

RESEARCH ARTICLE

Promoting Literacy and Numeracy in Adult Learning and Education

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Keywords: adult education | adult learning | adult skills | literacy | numeracy

ABSTRACT

Adults' development of literacy and numeracy skills that can enable them to navigate the demands of contemporary life and be prepared for the future is central to their economic, social, and personal well-being and the functioning of society. This article discusses the role of literacy and numeracy in adult learning and education, beginning with the current status of literacy and numeracy skills in OECD countries and economies. Explored are the types of frameworks and standards that are used to guide adults' acquisition of literacy and numeracy skills and approaches to delivering instructional and supportive services for those adults. The article concludes with challenges and considerations in strengthening literacy and numeracy as critical components of adult learning and education.

1 | Introduction

For the past two centuries, reading, writing, and arithmetic—precursors to literacy and numeracy—have been regarded as essential competencies for societal participation. These skills encompass concepts, cognitive processes, procedures, and conventions that are now systematically taught within foundational education worldwide. Historically, foundational education emphasized the technical mastery of these skills rather than their practical application in relevant contexts. However, by the final quarter of the 20th century, growing awareness emerged regarding the importance of fostering functional applications of language and mathematics. This shift aimed to empower individuals to utilize these skills for active participation in society as autonomous citizens. From this perspective, literacy and numeracy evolved into broader educational objectives, extending beyond foundational education to include lifelong learning and adult education. This approach reflects the necessity of adapting individuals' competencies to new contexts in an increasingly dynamic society (Cohen 1982; Geiger et al. 2015; Karaalli 2023).

The rapid technologization and digitalization of contemporary life have further underscored the need for adequate levels of literacy and numeracy, as well as their integration to address the challenges of everyday life. Adult literacy and numeracy vary across countries due to differences in responsible jurisdictions, such as city, region, state, or country, policies, and practices (O'Meara et al. 2024). These variations make cross-country overviews or comparisons challenging (see, for instance, Breitschwerdt et al. 2023; De Greef and Segers 2016; European Commission: European Education and Culture Executive Agency 2021). Adult literacy and numeracy may also be limited in some countries due to socio-economic constraints or policy priorities that focus on other areas (Desjardins et al. 2006).

Adult skills education has been expanded to include a proliferation of literacies deemed critical for navigating contemporary society. These include civic literacy, cultural literacy, data literacy, digital literacy, environmental literacy, family literacy, financial literacy, global literacy, health literacy, information literacy, media literacy, workplace literacy, and artificial intelligence literacy, among others. These literacies reflect societal

responses to technological advancements, global challenges, and cultural shifts. They often intersect and complement each other, promoting interdisciplinary problem-solving and decision-making. Moreover, these literacies apply traditional literacy and numeracy skills within specific thematic or contextual frameworks.

This article examines the role of literacy and numeracy in adult learning and education (ALE) from the perspective of selected priorities and action areas delineated in the Marrakech Framework for Action (MFA) (UNESCO 2022a). The MFA provides principles for achieving the vision advanced during CONFINTAE VII, including fostering ALE within a lifelong learning perspective, expanding opportunities for women and other vulnerable populations to enhance their literacy and numeracy skills and learn in digital environments, and preparing adults for the future of work. Furthermore, the MFA lists priorities and actions related to those principles for developing and delivering quality ALE that can contribute to the social and economic well-being of adults and encourage their lifelong learning. Discussed in this article are three MFA priorities related to the expansion and quality of literacy and numeracy in ALE. To reinforce the MFA priority of adult literacy and numeracy skills education to address the challenges that some countries have in achieving adequate adult literacy levels, this article provides key results from the 2023 Adult Skills Survey that was conducted as part of the Programme for the International Assessment of Adult Competencies (PIAAC) (OECD 2024). An important action discussed in the MFA is the need for comprehensive educational policies and frameworks that support ALE. Discussed are three frameworks and standards that were developed to inform the literacy and numeracy skills that are taught to adult learners in ALE environments. Furthermore, the article addresses the MFA's recommendations to ensure the quality of learning and expand learning domains by providing examples of promising practices that are being implemented to increase the types of literacies that are addressed in adult skills education and new instructional interventions that are being tested. The article closes with a discussion of challenges that need to be addressed to have robust literacy and numeracy services and considerations for strengthening the quality of literacy and numeracy in ALE.

2 | Programme for the International Assessment of Adult Competencies (PIAAC)

The PIAAC provides the most comprehensive data on the literacy, numeracy, and problem-solving proficiency skills of adults. The first cycle of the Survey of Adult Skills was conducted between 2011 and 2018 across 39 countries (OECD 2013, 2016). The second cycle of this survey was conducted during 2022–2023 and involved 31 Organisation for Economic Cooperation and Development (OECD) countries. The skills of about 160,000 adults aged 16–65 were assessed in this cycle, representing 673 million people (OECD 2024, 4).

2.1 | Definitions

The second cycle of the Survey of Adult Skills included updated definitions of literacy, numeracy, and problem solving that reflect

a holistic perspective, shifting the focus away from technical skills to emphasize higher-order cognitive abilities such as interpreting, managing, and reflecting. When conceptualized this way, literacy and numeracy prioritize active engagement in practical situations and meaningful participation in society. For instance, literacy is now defined as “accessing, understanding, evaluating and reflecting on written texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society” (OECD 2021, 32). The practical applications of numeracy are emphasized in its definition, which is “accessing, using and reasoning critically with mathematical content, information and ideas represented in multiple ways in order to engage in and manage the mathematical demands of a range of situations in adult life” (OECD 2021, 34). The importance of individuals' cognitive and metacognitive skills is included in the definition of adaptive problem solving, which “involves the capacity to achieve one's goals in a dynamic situation, in which a method for solution is not immediately available. It requires engaging in cognitive and metacognitive processes to define the problem, search for information, and apply a solution in a variety of information environments and contexts” (OECD 2021, 36).

2.2 | Literacy and Numeracy Proficiency

The PIAAC has been a critical indicator of the extent to which adults in OECD countries and economies are prepared to meet the current and future skill demands of contemporary life. The results from the 2023 Survey of Adult Skills point to a great variability in the literacy and numeracy skills of adults in the OECD countries, and that adults' skills mostly remained stable or declined since the first cycle of the Adult Skills Survey. In terms of adults' literacy skills, those participating in the 2023 survey had an average literacy proficiency score of 260 points (based on a scale of 500 points). Thirteen countries had an average literacy proficiency score above the average score, with adults in Finland scoring significantly higher than the averages of all other participating countries and economies. The scores of three countries, including the United States, were not statistically different from the OECD average. However, the results for adults in 15 countries were significantly below the OECD average (OECD 2024, 53).

Similar to the results for literacy, adults in Finland scored significantly higher in numeracy than all other participating countries and economies. Adults in 13 countries also achieved average scores above the OECD average numeracy score of 251 points (based on a scale of 500 points). The numeracy scores of three countries were not statistically different from the OECD average. However, 14 countries, including the United States, scored significantly below the OECD average (OECD 2024, 53).

For both literacy and numeracy, nearly one-fifth of adults who participated in the PIAAC are considered low performers, scoring less than 226 points, which in the 5-level system of PIAAC is called Level 1 or below (OECD 2024, 58). Fourteen countries had an increase in the portion of adults who were low performing in literacy, with no country indicating a reduction. In numeracy, the portion of low performers increased in nine countries and decreased in three countries (OECD 2024, 22).

The PIAAC results, particularly for countries with scores below the OECD average in literacy and/or numeracy and those with increasing portions of low performers in either domain, point to the need for an examination of current practices in the design, development, delivery, and dissemination of literacy and numeracy services for adult learners. Updated content, instructional approaches, and/or materials may be necessary to enable adult learners to acquire the levels of literacy and numeracy skills they must have to function successfully in daily life.

3 | Adult Literacy and Numeracy Frameworks and Standards

Frameworks and standards developed by governments or through expert initiatives often address the complexities of skill development and offer actionable insights for educational practices and policymaking. Those created for adult skills education generally focus on the skills, knowledge, abilities, and dispositions that adults should possess to succeed in education, the workplace, and their communities. Frameworks and standards can serve as guides for the skills and knowledge to teach to adult skills learners and have been used to signal the need to strengthen the academic rigor and breadth of those skills. This article describes three examples of frameworks and standards for adult literacy and numeracy skills from the United States and Europe (American Institutes for Research 2005; Hoogland et al. 2019; Javrh and Mozina 2018; Mozina 2022; U.S. Department of Education 2013). Those examples illustrate how frameworks and standards can help to expand the breadth and quality of instruction in adult literacy and numeracy. Also discussed is the increasing use of digital skill frameworks in guiding adult skills instruction.

3.1 | Adult Skills Frameworks and Standards

The design and use of frameworks and standards for adult skills education in the United States has evolved since the 1970s as the skills that adults need to succeed in life have increased in academic rigor and complexity. An initial shift in the types of skills that should be taught and tested in adult skills education occurred when the focus changed from teaching traditional reading, writing, and mathematics skills out of context to the use of competency-based adult education frameworks comprised of life skills (see, for instance, Alamprese 1979; Michigan State Board of Education 1986). In the late 1990s, there was a new use of frameworks when adult education state offices developed curriculum frameworks for numeracy and content standards for English as a second language (ESOL) to ensure that the skills adults needed to succeed were being taught (see, for instance, Arizona Department of Education 2004; Massachusetts Department of Education 2001). To bolster states' development of adult skills frameworks, the U.S. Department of Education supported the creation and dissemination of a model for using standards to guide adult skills education instruction, and for aligning curriculum, instruction, and assessment with content standards. This initiative also provided professional development to states and monitored adult skills education programs' use of

standards to guide their literacy, numeracy, and ESOL instruction (American Institutes for Research 2005, 14).

As the role of adult skills education in the United States, expanded from supporting adult learners' development of literacy and numeracy skills and attainment of a high-school equivalency diploma to include transitioning learners to postsecondary education, training, and the workforce, there was a need to increase the rigor of the skills being taught to adult learners. To address this need, the U.S. Department of Education funded an initiative to specify career and college readiness standards for adult education. The intent was to have standards that reflect the content most pertinent to prepare adult learners for success in postsecondary education, technical training programs, work, and citizenship in the areas of English language arts/literacy and numeracy. Developed in 2013, the College and Career Readiness Standards (CCRS) for Adult Education provide benchmarks that are aligned to the Common Core State Standards (CCSS), which were developed in 2010 and defined the knowledge and skills that students should acquire in their pre-K through grade 12 academic training. In specifying the CCRS, adult skills education experts selected the relevant CCSS that reflect a progression from the beginning levels of English language art/literacy and numeracy to readiness for college and career. The state agencies that administer Federal adult education funds appropriated under the Workforce Innovation and Opportunity Act of 2014 are required to use some form of adult skills standards, and states have adopted or adapted the CCRS to guide the delivery of adult skills education services in local communities (U.S. Department of Education 2013). The U.S. Department of Education continues to support the use of CCRS through the refinement of the CCRS and the provision of professional development to adult education state and local program staff.

3.2 | European Frameworks

Two recent projects in Europe to develop new adult skills frameworks have focused on adult numeracy and adult life skills. Those efforts illustrate how frameworks can signal the need to broaden and strengthen the skills that are taught to adult learners and can facilitate the provision of quality adult skills instruction.

3.2.1 | Common European Numeracy Framework

A project within the European Union (EU) is the work undertaken through Erasmus+ research and development projects. This effort has resulted in the creation of the Common European Numeracy Framework (CENF), which underscores the multifaceted nature of numeracy development. A key output of this initiative is a provisional overview of the elements necessary to enhance the quality of numerate behavior. Those elements are organized into four categories, described as aspects of numerate behavior—context, knowledge and skills, higher order skills, and dispositions. The CENF serves as a resource for educators and policymakers, emphasizing a comprehensive approach to numeracy that goes beyond technical skill acquisition to include critical thinking, problem-solving, and practical application in diverse contexts. The CENF reflects the broader shift from

focusing solely on technical skills to emphasizing higher-order skills such as critical thinking, problem-solving, and reflection. It also highlights the significant role of context and individual dispositions in developing and improving numeracy skills (Hoogland et al. 2019).

A consortium of 11 European countries has collaborated to implement the CENF. Their work includes creating illustrative lesson materials, resources to raise awareness about this innovative approach, and professional development modules designed for educators in adult numeracy education. These efforts aim to support the implementation of the framework and to promote a more holistic understanding of adult numeracy education.

3.2.2 | Life Skills for Europe Framework

Another framework within the EU is the Life Skills for Europe (LSE) framework that was developed as part of an Erasmus+ cooperation among organizations and institutions project. This project involved a consortium of five partners (European Association for the Education of Adults and adult skills entities from Denmark, Greece, Slovenia, and the United Kingdom) whose goal was to improve the delivery of basic skills education through further development and scaling of the life skills approach. The assumption was that the concept of life skills expands that of basic skills by promoting skills that go beyond those needed for survival. The LSE was an early effort in the EU to systematize definitions and approaches to life skills in adult education and develop a life skills framework for adults. As defined by the project, “Life skills are a constituent part of capabilities for life and work in a particular social, cultural, and environmental context” (Jayrh and Mozina 2018, 4). The LSE framework has eight key capabilities that adults need for life and work, and each capability has a difficulty of skill or capability level and familiarity of context. Those capabilities are literacy, digital, environmental, civic, personal and entrepreneurial, health, financial, and numeracy. They are intended to provide a range of starting points and support the recognition of learners’ progression (Jayrh and Mozina 2018; Mozina 2022).

In developing the LSE framework, the project partners identified promising practices and innovative tools that were being used to help adults become proficient in the eight capabilities defined in the framework. This process aided in confirming the appropriateness of the capabilities and reinforced that the contexts for life skills are wide-ranging (Jayrh and Mozina 2018).

3.3 | Digital Skills Frameworks

The critical role of technology in all forms of adult education and lifelong learning was a pervasive topic in the discussions at CONFINTEA VII, and the actions that should be taken to ensure adult learners’ access to and ability to use technology are prominent in the MFAs (Alamprese 2024). As the use of technology in education advances, frameworks are being created to specify the skills and knowledge individuals need to use technology tools and to guide the integration of digital technologies into instruction. More recently, frameworks are being customized to the needs of adult skills education to

ensure there is guidance that can facilitate the effective use of technology-based tools with adult skills learners (see, for instance, Jobs for the Future and World Education 2022).

3.4 | Summary

Frameworks and standards can be effective mechanisms for obtaining expert judgment about the literacy and numeracy skills and knowledge that adults need to succeed in their daily lives. These mechanisms also have potential for ensuring that the skills that individuals must have to learn effectively using digital tools are sufficient (for instance, see Hammada and Foli 2024).

4 | Delivery of Adult Literacy and Numeracy Services

The processes and content used in delivering adult literacy and numeracy services vary worldwide and are influenced by a range of factors. In the United States, the federal and state legislation that authorizes funding for adult skills education are key sources of guidance about the types of adult skills services that can be provided at the state and local levels (see, for instance, the Workforce Innovation and Opportunity Act 2014). Outside of the United States, national, regional, and state-supported efforts as well as donor-sponsored special projects may influence the types of adult skills services that are provided (see, e.g., UNESCO 2022b). As noted in the MFA, a key principle concerning the delivery of adult skills services is that those services are of high quality and can contribute to the social and economic well-being of adults and inspire their lifelong learning (UNESCO 2022a).

To provide a sense of adult literacy and numeracy skills services in the United States, described are two current initiatives that are sponsored by the U.S. Department of Education and provide professional development and technical assistance to state and local adult skills service providers. These initiatives are examples of services provided to different populations of adult skills learners and ones that measure different outcomes.

4.1 | Student Achievement in Reading (STAR)

STAR is a professional development initiative for adult reading instruction that the U.S. Department of Education created in 2001 and has been implemented by more than 20 states and adult skills programs. This reading reform initiative was designed to improve adults’ reading achievement through the use of evidence-based reading instruction (Kruidenier 2002). The target population for STAR is adult learners who read at grade level equivalents 4.0–8.9, which is a significant population of adults in the United States.

Adult skills program instructors who participate in STAR receive professional development, tools, and resources to assist them in planning reading instruction using methods for teaching adults the four key components of reading: alphabets, fluency, vocabulary, and comprehension. STAR is not a curriculum but assists instructors in learning to use evidence-based instructional

strategies and a range of materials to plan reading lessons. STAR professional development has been delivered in person and is now available as a facilitated online training that includes two virtual, synchronous meetings and 30 interactive and self-paced modules (LINCS [n.d.-a](#)).

4.2 | Integrated Education and Training

Integrated Education and Training (IET) is a career pathways approach in which “Adult education and literacy services are delivered concurrently and contextually with workforce preparation activities and workforce training for a specific occupation or occupational cluster for the purpose of education and career advancement” (Workforce Innovation and Opportunity Act, Section 203[11] and 34 C.F.R., 2014, 197). IE is increasingly viewed as an efficient approach to career pathways that can facilitate adults’ development of their literacy, numeracy, and other foundational skills while preparing for employment. The U.S. Department of Education is supporting professional development on IET through its ADVANCE IET initiative, which assists state adult education offices, professional development providers, and adult skills program staff in offering IET services for adult learners (LINCS [n.d.-b](#)).

IET programs have enabled adult skills learners to earn a high-school equivalency diploma simultaneously with an entry-level occupational credential or to develop skills needed for entering an apprenticeship. The contextualized teaching of literacy and numeracy along with career and college awareness assistance are characteristics of IET programs that have been found to be appealing and helpful to adult skills learners (Alamprese and Cheng 2021).

5 | Conclusion

This information age sees a rapid growth of quantitative requirements through digitalization, technologization, and the use of (big) data that permeates almost all parts of daily life. Both literacy and numeracy will require changes in the specific type of skills needed in those cognitive domains (see, for instance, Hoogland 2023). Both domains demand a shift away from merely technical skills to higher order skills like accessing situations, interpreting representations, understanding the conveyed messages, and critically reflecting and evaluating the presented information.

The use of frameworks and standards in adult skills education can help to homogenize the literacy and numeracy skills and knowledge taught to adult learners and provide inspiration to instructors to examine the domains of literacy and numeracy from new perspectives. However, incentives are needed for adult skills programs and staff to use frameworks and standards to guide their work. In the United States, the inclusion of standards in the legislation supporting adult skills education has facilitated the adoption of standards in that field.

Challenges with adults’ development of literacy include the need for new ways to teach comprehension and higher order thinking skills that can enable adults to process information

more effectively (see Borradaile et al. 2021). The recent PIAAC data reinforces the need for further work on adult literacy development.

There are two key challenges for the future of numeracy education. First, there is a significant disparity between the relatively small investments made in numeracy education and the rapidly increasing “mathematization” of our world. As highlighted in the documentary *Counted Out* (Abeles and Ferraris 2024), many people’s perceptions of numeracy are shaped by their memories of school mathematics, which often emphasized abstract procedures disconnected from real-world applications. These experiences frequently led to the belief that success in mathematics was dependent on being a “math person,” contributing to widespread math anxiety.

Second, the quantitative demands of the digital age are evolving. Foundational skills are no longer centered on procedures and algebra but on interpreting numerical data, engaging in modeling and problem-solving, and using digital tools to explore, understand, and apply mathematical models for informed decision-making and predictions. This shift necessitates raising awareness about both the growing importance of numeracy education in our data-drenched society and the need to adapt numeracy content to align with the changing requirements for adult learners.

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