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INTRODUCING DIGLIT SCORE: AN INDICATOR OF DIGITAL LITERACY ADVANCEMENT IN HIGHER EDUCATION

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ABSTRACT

Aim/Purpose	This paper introduces DigLit Score, an indicator of the extent to which educational institutions identify, assess, and amplify student digital literacy.
Background	Digital literacy has garnered considerable attention of late among scholars, leaders, and journalists. Nonetheless, institutions of higher education have been slow to define, assess, and amplify digital literacy on par with how reading, writing, and arithmetic are addressed.
Methodology	The dimensionality of DigLit Score – define, assess, amplify, assess – is demonstrated via two case studies.
Contribution	A measure of digital literacy offers university leaders and policy makers a means to monitor its diffusion.
Findings	Only one of the institutions was found to have a holistic approach to advancing digital literacy.
Recommendations for Practitioners	Practitioners should use DigLit Score to benchmark advancement of digital literacy in higher education.
Recommendation for Researchers	Researchers should refine DigLit Score and expand its application within and beyond higher education.
Impact on Society	DigLit Score represents an important first step in the direction of providing an important benchmark for higher education.

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Future Research Future research will refine DigLit Score and broaden its application within and beyond higher education.

Keywords digital literacy, technology, curriculum, assessment, student learning

INTRODUCTION

Digital literacy has garnered considerable attention of late among scholars, leaders, and journalists (Alexander, Adams Becker & Cummins, 2016; Vuorikari, Punie, Gomez & Van Den Brande, 2016). There is growing recognition that citizens and employees worldwide must be adept at leveraging information technology to create solutions to digital world problems. Nonetheless, institutions of higher education have been slow to define, assess, and amplify digital literacy on par with how reading, writing, and arithmetic are addressed. This paper introduces DigLit Score, an indicator of the extent to which educational institutions identify, assess, and amplify student digital literacy.

Before digital literacy gained wide acceptance as a construct, scholars referred variously to the constellation of competencies it comprises: computer fluency, technology proficiency, computer competence, digital media literacy, and so on. Digital literacy emerged as the construct of choice, perhaps due in part to a major initiative in higher education that removed the prejudice that literacy implies only basic proficiency (Ventimiglia & Pullman, 2016). As the deficit in digital preparedness grows, advancing digital literacy surfaces as a major challenge for higher education (Alexander et al., 2016).

The myriad extant definitions of digital literacy coalesce around the notion of effective use of information technology to solve real-world problems. Digital literacy is multifaceted, encompassing skills, knowledge, and attitudes (Alexander et al., 2016; Pérez & Murray, 2010) that drive intentional and reflective use of technology to solve problems (Pérez & Murray, 2010). Digital literacy extends beyond acquisition of technology skills (Goodfellow, 2011) to incorporate critical, analytical, and creative thinking. Several dimensions of core competencies have been identified, including basic understanding of computers and networks, functional use of operating systems and productivity software, information literacy, digital content creation, and understanding the socio-cultural impacts of technology. Conceptualizations of this complex construct also have in common a view of the user or learner becoming empowered through digital literacy study and practice (Alexander, Adams Becker, Cummins & Hall Giesinger, 2017).

Researchers have noted a deficit in digital literacy assessment and amplification among institutions of higher education (Murray & Pérez, 2014). DigLit Score represents an effort to evaluate and quantify how institutions approach the enhancement of student digital literacy. Subsequent sections of this paper outline the dimensions of DigLit Score and demonstrate its use in two case studies.

DIGLIT SCORE

Digital literacy has been referred to as the fourth literacy, taking its place alongside reading, writing, and arithmetic among the core competencies required for success in higher education and beyond. Nonetheless, colleges and universities have tended to assume adequate digital literacy among students, inferring that exposure to technology equates to deep understanding. The rich history of identification, assessment, and amplification of traditional literacies should be extended to include digital literacy.

DigLit Score is proposed as an indicator of the extent to which an institution defines, measures, and magnifies student digital literacy. Institutions may find DigLit Score beneficial in curriculum development, strategic planning, and continuous improvement efforts. DigLit Score results may be of interest to students, scholars, parents, university leaders, legislators, policy makers, and employers. The four dimensions that comprise DigLit Score evaluate how an institution defines digital literacy, assesses digital literacy of matriculating students, amplifies digital literacy, and assesses digital literacy among graduating students.

Define Digital Literacy

Institutions can define or address digital literacy in strategic plans, accreditation-related improvement plans, general education or foundational learning outcomes, program-specific curricula accessible to all students, graduation requirements, course learning outcomes, or ad hoc initiatives. This dimension of DigLit Score gauges the extent to which an institution has a holistic approach to advancing digital literacy. DigLit Score assigns points to each approach noted above, with a maximum of five attainable points.

Assess Digital Literacy of Matriculating Students

The second dimension of DigLit Score addresses whether institutions assess the digital literacy of matriculating students. Institutions might assess the digital literacy of all incoming students, students who take online courses, students who seek admission to specific programs, or students who register for a specific course. Assessment of digital literacy can take the form of grades in specialized or advanced-placement high-school courses, placement tests, test-for-credit scores, or specialized tests such as evaluations of online readiness. Points are assigned to each means of assessment, with a maximum of ten attainable in this area.

Amplify Digital Literacy

The third, most heavily weighted dimension of DigLit Score is how institutions advance student digital literacy. Curriculum is the primary means by which institutions boost digital literacy, although some institutions offer technology workshops not associated with for-credit courses. DigLit Score parses implementations of amplification strategies by acknowledging the value of mature curricula driven by a holistic, institutional strategy. An indicator of an intentional organizational strategy is compulsory digital literacy magnification for all students. For example, students may be required to take a digital literacy course in the liberal studies or general education core. Other institutions, in contrast, might amplify digital literacy via optional core courses and workshops, or requirements for certifications, minors, or degree programs. Twenty-five points are attainable in this dimension of DigLit Score.

Assess Digital Literacy of Graduating Students

The fourth dimension of DigLit Score is assessment of digital literacy as students prepare to graduate from the institution. Most assessment of graduation requirements takes place in program or curriculum review processes associated with accreditation. Institution-wide assessment among graduates is rare; instead, most institutions use course grades as proxies for various measures. This dynamic also plays out in the assessment of digital literacy. Five points are attainable in this DigLit Score dimension.

DigLit Score Dimension Weights

There are likely as many permutations of approaches to advancing digital literacy as there are educational institutions. The dimensions outlined in DigLit Score are derived from best practices in the assessment of educational effectiveness: assess, intervene, re-assess (Fulcher, Good, Coleman & Smith, 2014). The weights assigned to each subcomponent of DigLit Score dimensions are outlined in Table 1.

Table 1: DigLit Score Dimensions

Dimension	Methods	Points
Define [5]	Strategic plan [1]	1
	Learning outcomes or other initiatives [2]	2
	Improvement plan [1]	1
	Graduation requirements [1]	1
	Subtotal	5/5
Assess – Matriculating [10]	Scope [5]	5
	Method [3]	3
	Proxy [2]	2
	Subtotal	10/10
Amplify [25]	Compulsory course or equivalent test-out [10]	10
	Optional course available to all students [7]	7
	Course that meets a program requirement [5]	5
	Optional workshop [3]	3
	Subtotal	25/25
Assess – Graduating [5]	Scope [2]	2
	Method [2]	2
	Proxy [1]	1
	Subtotal	5/5
	TOTAL	**50/50**

CASE STUDIES

INSTITUTION A

Institution A is a mid-size public regional university, Carnegie-classified as a doctoral university with moderate research activity. The student body of Institution A is comprised primarily of undergraduates. Digital literacy is a focal point of an institution-wide improvement plan addressing information fluency, which is defined as comprising three skills sets – information literacy, technology literacy, and critical thinking. While student learning outcomes outlined in the improvement plan do not specifically mention information technology or digital literacy, actions commonly associated with information literacy standards and assessments (Association of College, Research Libraries, & American Library Association, 2000; "Project SAILS," 2018) are incorporated. Demonstration of information technology proficiency is a graduation requirement.

Incoming freshmen and transfer students are not formally assessed in the area of digital literacy. However, students may opt to demonstrate competency by successfully completing a university developed information technology proficiency exam. In fact, all students are required to either pass this exam or take a three-credit hour course that covers basic computer concepts, information literacy,

and productivity software. Most students choose to take the course rather than test out. The final exam administered in the course also serves as the proficiency exam.

In addition to the required course, institution A offers other opportunities for digital literacy amplification. A course is offered that explores the basics of algorithmic thought and basic programming logic. Moreover, a web design and development class that has no prerequisites is open to all students. A humanities course in the general education core explores the impact of technology on society, and a number of degree programs require additional technology courses. While institution A does not offer technology workshops per se, elective lab courses covering spreadsheets and database applications are available to all students.

Assessment of graduating seniors is done in two ways. First, a passing score of 70% or higher on the information technology proficiency exam is used as a proxy assessment for all students. Because many students take this exam during their freshmen year, a revised version of the exam is also administered to a random sampling of 200 graduating seniors. The results of this exam are used for curriculum improvement and to gauge how well the institution is meeting its improvement plan objectives. In sum, Institution A has a well-developed and implemented approach to digital literacy. While digital literacy assessment is not compulsory for all incoming freshmen, amplification is mandated, and students must demonstrate proficiency before graduation. The DigLit Score of Institution A (41/50) is summarized in Table 2.

Table 2: Case Study A – Mid-size Public University

Dimension	Methods	Points
Define [5]	Strategic plan [1]	0
	Learning outcomes or other initiatives [2]	2
	Improvement plan [1]	1
	Graduation requirements [1]	1
	Subtotal	4/5
Assess – Matriculating [10]	Scope [5]	2
	Method [3]	3
	Proxy [2]	2
	Subtotal	7/10
Amplify [25]	Compulsory course or equivalent test-out [10]	10
	Optional course available to all students [7]	7
	Course that meets a program requirement [5]	5
	Optional workshop [3]	3
	Subtotal	25/25
Assess – Graduating [5]	Scope [2]	2
	Method [2]	2
	Proxy [1]	1
	Subtotal	5/5
	TOTAL	**41/50**

Institution B

Institution B is a large public regional university, classified by Carnegie as a doctoral university with moderate research activity. The student body of Institution B is comprised primarily of undergraduates. Digital literacy is not defined at Institution B, nor does it appear in the strategic plan, learning objectives, or graduation requirements. Assessment of digital literacy among matriculating students occurs only by proxy, via a basic test that gauges readiness to participate in online courses. Amplification of digital literacy consists of a course that is available to all students but required in only several degree programs. There are a number of degree programs that require additional technology courses. All students may opt to participate in workshops that amplify basic technology skills. In sum, Institution B does not have an institutional approach to advancing digital literacy. In fact, a student can matriculate and graduate from this institution with no exposure to digital literacy. The DigLit Score of Institution B (17/50) is summarized in Table 3.

Table 3: Case Study B – Large Public University

Dimension	Methods	Points
Define [5]	Strategic plan [1]	0
	Learning outcomes or other initiatives [2]	0
	Improvement plan [1]	0
	Graduation requirements [1]	0
	Subtotal	0/5
Assess – Matriculating [10]	Scope [5]	0
	Method [3]	0
	Proxy [2]	2
	Subtotal	2/10
Amplify [25]	Compulsory course or equivalent test-out [10]	0
	Optional course available to all students [7]	7
	Course that meets a program requirement [5]	5
	Optional workshop [3]	3
	Subtotal	15/25
Assess – Graduating [5]	Scope [2]	0
	Method [2]	0
	Proxy [1]	0
	Subtotal	0/5
	TOTAL	**17/50**

Conclusion

Digital literacy is critical to full social, economic, and civic participation. However, institutions of higher education have not fully embraced advancement of digital literacy. This paper introduces DigLit Score, an indicator of the extent to which educational institutions identify, assess, and amplify

student digital literacy. The dimensionality of DigLit Score – define, assess, amplify, assess – is demonstrated via two case studies. Institution A takes a robust approach to assessment and amplification of digital literacy, ensuring that students graduate prepared to meet the demands of a digital society. Institution B, on the other hand, offers an optional digital literacy course but does not have a holistic, all-inclusive approach to advancing digital literacy.

As was noted above, there are nearly as many approaches to amplification of digital literacy as there are colleges and universities. The variance in approaches between Institution A and Institution B merely hints at the myriad permutations likely to be discovered as DigLit Score is refined and applied at more institutions – the logical extension of this research. As stated in the G20 Insights on the Digital Economy report, a measure of digital literacy offers policy makers a means to monitor its diffusion (Chetty, Qigui, Gcora, Josie, Wenwei & Fang, 2017). DigLit Score represents an important first step in that direction for higher education.

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BIOGRAPHIES

Jorge Pérez is Vice Provost and Professor of Information Systems at Kennesaw State University. Dr. Pérez has industry experience as a systems analyst, web developer, and consultant. He holds an undergraduate degree in English, an MBA, and a Ph.D. in information systems from Florida State University. He has published extensively and presented his research worldwide. Dr. Pérez has taught e-business, web development, systems analysis and design, data communications, and quantitative methods for business decisions. The focus of his current research is identification, assessment, and amplification of digital literacy.

Meg Murray is a Professor of Information Systems who holds a joint appointment in the Coles College of Business and the University College at Kennesaw State University. She holds a Ph.D. in information systems and has over thirty years of experience in academe and industry, and has received several National Science Foundation grants to enhance STEM education. Dr. Murray specializes in the development and implementation of emerging technologies to meet educational, business, and societal needs. Her current work devises strategies to assess, remediate, and amplify skills needed to leverage IT in innovation, a primary driver of economic growth.