

# **A Multi-Dimensional Digital Food and Nutrition Literacy Model to Enable Supplemental Nutrition Assistance Program Adults to Make Healthy Purchases in an Online Food Retail Ecosystem**

## ***A Scoping Review to Inform U.S. Policies***



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A selection of SNAP EBT cards from across the United States.

Credit: USDA

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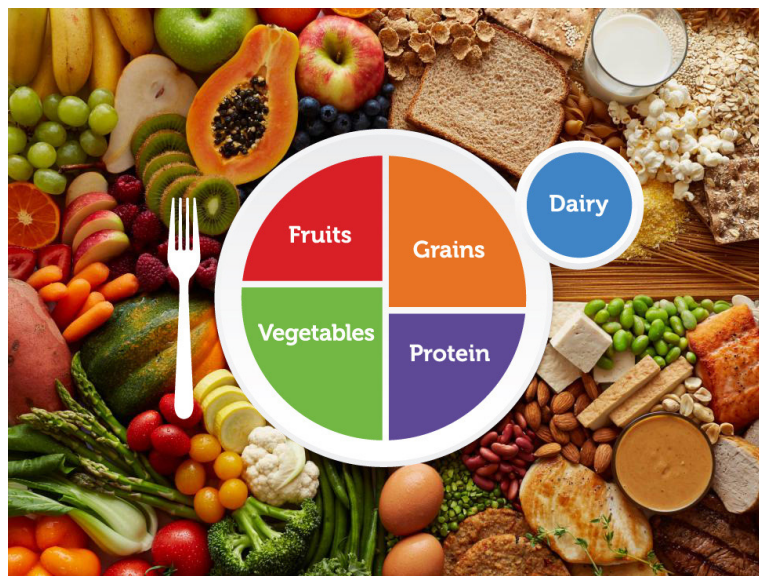
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Credit: USDA

# Executive Summary

**Background:** The coronavirus (COVID-19) pandemic disrupted the food supply, distribution and services and led to major changes in the federal government's safety-net programs. This paper synthesizes evidence for the literacy needs of Supplemental Nutrition Assistance Program (SNAP) eligible adults who receive benefits from the United States Department of Agriculture (USDA) to purchase groceries in an online food retail ecosystem.

**Methods:** We conducted a scoping review of four electronic databases and gray literature sources to synthesize evidence in a narrative review to recommend actions for U.S. institutions. Step 1 identified health, food, nutrition, digital, media and marketing literacy frameworks and models to develop a multi-dimensional literacy model to inform policies for SNAP participants operating in an online food retail ecosystem. Step 2 identified U.S. cross-sectional or intervention studies that evaluated food or nutrition literacy including SNAP-eligible adults, and the multi-dimensional literacy model was used to evaluate these studies. Both steps informed recommended policies and actions to strengthen SNAP participants' literacy skills for healthy grocery purchases online.

**Results:** We examined 40 literacy frameworks to develop a multi-dimensional, five-step, digital food and nutrition literacy model that included functional, interactive, communicative, critical and translational literacy. We used the model to review and evaluate 18 U.S. food and nutrition literacy studies. While adults with higher food or nutrition literacy scores had better cognitive, behavioral, food security or health status outcomes, there were no consistent findings across the studies. No frameworks examined digital literacy, three studies reported using a conceptual framework, and six studies examined SNAP or SNAP-Education (SNAP-Ed) outcomes. The results are used to recommend policies and actions for the U.S. Congress and federal agencies to strengthen the digital food and nutrition literacy infrastructure; and for USDA, industry, foundations, researchers and civil society organizations to address the digital food and nutrition literacy needs of SNAP adults who order groceries online.

**Conclusions:** The post-COVID food shopping trends underscore the need to enable SNAP participants at risk of food insecurity to develop many types of literacy skills to navigate the in-store "path to purchase" to the online digital food ecosystem in order to make healthy food and beverage product choices that align with the Dietary Guidelines for Americans (DGA) 2020-2025 and USDA's MyPlate. Future research should test this multi-dimensional food and nutrition literacy model, validate metrics to measure progress to achieve the outcomes, and develop dissemination tools tailored for SNAP participants. Diverse strategies could be implemented by U.S. government agencies, retailers, foundations and non-governmental organizations to strengthen digital literacy and the infrastructure for a healthy online food retail ecosystem.

# Study Purpose

This study had three objectives. First, to review the interdisciplinary evidence for conceptual models and frameworks relevant to food, nutrition, health, media, financial and digital literacy to develop a multi-dimensional literacy model relevant to SNAP participants making online food retail decisions. Second, to use the proposed multi-dimensional literacy model to summarize key findings from published cross-sectional and intervention studies that examined the food and nutrition literacy of U.S adults, including adult SNAP participants, and that shared findings for cognitive, behavioral, food security and/or health outcomes. Third, to synthesize the evidence to suggest future policy and research for U.S. institutional actors to enable SNAP participants to make healthy decisions in the online digital food retail ecosystem. This study was guided by two research questions:

1. What conceptual frameworks and models exist for food, nutrition, health, media, financial and digital literacy, and how can these be adapted into a multi-dimensional model to support SNAP participants to use online e-commerce platforms to make healthy online food-retail purchases?
2. What does the available evidence show about the literacy capacities and needs to support American adults, especially low-income SNAP and SNAP-eligible adult participants, to make healthy and affordable purchases within the online food retail ecosystem?

## Methods

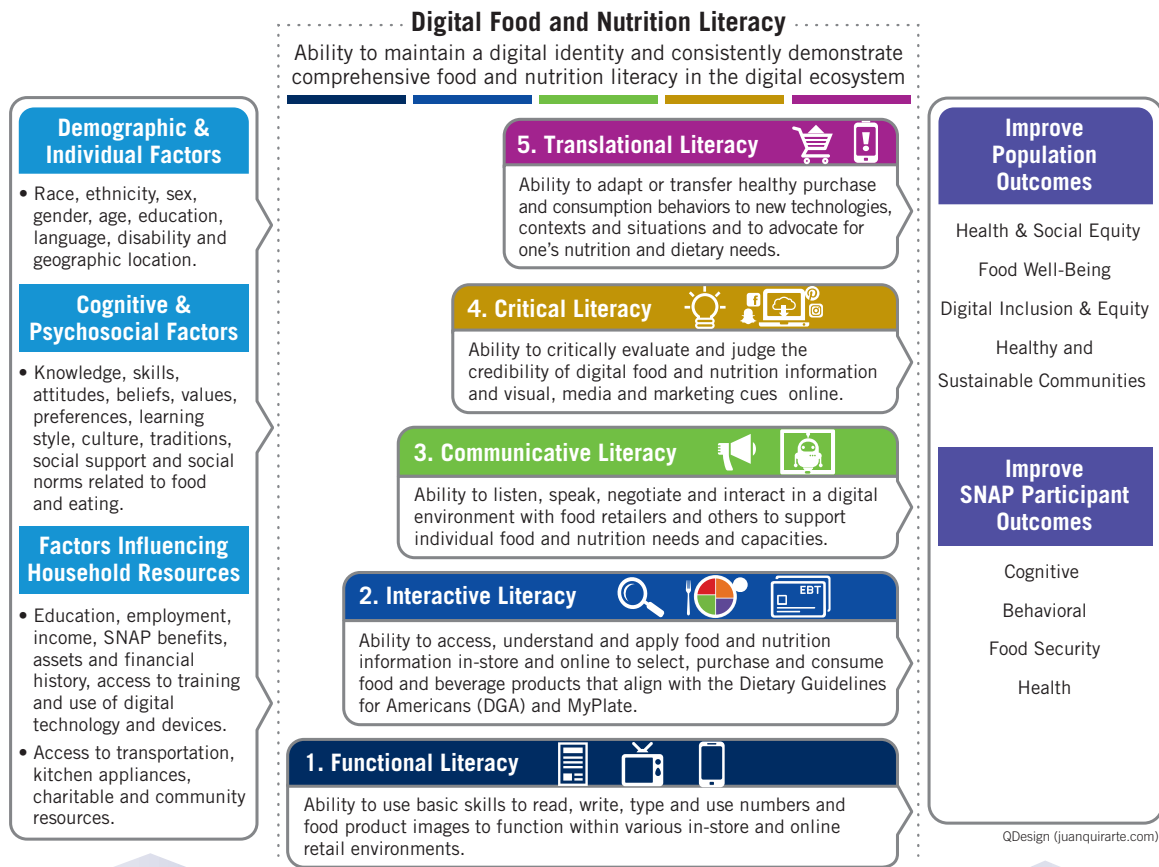
We conducted a two-step restricted scoping review of four electronic databases and gray literature sources to synthesize evidence in a narrative review. Step one identified health, food, nutrition, financial, digital, media and marketing literacy frameworks and models to develop a multi-dimensional literacy model to inform policies for SNAP participants operating in an online food retail ecosystem. Step two identified U.S. cross-sectional or intervention studies that evaluated food or nutrition literacy including SNAP-eligible adults, and the multi-dimensional literacy model was used to evaluate these studies. Both steps informed recommended policies and actions to strengthen SNAP participants' literacy skills for healthy grocery purchases online.

This study used a two-step, scoping review strategy, guided by a restricted review framework to compile relevant evidence for this paper. A scoping review was chosen because we expected that SNAP adults who use e-commerce platforms to purchase food and beverage products will need many types of literacy capabilities and diverse infrastructure support, especially given the unique challenges faced during COVID-19 and anticipated in a post COVID-19 context. Due to the broad nature of the research questions, the scoping review was guided by the five steps that included: (1) clarifying the research questions, (2) identifying relevant evidence that met the inclusion criteria, (3) selecting the evidence, (4) compiling and analyzing the evidence, and (5) synthesizing the results using a narrative format.

# Results

We examined 40 literacy frameworks to develop a multi-dimensional, five-step, digital food and nutrition literacy model that included functional, interactive, communicative, critical and translational literacy. We used the model to evaluate U.S. food and nutrition literacy studies (n=18) that examined cognitive, behavioral, food security and/or health outcomes defined in Figure 1 below. The 18 U.S. studies published between 2006 and 2020 were conducted in eight states including Florida, Indiana, Kansas, Louisiana, Maryland, New York, Tennessee and Texas; five studies were conducted in the Mid-Atlantic, Southeast or the lower Mississippi Delta regions; two studies were national; and two studies were administered via mail. Only three studies described the use of a conceptual or theoretically grounded framework to inform the study design and interpret the results. Only six studies examined SNAP or SNAP-Ed outcomes. Most of the studies (n=15) were cross-sectional. Fifteen out of the 18 studies reviewed reported or included two or more races or ethnicities, and seven of these studies found a statistically significant association between race and/or ethnicity and a measure of food and/or nutrition literacy. All of the studies (n=18) measured functional and interactive literacy; and five studies had measured communicative literacy (Figure 1). No study measured critical, translational or digital literacy depicted in our model.

**Figure 1.** A Multi-Dimensional Digital Food and Nutrition Literacy Model to Support SNAP Participants to Make Healthy Food and Beverage Purchases in the Online Food Retail Ecosystem



## Discussion

**M**any institutional actors could strengthen digital literacy infrastructure and skills for SNAP participants to make healthy dietary purchases in the online food retail ecosystem. These study findings were used to develop comprehensive policies and actions for the U.S. Congress and federal agencies including the U.S. Department of Health and Human Services (HHS), USDA, Department of Education, Department of Treasury, Federal Communications Commission (FCC), Food and Drug Administration (FDA) and Federal Trade Commission (FTC). We also offer recommendations for USDA-authorized food and beverage industry retailers, digital tech and media firms, private foundations, academic researchers, professional societies and civil society organizations. Enacted policies and actions implemented also should be monitored and evaluated. Policy reform for SNAP and SNAP-Ed and digital literacy is critical because more than 70% of American adults experienced overweight (30 percent), obesity (42.4 percent) or severe obesity (9.2 percent) in 2017-2018. Low-income, ethnically and racially diverse SNAP-eligible Americans are at higher risk and are disproportionately affected by obesity and exacerbated by poverty, food insecurity and diet-related chronic diseases including type 2 diabetes, heart disease and cancers, compared to middle- and high-income Americans. U.S. consumers are rapidly adopting online grocery shopping practices through multi- and omni-channels in an increasingly digital world. Table 1 and the section below summarize challenges and opportunities, and suggested policies and actions for U.S. institutional actors who have responsibility for and influence over strengthening the multidimensional literacy skills of Americans who are increasingly operating in the online food retail ecosystem.

## Conclusion

**T**here is an extensive literature defining and outlining conceptual models and frameworks for health, food and nutrition, and media literacy used to inform our conceptual model. However, there was limited published literature on financial and digital literacy research for SNAP populations specific to food and nutrition literacy. Additional research is needed to develop and test our multi-dimensional digital food and nutrition literacy model and develop comprehensive tools to guide equitable policies and programs for racially and ethnically diverse SNAP populations to function effectively within an e-commerce environment. The USDA should incorporate digital, food, nutrition, financial and marketing literacy skills within national nutrition education programs including SNAP-Ed and the Expanded Food and Nutrition Assistance Program (EFNEP). With projected increases in online grocery purchases, U.S. government agencies, retailers and other businesses, foundations and civil society have many opportunities to enact policies to strengthen the multi-dimensional digital literacy skills and infrastructure needed to support a healthy online food retail ecosystem for all Americans including SNAP-Ed participants.

**Table 1.** Recommended policies and actions for the U.S. Congress and federal government agencies to strengthen the digital food and nutrition literacy policies and infrastructure

Stakeholder	Recommended Policies and Actions
<b>Government</b>	<p><b>U.S. Congress</b></p> <ul style="list-style-type: none"> <li>■ Authorize and appropriate adequate funding in the 2023 U.S. Farm Bill legislation to include digital, food, nutrition, financial and health literacy programming within SNAP-Ed guidance.</li> <li>■ Enact legislation and empower the USDA to use its rulemaking authority to support national subsidies for nutritious foods and beverages.</li> </ul>
	<p><b>U.S. Department of Education</b></p> <ul style="list-style-type: none"> <li>■ Develop national standards for digital food and nutrition literacy for inclusion in U.S. schools' curricula.</li> <li>■ Encourage community colleges and institutions of higher education to adopt curricula to support digital food and nutrition literacy for adults.</li> </ul>
	<p><b>U.S. Department of Health and Human Services</b></p> <ul style="list-style-type: none"> <li>■ Add a research objective to Healthy People 2030 to increase digital, food and nutrition literacy and proficiency of Americans similar to the health literacy objective.</li> </ul>
	<p><b>U.S. Department of the Treasury</b></p> <ul style="list-style-type: none"> <li>■ Charge the federal U.S. Financial and Literacy Education Commission with examining the comprehensive digital and financial literacy needs of Americans to recommend actions to address low financial literacy skills, and develop best-practice guidelines to address digital privacy issues to protect all Americans, including SNAP recipients, from predatory marketing practices of online retailers.</li> </ul>
	<p><b>Federal Communications Commission</b></p> <ul style="list-style-type: none"> <li>■ Expand affordable broadband to all Americans and provide subsidies to low-income households to ensure access to digital technologies.</li> </ul>
	<p><b>Food and Drug Administration</b></p> <ul style="list-style-type: none"> <li>■ Ensure that online retailers and manufacturers offer easy access to clear and readable Nutrition Facts label, ingredients, and nutrition information to enable consumers to make informed food and beverage product purchases online.</li> </ul>
	<p><b>Federal Trade Commission</b></p> <ul style="list-style-type: none"> <li>■ Examine the marketing practices of online grocery retailers and third-party partners to develop regulatory guidance for the use of automated AI or machine learning that collects and shares customers' personal information and purchasing patterns.</li> <li>■ Update regulatory guidance for influencer endorsements and commercial sponsorships that use online digital advertising through social media platforms that may target SNAP recipients.</li> </ul>



**Table 2.** Recommended policies and actions for the USDA, industry and other stakeholders to strengthen digital food and nutrition literacy for SNAP adults operating in the online food retail ecosystem

Stakeholder	Recommended Policies and Actions
<b>Government</b>	<p><b>U.S. Department of Agriculture</b></p> <ul style="list-style-type: none"> <li>■ Adopt the 2018 Bipartisan Policy Center Task Force Report recommendations to prioritize nutrition and diet quality within SNAP; improve the use of digital technology to deliver services to SNAP participants; and adopt modern digital technology for administering SNAP to reduce costs and improve efficiency.</li> <li>■ Develop and adopt standards and regulations for retailers to become SNAP-authorized, including stocking standards aligned with the DGA 2020-2025, and marketing guidelines.</li> <li>■ Incorporate digital, food, nutrition, financial and marketing literacy skills within SNAP-Ed and EFNEP national nutrition education programs.</li> <li>■ Support the development, testing, and validation of a common multi-dimensional digital food and nutrition literacy assessment tool for SNAP participants that includes digital technology skills through USDA's National Institute of Food and Agriculture (NIFA) and Agriculture and Food and Nutrition Research Initiative (AFRI) funding.</li> </ul>
<b>Food and Beverage Industry and Partners</b>	<p><b>USDA-Authorized Retailers (Walmart, Amazon, Instacart and other)</b></p> <ul style="list-style-type: none"> <li>■ Adhere to the FDA guidance for food labeling and marketing policies and promote clear, understandable, truthful and non-misleading advertising to SNAP participants for food and beverage products that align with the DGA 2020-2025.</li> </ul>
	<p><b>Manufacturers, Advertisers, Marketers and Industry Trade Associations</b></p> <ul style="list-style-type: none"> <li>■ Adhere to the FDA guidance for food labeling and FTC guidance for food marketing to enable consumers to make informed food and beverage product purchases online and accessed by scanning QR digital codes for products in-store.</li> </ul>
	<p><b>Digital Technology and Media Firms (Amazon, Microsoft, Apple and Google)</b></p> <ul style="list-style-type: none"> <li>■ Develop and adopt best practices and policies that encourage healthy purchases with SNAP benefits that align with the DGA 2020-2025.</li> </ul>
<b>Other</b>	<p><b>Private Foundations, Academic Researchers, Professional Societies and Civil Society Organizations</b></p> <ul style="list-style-type: none"> <li>■ Support and conduct external evaluations and research on digital food and nutrition literacy needs, strategies and interventions.</li> <li>■ Develop policy and practice position statements for members to address digital health, food and nutrition literacy, and digital equity and inclusion comprehensively for individuals and communities.</li> </ul>





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