Multidimensions of digital inequality among the TANF population

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Abstract. This study applies the multidimensional digital inequality framework to analyze the complex ways in which digital access varies among low-income populations. This research specifically examines the results of digital skills training for individuals receiving Temporary Assistance for Needy Families (TANF) benefits and how it shapes their Internet use as well as returns of use. The research shows the importance of the multidimensional nature of digital inequality, focusing on how access and use of digital technologies varies among individuals with formal digital literacy skills training. Findings from the research offer insight into the need for additional technological investments and multistakeholder engagement.
Keywords. Digital inequality; Digital literacy skills; Digital technology; NorthStar assessment; TANF.
JEL. I23; I24; I38; J15.

1. Introduction

Research has shown that digital inequality can adversely shape an individual's income earning opportunities, information access, and social connections. It is increasingly important for individuals receiving Temporary Assistance for Needy Families (TANF) benefits and other low-income populations to recognize that more economic activity is taking place online. This population must learn to autonomously utilize their digital access, information and communication technology (ICT), and skills as a form of capital to improve their quality of life in a digital market economy.

Digital inequality extends beyond a binary division--those who can and cannot access digital technology. Social inequalities are useful in understanding digital inequalities. Physical aspects of social life are rapidly shifting to digital surfaces and/or environments. As such, it is important for low-income individuals to know how to navigate diverse information and communication technologies.

The District of Columbia government is committed to digital inclusion for all District residents. The local government continues to invest in digital inclusion efforts – access to digital technology, low-cost Internet, and digital skills training – in hopes that this will rebuild the District of Columbia's economy post COVID-19. This inclusion may also increase the number of

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African American and Hispanic residents and other residents of color who are able to increase their skills and thrive in careers in the new economy.

Digital access plays a significant role in socioeconomic inclusion. The relationship between digital and social inequality is increasingly important as competition becomes more digitalized. This rapid digital transformation has led to the expansion of opportunities for digital inclusion.

The District of Columbia's Department of Human Services administers the TANF program. The agency provides cash assistance to families in need and an array of wraparound services to support individuals in becoming self-sufficient. Families enrolled in the District's TANF program must meet income requirements and have a child in the home to be eligible.

The agency contracts with organizations, known as TANF Employment Program (TEP) providers and/or partners, to engage participants through education, employment and parental coaching. Along with coaching, TEP providers help individuals and families build upon their strengths to achieve positive goals and improve family well-being. Providers and partners also employ a Two-Generation (2Gen)approach to serve individuals and their families.

Two-generation (2Gen) approaches build family well-being by intentionally and simultaneously working with children and the adults in their lives together. 2Gen approaches center on the whole family to create a legacy of educational success and economic prosperity that passes from one generation to the next (2Generation Approach, 2022).

The University of the District of Columbia's Paving Access Trails to Higher Security (PATHS) program serves as a District of Columbia TEP partner. The Work Readiness Program trains up to 400 individuals annually. Training includes, but is not limited to, Digital Literacy, Mandated Reporter, Contact Tracing and Community Health Worker and Hospitality certifications.

The UDC Digital Literacy training seeks to help program participants build their digital and information literacy skills needed to seek, obtain and retain education and employment. Program participants are provided with access to the Internet, devices and skills training. Other support services include life skills training, transportation farecards, and behavioral and mental health referrals including substance abuse and domestic violence.

The District of Columbia government's partnership with the University of the District of Columbia has been in existence for more than 20 years. This is significant because this partnership is directly tied to the University's mission. UDC is dedicated to serving the needs of the community of the District of Columbia and producing lifelong learners who are transformative leaders in the workforce, government, nonprofit sectors and beyond.

University-government partnerships are rooted well in the history of land-grant universities. The University of the District of Columbia, founded in 1851, is a historically Black land-grant university. It is the only Urban Land-grant University in the nation's capital (APLU, 2022).

With education offerings that span workforce and certificate programs and degrees ranging from associate to doctoral, UDC draws many of its students from public schools systems in Washington metropolitan area (including Washington, D.C., Maryland, and Virginia).

In 2018, the University created the Equity Imperative to help address this issue. The program focuses on minimizing a digital divide that perpetuates inequities in marginalized groups. The university's goal is to advance digital

literacy across its programs to improve students' access to economic opportunities (Microsoft, n.d.). Approximately 16% of families in Washington, D.C. live below the poverty line (Census Reporter, n.d.).

Beyond physical access to digital equipment, Internet, and skills training, there are other challenges to narrowing digital inequities. Many educators, researchers, and policymakers focus on the *technological* or *educational* dimensions, and pay less attention to the other, often less visible, ways in which digital access shapes what people can do and be – their human capabilities (Nussbaum, 2001).

This research examines how a University digital literacy program prepares low-income District of Columbia residents to use digital resources for personal and professional goal attainment. Furthermore, the research examines how the multidimensions of digital inequality shape information and communication technology use for a sample of individuals receiving TANF benefits.

2. Theory and literature review

DiMaggio *et al.,* (2004) were among the first researchers to offer a theoretical framework for the factors or outcomes of digital inequalities. Their framework focuses on the multidimensions of digital inequality. Specifically, the framework discusses how access to, and use of digital technologies varies even among individuals with Internet access. This multidimensional approach draws attention to five key aspects of digital inequality. The key aspects include the following:

(1) The variety and quality of hardware, software and network connections.
(2) Autonomy of Internet use.
(3) Variations in the level of digital skills.
(4) Availability and variation of social support network; and
(5) Variations in the purposes for which individuals use technology (DiMaggio, 2004).

The authors explain that demographic and socioeconomic factors influence the level and quality of the first four dimensions. This, in turn, influences the types of uses, and then results in differentiated benefits and opportunities and divergent life outcomes.

Digital inequality extends beyond a binary division; those who can and cannot access digital technology. Van Dijk maintains the presence or absence of Internet access remains an important dimension of digital inequality. The concept of a binary divide, which highlights absolute inequalities between the included and excluded, does not account for the fact that many technological inequalities are relative, continually shifting as innovative technologies emerge.

van Dijk (2006) describes four types of digital access: motivational, material, skills and usage. Schools, libraries, and community organizations provide *material access* via the Internet, hotspots and computers. These resources are crucial for low-income communities. Individuals must be interested or motivated (*motivational access*), use their *digital skills* and experience meaningful opportunities to use technologies, especially for critical thinking (*usage access*).

Many adult programs teach digital skills. According to van Dijk (2006), these efforts focus on *operational* and *information processing skills* rather

than *strategic* (critical) skills. Technological resources are used to accomplish personal or social goals.

Neuman & Celano (2006) maintain that usage access is where the most profound inequalities are evident. Households with higher incomes and education use technologies in diverse ways and therefore gain more socio-economic and educational advantages.

The 'new' digital divide, then, stems from what people *do* with technologies (van Dijk, 2006; Dolan, 2016). Policymakers must address digital literacy issues implementing measures to bridge the gap between groups with access and groups without access to digital technology, skills, and training. Dolan characterizes this as a gap between the "cans and cannots (Dolan, 2016). The absence of information technology will widen the gap between the haves and have-nots, or the cans and cannots (Roswell & Morrell, 2023).

Van Dijk's (2005) scholarship widened the theoretical scope of digital inequalities by introducing a *resources and appropriation theory. It describes the differences or* inequalities of Internet access by examining personal and positional categories (i.e., education and work) of individuals and their resources. Digital access in itself is a process of appropriation. It includes attitudinal, material, skills and usage access (van Deursen, 2020). The latter is increasingly the focus of attention when studying how people in different social groups use the Internet (Blank & Groselj, 2014).

It also addresses the adoption of advanced technologies (van Dijk, 2005; van Dijk, 2013). According to this relational theory, digital inequalities should be examined from the vantage point of elite technology use.

Here, "the advantaged group is the first to adopt the new technology. For example, schools are environments in which technology is introduced and utilized. In this setting, the digital learning function is implemented in elite school systems to advance students attending these institutions over students in other schools.

Attending elite or prestigious schools may afford an individual to make gains in an immersive and/or mixed technology environment. This creates an advantage over schools and students who are unable to participate in a similar digital manner (van de Werfhorst *et al,* 2022).

Helsper (2018) maintains that there are systematic differences in the opportunity and ability to use ICTs (or decide not to use them) in ways that allow individuals to obtain beneficial outcomes across all domains of everyday life and avoid negative outcomes.

She adds that inequalities in the socio-digital realm often follow the existing lines of stratification, meaning the vulnerable are less likely to have positive experiences and connections online than the already privileged (Helsper, 2020).

3. Methodology

The NorthStar Digital Literacy assessment method was administered to four cohorts of program participants enrolled in the Digital Literacy training course. The assessment defines basic skills needed to perform tasks on computers and online. Students participated in an online course proctored by an instructor. The instructor led the students through the self-guided modules. The module content covered three principal areas:

- Essential Computer Skills-Basic Computer Skills, Internet Basics, Using Email, Windows Operation System, Mac Operating System
- Essential Software Skills-Microsoft Word, Excel, PowerPoint, Google Docs
- Using Technology in Daily Life - Social Media, Information Literacy, Career Search Skills, Accessing Telehealth Appointments, Supporting K-12 Distance Learning, Your Digital Footprint.

NorthStar focuses on basic digital literacy skills-such as using a mouse, conducting information searches on the Internet, and using email-as well as advanced skills, such as using Google Docs and online job searches. It offers assessments in fourteen digital skills areas that measure proficiency and identify skill gaps.

The NorthStar digital literacy standards help prepare job seekers who may lack the digital literacy skills needed to seek, obtain, and retain employment, as well as to perform other tasks in daily life. Program participants were able to take the assessments remotely via the NorthStar homepage. Upon passing each assessment, individuals earn and obtain the NorthStar Digital Literacy Certificate.

The certificates provide an important credential for employment, as even entry-level jobs in the fast-food and retail industries increasingly require basic computer skills. Certificates also certify the participant's ability to complete computer skills needed in higher education and demonstrate their ability to use social media and online information purposely.

In FY'2021, the university engaged a minority and women-owned workforce organization to proctor the NorthStar Digital Literacy assessment and trained 77 participants for the four-week digital literacy program. The organization, an experienced and certified workforce readiness provider, had previous experience delivering culturally competent training to the TANF population in the District of Columbia.

For trainers involved in education, cultural competency training is important because it improves the understanding of students' needs. By appreciating students' cultures and their approaches to things like learning and education, trainers can tailor their approaches much better. This approach can help in addressing any biases that trainers may maintain about students of certain backgrounds/cultures, as well as develop better decision-making skills (Vulture, 2022).

4. Findings

Table 1. *FY 2022 digital literacy results for participants*

Assessment Area	Total number of assessments	Total number of passing assessments
Basic Computer Skills	279	179 (64.2%)
Internet Basics	261	156 (60.3%)
Windows 10	223	134 (60.1%)
Mac Operating System	242	117 (48.3%)
Using Email	170	143 (84.1%)
Microsoft Word	254	152 (59.8%)
Microsoft Excel	201	98 (48.8%)
Microsoft PowerPoint	264	100 (37.9%)
Google Docs	185	111 (60%)
Social Media	308	152 (49.4%)
Information Literacy	216	77 (35.6%)
Career Search Skills	260	105 (40.4%)

Your Digital Footprint	201	106 (52.7%)
Supporting your K-12 Learner	134	118 (88.1%)
Telehealth	17	15 (88.2%)

Table 2. *FY 2021 Digital Literacy Results for Participants*

Assessment Area	Total number of assessments	Total number of passing assessments
Basic Computer Skills	119	80 (67.2%)
Internet Basics	120	73 (60.8%)
Windows 10	106	72 (67.9%)
Mac Operating System	109	54 (49.5%)
Using Email	78	69 (88.5%)
Microsoft Word	99	73 (73.7%)
Microsoft Excel	101	54 (53.5%)
Microsoft PowerPoint	125	48 (38.4%)
Google Docs	91	58 (63.7%)
Social Media	153	73 (47.7%)
Information Literacy	111	39 (35.1%)
Career Search Skills	137	49 (35.8%)
Your Digital Footprint	103	55 (53.4%)
Supporting your K-12 Learner	62	56 (90.3%)

From January to September 2022, 100 individuals enrolled in the digital skills literacy training. A total of 55 students passed at least two assessments. A total of 40% of the students passed 15 assessments (see Table 1) and earned three certifications in the following areas:

• Essential Computer Skills-Basic Computer Skills, Internet Basics, Using Email, Windows Operation System, Mac Operating System.

• Essential Software Skills-Microsoft Word, Excel, PowerPoint, Google Docs.

• Using Technology in Daily Life – Social Media, Information Literacy, Career Search Skills, Accessing Telehealth Appointments, Supporting K-12 Distance Learning, Your Digital Footprint.

From January to September 2021, 96 individuals enrolled in the digital skills literacy training certification program. A total of 77 participants participated in the training. 62% of the participants passed at least one assessment. A total of 36% of the participants passed 14 assessments (see Table 2) and earned three certifications (see above).

A total of 106 participants passed at least one assessment in both FY' 21 and FY' 22. Sixty-two participants passed all 14 assessments in both years. A total of 99 participants passed a combination of two, three or four assessments in both periods.

In FY '22 and FY '21, participants maintained passing assessments in *three* out of the fourteen 14 NorthStar skills assessments (see Tables 1 and 2). From FY'22 to FY '21, participants consecutively performed well in assessments related to *Supporting Your K-12 Learner* and *Using Email*.

Both skills assessments are practical in nature and support the recommendation that exposure to, application of, and execution of technology helps to reinforce the skills. Factors that contributed to the high scores included guidance to participants on how to use tablets and computers interactively with their children and interacting with school staff to reinforce the use of diverse technology, receiving and sending emails during the instructional period, and consistency with participation in the digital literacy program.

4.1. Telehealth and Microsoft Word

From FY'22 to FY'21, there was a variation in the skills area with the highest number of passing assessments. In FY'22, NorthStar's added a new Telehealth skills assessment to the curriculum. Fifteen out of seventeen participants passed the Telehealth skills assessment. A total of 88% of the assessments received a passing score. In FY'21, 74% 73 out of 99 Microsoft Word skills assessments received a passing score. This accounted for 74% of passing assessments in this skills test.

As access to healthcare becomes more digitalized, it can threaten to marginalize some populations. Recent scholarship tracked the use of telehealth visits in the US during the height of the COVID-19 pandemic. Results found that African Americans were more than four times more likely than Caucasians to seek healthcare in the emergency department over telehealth services, even when adjusting for co-morbidities and preferred language (Yee *et al.,* 2022).

4.2. Information literacy

The Information literacy skills test received the lowest number of passing assessments for both years. In FY '22, 77 out of 216 assessments received a passing score. This accounted for 35.6% of the assessments with a passing score. In FY' 21, 39 out of 111 assessments received a passing score. This accounted for 35.1% passing assessments.

The Information Literacy skills assessment tests how to use information to solve a problem, answer a question, plan and/or accomplish a goal or objective. Information literacy is a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information (Presidential Committee on Information Literacy: Final Report, 2012)." To be information literate, one needs skills not only in research but in critical thinking. Developing critical thinking skills in adults empowers them to make sound decisions. Even though technology makes it possible to have much of the world's information at your fingertips, information alone is insufficient for critical thinking. This information is meaningless without the desire and ability to ask the right questions, identify conflicting information, assess the credibility and accuracy of that information, and determine what actions ought to be taken in response.

4.3. Microsoft PowerPoint

In FY'22, the number of passing assessments for Microsoft PowerPoint was 48 out of 125 assessments. This accounted for 38.4% of passing assessments for Microsoft PowerPoint. In FY'21, the number of passing assessment was 100 out of 264. This accounted for 37.9% of passing assessments.

The software is most visible during presentations. This skill is needed to communicate effectively to deliver information for internal and external audiences. The Microsoft PowerPoint test evaluates an individual's conceptual and creative skills to shape compelling presentations. The assessment tests technical skills in creating effective skills using PowerPoint as part of the Microsoft Office suite.

4.4. *Career search skills*

Job search assistance is a common feature of state work readiness programs that are trying to migrate low-income populations into employment and help increase their earnings, and a core component of employment activities in the TANF program.

In FY'22, there were 105 out of 260 passing assessments for Career Search skills. This accounts for 40.4% passing assessments. In FY'21, 49 out of 137 assessments received a passing score (35.8%) in Career Search Skills. This assessment measures the individual's ability to conduct an online job search using Internet resources, job listings, job fairs, social media, and networking. It also provides tools for career aptitude assessments and cover letter and resume writing.

4.5. Social media

Participants scored 47.7% in social media skills. Social media and digital tools are being used in educational and training settings. The ability to use social media is important to being able to create content and information. The communication tool can enhance and improve communication among individuals and groups. Social platforms like Twitter, Instagram and Facebook have value. They help individuals to remain informed or find others with shared interests. Recently, hospitals and social service agencies utilize social media to provide health alerts and program updates.

Helsper makes the argument that it is equally important to understand how inclusion in online communities works to understand how differences in social well-being, online mobbing or loneliness affect us. Inequalities in our social relationships online often follow existing lines of stratification, meaning the vulnerable are less likely to have positive experiences and connections online than the already privileged (Helsper, 2021).

4.6. Demographics

In FY' 21, a total of 96 individuals enrolled in the digital literacy program. Of the 96, there were 94.8% were female. 89.6% of the participants reported being single. The remainder of the individuals were either married and/or divorced. A total of 29% of the participants resided in Ward 7 and 25% resided in Ward 8. Approximately 15% resided in Ward 6 and 13% in Ward 1. Four percent of the participants resided in Ward 4. The remainder of the participants resided in Wards 2 (1%) and 3 (1%).

4.7. Education

In FY'21, Fifty-four percent of the participants had earned a high school diploma or general equivalency degree (GED). Thirty-two percent reported attending but not completing their college education. A total of 11% of the participants reported attending high school but did not complete their high school education. Five percent of the participants possessed a bachelor's degree. One percent reported having earned a master's degree.

4.8. Access to the Internet

Seventy-six percent of the participants reported having access to high-speed Internet service. Thirteen percent of the participants report not having access to high-speed Internet service. Eleven percent reported having Internet

access "sometimes." According to research (Bowser Administration to Celebrate Infrastructure Week by Highlighting District Investments, n.d.), the District of Columbia Mayor, Muriel Bowser, has committed to provide continuous technological innovations to improve service delivery and ensure that all District residents have access to the high-speed Internet.

Approximately 45.8% of the participants reported knowledge of how to use a hotspot in public spaces. 30% reported not using a hotspot to access the Internet while 24% reported using a hotspot "sometimes," to access the Internet.

4.9. Access to devices

Of the 96 participants, 69% of the participants used a laptop to access the digital literacy skill training. A total of 24% of the students utilized a tablet during the program. Digital device support was provided by the Department of Human Services and District of Columbia Public Libraries.

Most of the participants reported owning a smartphone (68%). Fifty-five percent reported having a laptop in their home. Only 11% reported having a desktop and 28% reported having a tablet in the home.

5. Barriers

During the intake process, the proctor was not privy to information related to individual's mental health, learning differences, domestic violence, high school completion records and/or literacy barriers. It is possible that these factors may have contributed to the participant's digital literacy results. The lack of regular exposure to digital technology posed the biggest challenge for participants.

Many of the assessments centered on the use of digital technology in both your personal and personal life. The challenges of digital inequality were evident throughout the training. Outside of the classes, participants did not have opportunities to regularly practice using digital technology. Individuals were not attending virtual social events. As such, participants were not familiar with how to host social events using digital technology. Though participants maintained knowledge and use of social media, most did not know how to use social media to seek employment.

The level of frustration of participants was evident during instances when they did not know how to join or access a meeting by clicking on a meeting link or leave or log off a meeting. This strain was further compounded and demonstrated when a participant did not know how to mute their microphone to block out background noises, log back into a meeting when audio or video issues arose and/or how to display the camera.

These examples highlight skills that are needed for individuals to maintain in-person or remote employment. Furthermore, these digital skills are needed to support an individual's career advancement. Helsper (2021) contends that what people get out of digital engagement depends on the offline resources that they have and the online resources they use. She emphasizes that some individuals will gain from this while others will lose out (Helsper, 2021).

Participants were unfamiliar with diverse learning modalities (hybrid, virtual, remote, etc.). Trainers began offering diverse modalities to allow students to visit the campus to receive in-person assistance on Mondays and Wednesdays and join online Tuesdays and Thursdays.

The class also included participants who enrolled in the digital literacy program but did not complete the NorthStar assessment.

Reading comprehension and critical thinking skills were a continuous hinderance throughout the training. Students were challenged by the vocabulary and context in which the questions were being asked. As a solution, trainers engaged students in one-on-one sessions. Here, the trainers provided parallel examples to highlight and explain the lesson concepts.

6. Limitations of the study

6.1. Different groups of participants from year 1 to year 2-

There were two different groups of participants in the first and second year of the study. The participant pool is fluid. The Department of Human Services makes referrals to the program. Upon completion of the program, participants are transferred to another program, enroll in college, obtain employment and/or leave for medical reasons.

6.2. Pre-and post-assessment experiences-

The pre- and post- experiences for each group were not captured. The proctor did not assess each participant's digital skills pre-post the assessment. The NorthStar assessment was not configured for the pre-and post-testing.

6.3 Absence of previous research on TANF populations-

Scholarship on the autonomous use of information and communication technology relative to the TANF population is scant. Digital skills training is not equivalent to having access to technology. The research is rich in painting a more complex picture of the multidimensions of digital inequality, specifically as they relate to low-income populations. The evidence highlights how digital inequalities shape experiences and outcomes for low-income households. Current scholarship centers around the capacity of low-income households to use their access intentionally.

7. Conclusion

Most of the participants were not able to autonomously utilize the Internet to pursue personal interests or for a variety of purposes (work, leisure, and community). The two-year study revealed that there was a lack of digital capacity and support of social networks. These digital inequalities impacted the diverse realms of the participant's quality of life. This was evident in the NorthStar digital literacy assessment.

The District of Columbia will need to invest continuous technological efforts to support low-income households. Digital skills and technology are critical to digital inclusion. Education, experience, language, racial and economic background, gender and age can be barriers to an individual's ability and experience to navigate information and communication technologies to find, evaluate, create, and communicate information.

Access is not synonymous with equity and inclusion. As the world becomes increasingly digitized, helping to bridge digital inequality gaps will require a collective effort. Emphasis in research and interventions has to rebalance from narratives of systematic exclusion and individualistic 'victim blaming' towards collective responsibility (Helsper, 2021).

There is a lack of diversity in the digital literacy community, particularly among researchers, practitioners, educators, program developers and policymakers. This problem of representation is linked to larger issues of access to digital technology and inclusion in online spaces.

The Internet can be used to promote economic opportunity for everyone. If the barriers to access to information and communication technologies are not removed, then the access to digital technology will continue to widen. This is counterproductive to promoting digital equity.

What remains to be seen are not programs to support access to digital skills, but a community of practice to support a needed level of capacity building.

8. Recommendations

1. Increase representation in the digital literacy community: A lack of adequate and meaningful representation within the digital literacy community translates to policies and practices that do not consider the immediate concerns or experiences of diverse and historically marginalized communities (Brisson-Boivin & McAleese, 2021).

2. Collaborate with local government and community mental health organizations: Some adult learners have not been screened for learner differences. This impacts participant ability to fully engage in digital skills training and access digital technology. Mental health barriers are also tied to learner differences. Both can impact an individual's ability to obtain and retain employment. TANF recipients are more likely to suffer from physical or mental health problems that limit employability than the general population. The Manpower Demonstration Research Corporation (MDRC) found that nearly one-third of the non-working recipients studied reported having fair or poor health (Goldberg, 2002).

3. Reinforcement of digital skills training: Consistent exposure, application, and execution of technology helps to reinforce the digital skills to the participants. Organizations must invest in the communities in which they are located. This means ensuring that there is broadband access for the entire community to promote greater digital equity.

4. Establish a digital equity office: This would support local programs that help to build the digital skills of District residents and community households. In turn, this would support Washington metropolitan employers and boost the District of Columbia's economy. This is especially important in majority low-income neighborhoods or for TANF populations that have struggled to digitally compete.

5. Engage in a multi-stakeholder approach involving national policy and targeted interventions supporting employers, schools, non-profit and community organizations.

6. Expand the modalities of participants: Multimodality is a belief that digital literacy will broaden with the use of two or more modes of digital technology. Research supports students' use and design texts with two or more modes of representation and expression (Roswell & Morrell, n.d.). The experimentation with makerspace and problem-solving approaches can enhance digital training (Halverson & Sheridan, 2014).

References

2Gen Approach. (2022, September 22). *Ascend at the Aspen Institute*. [Retrieved from].

APLU. (2022, December 28). *Land-grant university faq*. [Retrieved from].

Blank, G., & Groselj, D. (2014). Dimensions of internet use: Amount, variety, and types. *Information, Communication & Society*, 17(4), 417–435. doi. 10.1080/1369118X.2019.1646777

Bowser administration to celebrate infrastructure week by highlighting District investments. (n.d.). DMOI. [Retrieved from].

Census Reporter. (n.d.). *Census profile*: Washington, DC. [Retrieved from].

DiMaggio, P., Hargittai, E., Celeste, C., & Shafer, S. (2020). Excerpts from digital inequality: From unequal access to differentiated use. *In Inequality in the United States: A Reader* (1st ed., p. Chapter 11). Routledge. doi. 10.4324/9781003071709

Dolan, J.E. (2016). Splicing the divide: A review of research on the evolving digital divide among K–12 students. *Journal of Research on Technology in Education*, 48(1), 16-37. doi. 10.1080/15391523.2015.1103147

Edwards, L. (2020). Protecting digital rights during a pandemic, *UK IGF 2020 Session Speakers*. [Retrieved from].

Goldberg, H. (2002). Improving tanf program outcomes for families with barriers to employment, *Centre on Budget and Policy Priorities*. [Retrieved from].

Halverson, E.R., & Sheridan, K. (2014). The maker movement in education. *Harvard Educational Review,* 84(4), 495–504. doi. 10.17763/haer.84.4.34j1g68140382063

Helsper, E. (2021a). *The Digital Disconnect: The Social Causes and Consequences of Digital Inequalities*. SAGE. doi. 10.4135/9781526492982

Helsper E.J. (2008) *Digital Inclusion: An Analysis of Social Disadvantage and the Information Society*. Department for Communities and Local Government, London, UK.

Microsoft. (n.d.). *How the University of D.C. is working to close the digital divide*. Microsoft Education Blog. [Retrieved from].

Neuman, S.B. & Celano, D. (2006). The knowledge gap: Implications of leveling the playing field for low-income and middle-income children. *Reading Research Quarterly*, 41, 176-201. doi. 10.1598/RRQ.41.2.2

Nussbaum, M.C. (2001). *Women and human development: The capabilities approach. (The Seeley Lectures: Series Number 3)*, Cambridge University Press. doi. 10.1017/CBO9780511841286

Presidential committee on information literacy: Final report. (2012). Association of College and Research Libraries (ACRL). [Retrieved from].

Rowsell, J., & Morrell, E. (n.d.). *Digital Divide. International Literacy Association* [Retrieved from].

van Deursen, A.J.A.M. (2020). Digital inequality: During a pandemic: quantitative study of differences in COVID-19-related Internet uses and outcomes among the general population. *Journal of Medical Internet Research*, 22(8), [e20073]. doi. 10.2196/20073

van de Werfhorst, H.G., Kessenich, E., & Geven, S. (2022). The digital divide in online education: Inequality in digital readiness of students and schools. *Computers and Education Open*, 3, 100100. doi. 10.1016/j.caeo.2022.100100

van Dijk, J.P. (2013). *A Theory of the Digital Divide*. Routledge Books, 49-72. doi. 10.4324/9780203069769-10

van Dijk, J.A.G.M. (2006). Digital divide research, achievement, and shortcomings. *Poetics*, 34(4-5), 221-235. doi. 10.1016/j.poetic.2006.05.004

van Dijk, J.A.G.M. (2005). *The Deepening Divide: Inequality in the Information Society*. Sage Publications. London, UK.

Vulture, C. (2022). *A Simple Guide to Cultural Competency Training*. Commisceo Global Consulting Ltd. [Retrieved from].

Yee, V., Bajaj, S.S., & Stanford, F.C. (2022). Paradox of telemedicine: building or neglecting trust or equity. *The Lancet*, 4(7), 480-81. doi. 10.1016/S2589-7500(22)00100-5