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Learning the Code:
Deciphering Digital Literacy

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ABSTRACT

The concept of "digital literacy" has been much discussed and variously misunderstood in our society. Owing to digital communication technologies, it is often confused with other literacies and skills necessary for utilizing and evaluating digital information. As information and communication is increasingly produced, accessed, and controlled in digital formats, there is significant need to clarify among "information literacies" what "digital literacy" means and demands. In order to accomplish this, the author reviews what is meant by literacies in human society, examines the nature of the digital as a language, describes genuine digital literacy, and elucidates the sociopolitical importance of the growing digital illiteracy in global citizenry and how this might be addressed.

KEYWORDS

Cultural Citizenship, Digital Information, Digital Literacy, Information Literacy, Library and Information Science, Literacy Education

INTRODUCTION: DIGITAL LITERACY AS CODE, OR "HOUSTON, WE'VE HAD A PROBLEM!"

According to generous 2020-2024 occupational outlook numbers (data including not only computer programmers, but software developers, data analysts, information and network systems managers, application developers, game developers, and more), professional digital coders (those able to compose, comprehend, and employ computer programming languages, accordingly, the *literate*) globally number approximately 23.9 million individuals (Bureau of Labor statistics, Office of Occupational Statistics and Employment, 2021; Bureau of Labor statistics, U.S. Department of Labor, 2021a, 2021b, 2021c; Daxx Software Development Teams, 2020; Evans Data Corporation, 2019, 2020; US Department of Labor, 2019; Worldometer, 2021). This amounts to around 3% of the world's population, indicating that the preponderance of our species is *illiterate* to the dominantly expressive semiotic medium on which a majority of current human communications and transactions, economic and sociopolitical coordination, cultural and personal participations are coded, constructed, and deployed. This signals an alarming situation of global illiteracy pertaining to how information, communication, economies, politics, transportation, labor, education, organization, health and safety, social relationships, and beyond - are structured, produced, presented, accessed, and achieved.[1] There is an ever-increasing illiterate majority reliant upon a minute and diminishing hegemony of public and private entities

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and organizations determining the governance, access, operations, energy extraction and providence, supply chains, distribution and networking inclusion (or exclusion).[2]

Public press and scholarship have begun focusing on this in the past decade – outpourings of discussion, debate, publications and documentaries regarding 'filter bubbles'; privacy and equity issues; 'fake' or 'alternate' facts and news; search engine biases, parameters and retrieval programs; stacks, spiders, and digital divides; digital rights and access; production costs and natural resource destruction; invasive surveillance; AI/AR/VR and machine-learning innovation; biotechnologies; modeling and control; binary categorizations and politicization; human factors, algorithmic justice, and a host of other issues arising from the global evolution of information communication technologies (ICTs) and their dominance over societal participation - imposing submission to the functional requirements of digital culture and its operative technologies (see Berthier & Teboul, 2018; Chun & Joyrich, 2009; Chun, 2006, 2013, 2016; Clark & Kaptanian, 2018; Drucker, 2001; Elden, 2005; Finn, 2017; Franklin, 2013; Galloway, 2006; Galloway et al., 2013; Galloway & Thacker, 2007; Gunkel, 2014; Han, 2017; Heidegger, 1977; Hui, 2010, 2015, 2016b; Kittler, 1990, 1999; Kittler et al., 2013; Morozov, 2013; Oremus & Oremus, 2016; Pariser, 2011; Pasquale, 2015; Ramsay, 2011; Rouvroy & Stiegler, 2016; Steiner, 2012; Sumpter, 2018; Vaidhyanathan, 2011).

In the past decade (earnestly since 2015) many international, federal, corporate entities, and public and private organizations (e.g. Google, Microsoft, governments and others, see references) have been developing initiatives toward compulsory implementation of "coding literacy," "computer science education," and "computational thinking (CT)" in K-12, higher education curricula, and professional development programs ("Arkansas' School-Coding Initiative Centers on Teacher PD; Arkansas Isn't the First Jurisdiction to Set Aggressive Coding-Education Objectives, but Its Emphasis on Teacher Training Has Set It Apart," 2016; *Center for Computational Thinking, Carnegie Mellon*, n.d.; CAS London & Computer Science for Fun (CS4FN), n.d.; Coalition of Black Excellence, 2020; Code Club, 2021; Code.org, 2021a, 2021b, 2021; CoderDojo, 2021; CodeSpeak Labs, 2020; Cruz, 2018; CSforALL, 2021; Delacruz, 2020; Dindelegan, 2018; Discovery Education, 2021; Google, n.d.-a; Kite et al., 2021; Lafee, 2017; Massachusetts Institute of Technology (MIT), n.d.; Microsoft, 2021; Montiel & Gomez-Zermeño, 2021; Office of the Press Secretary, 2014; Rich et al., 2019; Romero et al., 2017; Smith, 2016; the Faculty of Education Universiti Kebangsaan, Malaysia et al., 2021; Trucano, 2015; Wolfram, 2016). These are notable contributions, but are failing desperately to meet the demand necessary for a professional class (or caste), let alone a relatively literate global society.

This is evidenced by yearly reports during simultaneous periods regarding the significant gaps between the extravagantly growing demand for individuals fluent in computable languages (programmers, software developers, information technology (IT) management, network securities, etc.) and the supply of a competently *literate* workforce (Bureau of Labor statistics, Office of Occupational Statistics and Employment, 2021; Evans Data Corporation, 2019; Geerligs, 2020; International Telecommunication Union, ITU, 2021; Kosenko, 2020; Liu, 2019; Melnicuk, 2019; Pham, 2021; Rayome, 2017). Recent statistics indicate disparities as high as nearly a million employment openings, while capable applicants number under 200,000 (in the U.S. alone) and projected numbers globally indicate more extreme disparities (certainly accentuated by the global pandemic and its forcing vast operations remote and "online").

If indeed our "world is inscribed by the digital" (Tamatea, 2019, p. 1), the ability to maintain a critical and relatively free participatory relation to increasingly computable technologies ambient and 'everyware' must include comprehending their ontology and epistemology; design, purposes, and use; social and political functions and intentions; and be capable of altering and effecting change within them. This article argues that a deeper understanding of digital literacy is required in order to realize this – a genuine literacy through which a majority of citizens or socio-political participants are able to read, write, understand, and effect the regnant symbolic codes directing the majority of human communities (Beer, 2014; Berry, 2015; Drucker, 2009, 2013; Feenberg et al., 1995; Floridi, 2011, 2014, 2015; International Telecommunication Union, ITU, 2021; Kockelman, 2017; Vee, 2017).