REL Appalachia Ask A REL Response

Online Courses
October 2020

Question:

What are some effective practices for teaching and measuring digital literacy in middle and high school?

Response:

Thank you for your request to our REL Reference Desk regarding evidence-based information about teaching and assessing digital literacy. Ask A REL is a collaborative reference desk service provided by the 10 Regional Educational Laboratories (RELs) that, by design, functions much in the same way as a technical reference library. Ask A REL provides references, referrals, and brief responses in the form of citations in response to questions about available education research.

Following an established REL Appalachia research protocol, we searched for peer-reviewed articles and other research reports on digital literacy. We focused on identifying resources that specifically addressed the effects of practices and assessments of digital literacy on middle and high school students. The sources included ERIC and other federally funded databases and organizations, research institutions, academic research databases, and general Internet search engines. For more details, please see the methods section at the end of this document.

The research team did not evaluate the quality of the resources provided in this response; we offer them only for your reference. Also, the search included the most commonly used research databases and search engines to produce the references presented here, but the references are not necessarily comprehensive, and other relevant references and resources may exist. References are listed in alphabetical order, not necessarily in order of relevance.

References

Ferrari, A. (2012). *Digital competence in practice: An analysis of frameworks*. Joint Research Centre, European Commission.
https://pdfs.semanticscholar.org/851f/ebe72df176a16ad6e26b00ff5df35520da34.pdf

From the executive summary: "This report aims to identify, select and analyse current frameworks for the development of Digital Competence of every citizen. Its objective is to understand how Digital Competence is currently conceived and implemented in fifteen (15) cases, drawn from school curricula, implementation initiatives, certification schemes an academic papers. It develops a proposal for a common understanding of Digital Competence and identifies the subcompetences that compose it."

Fraillon, J., Ainley, J., & Schulz, W. (2013). *International computer and information literacy study: Assessment framework*. International Association for the Evaluation of Educational Achievement. https://eric.ed.gov/?id=ED545260

From the introduction: "The purpose of the International Computer and Information Literacy Study 2013 (ICILS, 2013) is to investigate, in a range of countries, the ways in which young people are developing 'computer and information literacy' (CIL) to support their capacity to participate in the digital age. To achieve this aim, the study will assess student achievement through an authentic computer-based assessment of CIL administered to students in their eighth year of schooling. It will also collect and report on analyses of data about student use of computers and other digital devices as well as students' attitudes toward the use of computers and other digital tools. This study is the first of its kind—in terms of emphasis on students' acquisition of CIL—in international comparative research. It is a response to the increasing use of information and communication technologies (ICT) in modern society and the need for citizens to develop relevant skills in order to participate effectively in the digital age. It also addresses the necessity for policymakers and education systems to have a better understanding of the contexts and outcomes of ICT-related education programs in their countries. The purpose of the ICILS framework is to articulate the basic structure of the study. It provides a description of the field and the constructs to be measured. It also outlines the design and content of the measurement instruments, sets down the rationale for those designs, and describes how measures generated by those instruments relate to the constructs. In addition, it hypothesizes relations between constructs so as to provide the foundation for some of the analyses that follow. Above all, the framework links ICILS to other work in the field. The contents of this assessment framework combine theory and practice in an explication of 'both the "what" and the "how"' (Jago, 2009, p. 1) of ICILS. Research questions include: (1) How does student computer and information literacy vary within and between countries? (2) What aspects of schools and education systems are related to student achievement in computer and information literacy? (3) What aspects of students' personal and social backgrounds (such as gender, socioeconomic background, and language background) are related to computer and information literacy? (4) What can education systems and schools do to improve students' computer and information literacy? Appended are: (1) Organizations and individuals involved in ICILS; and (2) Hypothetical progress map for CIL."

Kong, S. C. (2014). Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy. *Computers & Education*, *78*, 160–173. Abstract retrieved from https://www.sciencedirect.com/science/article/pii/S0360131514001316

From the abstract: "A study was conducted for creating digital classrooms to support students to develop information literacy competency and critical thinking skills through domain knowledge learning in digital classrooms. A total of 107 students from four Secondary 1 classes were invited from a secondary school in Hong Kong to participate in the study. In the 13-week trial teaching, every three students shared a Tablet PC for learning two topics in the Integrated Humanities subject. The pre- and post-tests of the two target subject topics found that the students had a statistically significant growth in domain knowledge. The three identical information literacy tests and critical thinking tests throughout the trial teaching found that the students had a statistically significant growth in information literacy competency and critical thinking skills. The semi-structured interviews found that the

students and teachers positively perceived the effectiveness of the pedagogical designs of the digital classrooms on supporting the development of information literacy competency and critical thinking skills. Three implications are drawn for enhancing the pedagogical designs in digital classrooms that put emphasis on fostering students' development of information literacy competency and critical thinking skills through day-to-day domain knowledge learning in class."

Lombardi, A. R., Izzo, M. V., Rifenbark, G. G., Murray, A., Buck, A., & Johnson, V. (2017). A preliminary psychometric analysis of a measure of information technology literacy skills. *Career Development and Transition for Exceptional Individuals, 40*(4), 235–243. https://eric.ed.gov/?id=EJ1158200

From the abstract: "Information technology (IT) literacy skills are increasingly important for all adolescents to learn, as the majority of post-school pursuits will require at least some amount of computer skills. For adolescents with disabilities, this urgency is perhaps more pronounced, as this subpopulation typically experiences more dismal post-school outcomes than their peers without disabilities. The purpose of this study was to examine the psychometric properties of the 'Envision Information Technology Literacy' (EITL) scale based on pretest and posttest responses of students with and without disabilities ($N = 150$). Findings show promising validity and reliability of the EITL scale. Implications for practice are discussed with regard to uses in high school career courses and as an age-appropriate transition assessment."

National Assessment Governing Board. (2018). *Technology & engineering literacy framework for the 2018 National Assessment of Educational Progress*. U.S. Department of Education. https://eric.ed.gov/?id=ED594359

From the preface: "Technology and engineering are increasingly being incorporated into school coursework, ranging from instruction on the use of computers and information technology within school subjects to classes that examine the role of technology in society, or courses that teach engineering design. Information communication technologies have become integral tools of the trade in academic, workplace, and practical contexts. Technology and engineering are essential components of contemporary science, technology, engineering, and mathematics (STEM) education. Because of this growing importance of technology and engineering in the educational landscape, the National Assessment Governing Board decided that an assessment of technological literacy would be an important addition to the National Assessment of Educational Progress (NAEP). The '2018 NAEP Technology and Engineering Literacy Framework' is a statement about what should be expected of students in terms of their knowledge and skills with technology, written to be the basis for an assessment of technology and engineering literacy appropriate for all students. It opens the door to seeing what our K-12 students know about technology and engineering, in the same way that NAEP assesses their knowledge and capabilities in reading, mathematics, science, and other subjects."

Common Sense: https://www.commonsense.org/

From the website: "Common Sense is the nation's leading nonprofit organization dedicated to improving the lives of all kids and families by providing the trustworthy information, education, and independent voice they need to thrive in the 21st century."

- Digital Citizenship Curriculum: https://www.commonsense.org/education/digital-citizenship/curriculum

Edutopia: https://www.edutopia.org/

From the website: "Our Foundation is dedicated to transforming K–12 education so that all students can acquire and effectively apply the knowledge, attitudes, and skills necessary to thrive in their studies, careers, and adult lives."

- Digital Citizenship: Resource Roundup: https://www.edutopia.org/article/digital-citizenship-resources

International Society for Technology in Education: https://www.iste.org/

From the website: "Welcome to the International Society for Technology in Education (ISTE), home to a passionate community of global educators who believe in the power of technology to transform teaching and learning, accelerate innovation and solve tough problems in education."

- Standards for Students: https://www.iste.org/standards/for-students
- Learning Ideas: https://www.iste.org/explore/In-the-classroom/Find-ideas-for-learning-with-tech-in-our-back-to-school-guide%21

U.S. Department of Education, Office of Educational Technology: https://tech.ed.gov/

From the website: "The U.S. Department of Education Office of Educational Technology (OET) develops national educational technology policy and establishes the vision for how technology can be used to transform teaching and learning and how to make everywhere, all-the-time learning possible for early learners through K–12, higher education, and adult education.

Methods

Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

- (assessment* OR practice*) AND (instruct* OR teach* OR assess* OR strateg*) AND (online OR digital OR technology OR computer) AND (literacy OR competency OR skills) AND ("secondary school" OR "middle school" OR "high school")

Databases and Resources

We searched ERIC, a free online library of more than 1.6 million citations of education research sponsored by the Institute of Education Sciences (IES), for relevant resources. Additionally, we searched the academic database ProQuest, Google Scholar, and the commercial search engine Google.

Reference Search and Selection Criteria

In reviewing resources, Reference Desk researchers consider—among other things—these four factors:

- Date of the publication: Searches cover information available within the last 10 years, except in the case of nationally known seminal resources.
- Reference sources: IES, nationally funded, and certain other vetted sources known for strict attention to research protocols receive highest priority. Applicable resources must be publicly available online and in English.
- Methodology: The following methodological priorities/considerations guide the review and selection of the references: (a) study types—randomized controlled trials, quasi experiments, surveys, descriptive data analyses, literature reviews, policy briefs, etc., generally in this order; (b) target population, samples (representativeness of the target population, sample size, volunteered or randomly selected), study duration, etc.; (c) limitations, generalizability of the findings and conclusions, etc.
- Existing knowledge base: Vetted resources (e.g., peer-reviewed research journals) are the primary focus, but the research base is occasionally slim or nonexistent. In those cases, the best resources available may include, for example, reports, white papers, guides, reviews in non-peer-reviewed journals, newspaper articles, interviews with content specialists, and organization websites.

Resources included in this document were last accessed on October 26, 2020. URLs, descriptions, and content included here were current at that time.