participants’ years of teaching and professional training to support self-assessed DL self-efficacy. Formula $y=f(x)=ax+b$ was calculated using the least-squares method. The hypothesis is that those with professional training have greater DL self-efficacy. A Pearson product–moment correlation coefficient was calculated, where 1 indicates perfect positive correlation, zero indicates no correlation, and $\pm 1$ indicates perfect negative correlation. Results suggest that location A had greater DL adoption.
Figure A3 shows both locations’ cumulative averages for the three variables collected using the survey.

**Table A1. Technology Perceptions Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Mean training</th>
<th>Mean self-efficacy</th>
<th>Tipping point</th>
</tr>
</thead>
<tbody>
<tr>
<td>College A (M1)</td>
<td>3.49</td>
<td>7.8</td>
<td>2</td>
</tr>
<tr>
<td>College B (M2)</td>
<td>4.95</td>
<td>8.02</td>
<td>2</td>
</tr>
</tbody>
</table>

Using the online survey, participants reported self-assessments of their digital technology self-efficacy and digital literacy perceptions using a Likert-type scale that ranged from 1 to 10, where 1 indicated low self-efficacy and 10 high self-efficacy. Rogers’ (2003) diffusion of innovation bell curve suggests that when a phenomenon under investigation surpasses the “chasm” (i.e., 20% or 2.0), in general terms it is considered that a tipping point was achieved (Figure 4).

**Table A2. Coding Strategy During Data Analysis**

<table>
<thead>
<tr>
<th>Research Question and Sub-questions</th>
<th>Themes</th>
<th>Sub-themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. What are institutional leaders’ perceptions of institutional digital literacy with academic technology adoption on their campuses?</td>
<td>A. <strong>Understanding:</strong> definition and application of digital learning with academic technology and digital literacy</td>
<td>1. Concept and meanings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Cognitive actions and learning</td>
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<tr>
<td></td>
<td></td>
<td>3. Professional development and training</td>
</tr>
<tr>
<td>(a) What is the philosophy of teaching and learning related to participants’ academic technology epistemology (i.e., using digital learning tools)?</td>
<td>B. <strong>Incorporation:</strong> possible technology levels of digital learning with academic technology and digital literacy</td>
<td>1. Practical skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Self-efficacy and personal competence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Benefits or limitations</td>
</tr>
<tr>
<td>(b) What are participants’ perceptions of digital literacy with academic technology on their campuses or in their disciplines?</td>
<td>C. <strong>Adoption:</strong> perceptions of digital learning with academic technology and digital literacy self-efficacy</td>
<td>1. Self-efficacy and personal competence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Noncognitive value and content</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Motivation, strategies, and policy</td>
</tr>
</tbody>
</table>
Figure A3. College A (M1) and College B (M2) mean training and mean self-efficacy scores show that both surpassed Roger's Chasm 20% value. The quantitative and qualitative survey instruments were a combination, with both directed and open-ended questions posed to community college faculty, librarians, and institutional personnel. Questions were taken from Schommer's epistemological belief index (EBI) (Schommer-Aikins, Unruh, & Morphew, 2015), and were framed to address faculty and librarians' perspectives of the complex nature of digital technology and how it applies to digital literacy pedagogy, and the institution's DL policies.
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