Supporting Equitable Technology Practices in Early Childhood Care and Education: A Review and Recommendations for Policy, Training, and Technical Assistance

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The Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government requires federal agencies to take a comprehensive approach to advancing equity, addressing the conditions of calling attention to those who have been historically marginalized, under-resourced, and adversely impacted by poverty. While federal agencies, like the Department of Education and Department of Health and Human Services, have developed plans or data analysis to understand how their programs have historically or currently reinforced inequity or supported equity, there is not a comprehensive understanding of how early childhood policies and training and technical assistance have currently or historically supported equitable educational technology practices. This brief addresses this gap by analyzing how Head Start and Child Care law, regulation, guidance, and training and technical assistance (T/TA) reference technology and if they support equitable practices for children and practitioners, and identifying areas of improvement.

Defining Equitable Practices

To frame equitable practices in educational technology, two terms are used to guide this brief: "digital use divide" and "digital equity."

In the *2017 National Educational Technology Plan Update, Reimagining the Role of Technology in Education*, The Office of Educational Technology describes "digital use divide" as the disparity between students using tools in an imaginative, active way to support their learning (i.e., producing media, connecting with experts, design, etc.) and those using technology in a passive, consumable way (i.e., watching a video or completing digital worksheets). Active technology experiences build the cognitive and non-cognitive competencies, skills, and expertise students need to be responsible global citizens, develop a sense of agency, and engage learners. These experiences need to be designed to address all learners by including principles of Universal Design for Learning and assistive technology and considering the needs of multilingual learners.

"Digital equity," as defined by OET in the *Advancing Digital Equity for All* report, is "the condition in which individuals and communities have the information technology capacity that is needed for full participation in the society and economy of the United States." The report highlights access as a key challenge and to focus on the three components: availability, affordability, and adoption. The third component adoption addresses the digital skills, support, and knowledge necessary to use technology and engage in online participation and learning.

Policies and training and technical assistance (T/TA) need to address both digital use equity and adoption when integrating technology.

Early Childhood and Technology

Federal Agencies

In 2015, The Office of Research, Planning, and Evaluation released the report *Uses of Technology to Support Early Childhood Practice*, summarizes research and expert interviews on the use of technology in early childhood. The U.S. Department of Education and the U.S. Department of Health and Human Services jointly produced the E*arly Learning and Educational Technology Policy Brief* presented research-based guidance on using technology in early childhood settings, primarily for 2-8 year olds, that support children's learning and growth. From examining both these documents, four main purposes of technology use emerged: 1) teaching and learning, 2) parent, family, and community engagement, 3) professional development and informal learning, and 4) assessment.

While these are the two most recent comprehensive federal documents on technology in early childhood, organizational reports cited in both documents have released updates and more research has been conducted. Some of the recent updated publications include: American Academy of Pediatrics' *Family Media Plan* online resource and *Children and Adolescents and Digital Media* report, Fred Rogers' Institute and Erikson TEC Center's *Technology and Interactive Media for Young Children: A Whole Child Approach Connecting the Vision of Fred Rogers with Research and Practice*, the 4th edition of *Caring for Our Children*, and Zero to Three's 2018 *Screen Sense* report. Additionally, since 2016, research findings have both supported points from these federal documents and expanded technology use, specifically providing evidence that technology is a substantial content area.

Research-Based Technology Use in ECCE

When considering recent publications and research, technology use in early childhood is adjusted to the following five purposes: 1) teaching and learning, 2) professional learning, 3) family communication and connection, 4) assessment, and 5) program administration. These themes are consistent when programs are delivered in-person and conducted online due to stay-at-home orders issued during the height of the COVID-19 pandemic.

For teaching and learning with children, technology mediates learning and development of different areas, such as STEM, language, social-emotional, creative arts, and gross and fine motor skills and activity implementation[1]. It also supports the needs of children with disabilities

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[1] Dore, R. A., Zosh, J. M., Hirsh-Pasek, K., and Golinkoff, R. M. (2017). Plugging into word learning: The role of electronic toys and digital media in language development. In F. C. Blumberg and P. J. Brooks (Eds.), Cognitive development in digital contexts (pp. 75-91). Academic Press.; Dore, R. A., Shirilla, M., Hopkins, E., Collins, M., Scott, M., Schatz, J., Lawson-Adams, J., Valladares, T., Foster, L., Puttre, H., Spiewak Toub, T., Hadley, E., Golinkoff, R. M., Dickinson, D. & Hirsh-Pasek, K. (2019). Education in the app store: using a mobile game to support U.S. preschoolers' vocabulary learning, *Journal of Children and Media*, *13*(4), 452-471. https://doi.org/10.1080/17482798.2019.1650788 Steed, E. A., Leech, N., Phan, N., & Benzel, E. (2022). Early childhood educators' provision of remote learning during COVID-19. *Early Childhood Research Quarterly*, 60, 307-318. https://doi.org/10.1016/j.ecresq.2022.03.003; Vasquez, V. M. (2013). *Technology and critical literacy in early childhood*. Routledge.

(i.e., assistive technology, accessible materials, etc.) and dual and multilingual learners[2]. Technology tools, like social media, online modules, and online communities, mediate professional learning for practitioners about early childhood topics[3]. For both children and practitioners, technology is a discipline that includes the content areas of design, computational thinking, digital literacy, media literacy, and maker education[4].

Practitioners use text messages, websites, digital newsletters and video conferencing to communicate and connect with families[5]. They can also utilize digital software to conduct assessments by building e-Portfolios and capturing developmental milestones, and both children and practitioners can document learning[6]. To administer programs, practitioners use

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[2] Bhatnagar, R. & Many, J. (2022). Novice teachers' use of culturally responsive pedagogies in high-needs schools during pandemic induce remote online instruction. Journal of Online Learning Research, 8(2), 181-202; Crawford, A., Vaughn, K. A., Guttentag, C. L., Varghese, C., Oh, Y., & Zucker, T. A. (2021). "Doin what I can, but I got no magic wand:" A snapshot of early childhood educator experiences and efforts to ensure quality during the COVID-19 Pandemic. *Early Childhood Education Journal*, 49, 829-840. https://doi.org/10.1007/s10643-021-01215-z; Parette, H. P. & Blum, C. (2015). Including all young children in the technology-supported curriculum: A UDL technology integration framework for 21st-century classroom. In. C. Donhone (Ed.), *Technology and digital media in the early years: Tools for teaching and learning* (pp. 129-149). Routledge.; Nemeth, K. N. (2015). Technology to support dual language learners. In C. Donohue (Ed.), *Technology and digital media in the early years: Tools for teaching and learning* (pp. 115-128). Routledge.; Nemeth, K. N. (2022). *Educating young children with diverse languages and cultures*. Routledge

[3] Armstrong, A. (2015). Connected educator-connected learner: The evolving roles of teachers in the 21st century and beyond. In C. Donohue (Ed.), *Technology and digital media in the early years: Tools for teaching and learning* (pp. 250-260). Routledge. Donohue, C., & Schomburg, R. (2015). Teaching with technology: Preparing early childhood educators for the digital age. In C. Donohue (Ed.), *Technology and digital media in the early years: Tools for teaching and learning* (pp. 36-53). Routledge.; Stone-MacDonald, A. & Douglass, A. (2015). Introducing online training in an early childhood professional development system: Lessons learned in one state. *Early Childhood Education Journal,* 43, 241-268. https://doi.org/10.1007/s10643-014-0649-2

[4] Bers, M. U. (2020). Coding as another language: Why computer science in early childhood should not be STEM. In. C. Donohue (Ed.), *Exploring key issues in early childhood and technology: Evolving perspectives and innovative approaches* (pp. 63-70). Routledge; Highfield, K., Paciga, K. A., and Donohue, C. (2018). Supporting whole child development in the digital age. In S. J. Danby et al. (Eds.). *Digital childhoods: International perspectives on early childhood education and development* (pp. 165-182). Springer; Rogow, F. (2022). M*edia literacy for young children: Teaching beyond the screen debates*. NAEYC.

[5] Snell, E. K., Hindman, A. H., & Wasik, B. A (2020). Exploring the use of texting to support family-school engagement in early childhood settings: Teacher and family perspectives, *Early Child Development and Care*, 190:4, 447-460, https://doi.org/10.1080/03004430.2018.1479401; Plotka, R. & Guirguis, R. (2022). Distance learning in early childhood during the COVID-19 crisis: Family and educators' experiences. *Early Childhood Education Journal*, https://doi.org/10.1007/s10643-022-01384-5; Donohue, C. (Ed.). (2017). *Family engagement in the digital age: Early childhood educators as media mentors*. Routledge.

[6] Pila, S., Blackwell, C. K., Lauricella, A. R., & Wartella, E. (2019). *Technology in the lives of educators and early childhood programs: 2018 survey*. Center on Media and Human Development, Northwestern University.; Bailey, M. & Blagojevic, B. (2015). Innovate, educate, and empower: New opportunities with new technologies. In C. D. (Ed.), *Technology and digital*

technology for a variety of purposes: communicating with staff, daily operations, and organizing records for state and local requirements[7]. When using technology for any of these purposes, in order to be equitable, culturally and linguistically inclusive practices, principles that address learner variability, and meeting the needs of children with disabilities should be embedded.

While equitable practices within educational technology and research-based practices using technology in early childhood have been established, we need to know if federal agencies are supporting these practices. More specifically, we need to understand how early childhood policies and training and technical assistance support equitable technology practices and identify areas for improvement. This policy brief addresses this need by analyzing Head Start and Child Care policies and programs.

Methods

This study analyzes the use of technology and digital media in Head Start and Child Care program policies: law, regulation, information memorandum, and program instructions, as well as training and technical assistance. To identify technology and digital media use, the following documents were used to generate key terms: the Office of Educational Technology's Advancing Digital Equity for All report, TEC Center's Media Literacy in Early Childhood report, and Eliasson, Peterson, and Lantz-Andersson's literature review of technology education in early childhood. Once the key terms list was generated, online policies and training and technical assistance materials were reviewed for these terms. The key terms generated were "technology," "media," "digital," "software," "online," "mobile," "internet," "electronic," and "virtual."

From January 23rd to June 2nd of 2023, the following materials were reviewed: The Improving Head Start for School Readiness Act of 2007, The Child Care Development and Block Grant Act of 2014, Head Start Program Performance Standards, The Child Care and Development Fund program, Final Rule, approximately 120 guidance documents (i.e., program instructions and information memoranda) for Head Start and Child Care, and approximately 220 training and technical assistance (T/TA) documents and for Head Start and Child Care. Training and technical assistance materials reviewed were from: the National Center on Program Management and Fiscal Operations (NCPMFO), the National Center on Early Childhood Development, Teaching and Learning (NCECDTL), and the National Center on Parent, Family, and Community Engagement (NCPFCE) and the Child Care Technical Assistance Network. After identifying these materials, each was examined for its description of technology and digital media use in preschool programs. Policies and T/TA for infant and toddler programs were not included.

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media in the early years: Tools for teaching and learning (pp. 162-182). Routledge. https://cmhd.northwestern.edu/wp-content/uploads/2019/08/NAEYC-Report-2019.pdf

[7] Simon, F. & Nemeth, K. (2012). *Digital decisions: Choosing the right technology tools for early childhood education*. Gryphon House.

Findings

Overall findings indicate, technology is presented less frequently in policies that are required with guidance referencing technology the most frequently, followed by regulation, and then laws. T/TA features technology more than any policy and covers all five purposes. It is worth noting some of the resources presented in the Child Care Technical Assistance Network link to Head Start materials, and those links were attributed to Head Start in this analysis. The following table illustrates Head Start and Child Care policies and training and technical assistance's alignment with the five technology use purposes, with (y) indicating yes and (n) indicating no.

Office of Head Start

	Law	Regulation	Guidance	Training and Technical Assistance
Teaching and Learning	N	Y	Y	Y
Professional Learning	Y	Y	Y	Y
Family Communication and Connection	N	N	N	Y
Assessment	N	Y	N	Y
Program Administration	Y	Y	Y	Y

Office of Child Care

	Law	Regulation	Guidance	Training and Technical Assistance
Teaching and Learning	N	N	Y	Y
Professional Learning	N	Y	Y	Y

Family Communication and Connection	N	Y	Y	Y
Assessment	N	N	N	Y
Program Administration	Y	Y	Y	Y

Teaching and Learning

For teaching and learning, technology is primarily incorporated in T/TA as a tool to support children's learning of different content areas, social emotional development, and meet the needs of children with disabilities and dual language learners. Some of the curriculum options that align with Head Start Program Performance Standards listed in T/TA include technology as one its domain areas. Guidance presents strategies for using interactive media and technology planning. OHS mentions technology in its regulation within the resources listed in the Early Learning Outcomes Framework cognitive domain within the context of STEM and STEAM and offers T/TA for implementing STEAM activities. The Framework also mentions the use of assistive technology for individualized instruction or accommodations. Both Child Care and Head Start listed options and strategies for supporting at-home and online learning during the COVID-19 pandemic.

Professional Learning

All policies, except for the CCDBG, describe technology use for delivering professional training or resources. Developing technology literacy programs for American Indian and Alaskan Native agencies is mentioned in Head Start law, regulation, and guidance. Head Start T/TA offers an assessment of staff's skills, use, and comfort with software and technology, strategies and resources for building virtual communities with colleagues, and research-based approaches to supporting STEAM learning.

Family Communication and Connection

Child Care regulation, guidance, and T/TA and Head Start T/TA present one or more strategies for using technology to connect and communicate with families. Some approaches focus on reciprocal communication with families, such as text messaging, gathering for virtual conversations, and emails, keeping families informed through websites, and using social media and online resources that support culturally and linguistically responsive family and community engagement. Other strategies provide digital and online resources that engage families in child development content, support home language learning, and guide design and implementation of practices and activities for structuring virtual learning at home.

Assessment

HSPPS refers to aggregating and analyzing child-level assessment data, which includes data gathered via technology tools. Head Start and Child Care T/TA address using technology for gathering data for child assessments, conducting assessments, and managing assessment data. For example, digital cameras, smartphones, and tablets are tools that capture information, which can then be uploaded as observation notes for some online assessment systems and apps. Other approaches of using technology for assessment are: using electronic spreadsheets for aggregating and analyzing documentation, sharing information with families through apps, email, text messages, identifying research instruments using the internet, incorporating translation technology in bilingual assessments, and using assistive technology as an accommodation option.

Program Administration

All policies mentioned using technology for program management. In law, technology is used for posting and distributing information, like quality improvement plans, monitoring and inspection reports, and child care services. CCDDF describes the use of technology for several administrative purposes, such as managing data and payment systems, producing forms, and posting reports. HSPPS lists technology use for recordkeeping and providing consent. Head Start and Child Care guidance provide several approaches to using online systems and databases to complete regular operational tasks, and Child Care offers specific guidance on designing consumer education websites. T/TA of Head Start and Child Care offer resources and training for using technology in program operations. Some of the topics are similar for both Offices, like managing staff's social media use, using software for data management, and completing daily tasks. Other topics vary possibly due to the different regulations within the Offices, such as designing a consumer education website is content area only found in Child Care.

It is also important to note both Head Start and Child Care included technology guidance for funding that was generated in response to the Covid-19 pandemic, such as the American Rescue Plan and Coronavirus Aid, Relief, and Economic Security, and Coronavirus REsponse and Relief Supplemental Appropriations Act. Broad suggestions were listed as possible funding options, but it was for each program to decide. Some suggestions provided were for: technology infrastructure, systems and updates, providing communities with internet access, and virtual professional learning.

Recommendations

Findings demonstrate that technology is not consistently referenced in Head Start and Child Care policies and T/TA. While technology is most often used as a tool to support learning, assessments, and program administration, it is rarely ever presented as a substantial academic

content area for children or practitioners. Additionally, while policies present practitioners with opportunities to use technology actively and gain digital skills, this is rarely the case for children. New research, publications, and lessons learned from the Covid-19 pandemic can be used to update current policies and T/TA that will address the “digital use divide” and “digital equity.” Recommendations for fostering equitable educational technology practices in early childhood are:

1. Update Uses of Technology To Support Early Childhood Practices report (OPRE) and Early Learning and Educational Technology Brief (ED and HHS) to reflect
    a. Current research on technology use in early childhood programs with practices that are culturally and linguistically inclusive, consider learner variability, and address the needs of children with disabilities
    b. Lessons learned from the COVID-19 pandemic
    c. Research and practices of teaching young children different disciplines within the technology field (i.e., coding, media literacy, digital literacy, design, etc.)
    d. Present practice examples of addressing the “digital use divide” and building digital skills in the early childhood context
2. Use reauthorizations and regulatory and guidance revisions as opportunities to create policies that reflect current technology research and practices with emphasis on cultural and linguistic inclusivity, learner variability, and children with disabilities
3. Allocate resources (i.e., T/TA) that support early childhood programs’ implementation of technology practices that are culturally and linguistically inclusive and address learner variability and the needs of children with disabilities