Improving Adult Literacy Instruction: Options for Practice and Research

Committee on Learning Sciences: Foundations and Applications to Adolescent and Adult Literacy; Alan M. Lesgold and Melissa Welch-Ross, Editors; National Research Council

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Conclusions and Recommendations

It is clear that a significant proportion of U.S. adults do not have the high level of literacy in both print and digital media required for negotiating many aspects of life in the 21st century. As noted in Chapter 1, more than 90 million U.S. adults are estimated to lack adequate literacy (Kutner, Greenberg, Jin, Boyle, Hsu, Dunleavy, and White, 2007); only 38 percent of U.S. twelfth graders are at or above proficient in reading (National Assessment of Education Progress, 2009); and more than 50 percent of recent 250,000 community college student enrollees were referred to at least one developmental (remedial) education course to remediate weak skills during their college tenure (Bailey, Jeong, and Cho, 2010), with about one-third of them referred specifically for reading. Furthermore, the estimated 2.6 million adults enrolled in federally funded programs in 2005 showed variable progress in their literacy skills, and their skill gains were insufficient to achieve functional literacy (Tamassia et al., 2007).

This committee was asked to (1) synthesize research findings on literacy and learning from cognitive science, neuroscience, behavioral and social science, and education; (2) identify from the research the main factors that affect literacy development in adolescence and adulthood, both in general and with respect to the specific populations served in education programs for adults; (3) analyze the implications of the research for informing curricula and instruction used to develop adults’ literacy; and (4) recommend a more systemic approach to subsequent research, practice, and policy. To focus our work, we defined the target population (to whom we refer generally as “adults”) to be adolescents and adults aged 16 and older who need to develop their literacy skills outside the K-12 system. This definition is consistent with eligibility for participation in federally funded adult literacy education programs. We considered research on learning and literacy that would be most relevant to those eligible or likely to attend formal literacy instruction in programs of four general types: adult basic education, adult secondary education, English as a second language programs offered in a wide range of settings (e.g., community-based programs, local education agencies, community colleges, workplace, prisons, etc.), and developmental education courses for academically underprepared students in college.

Ideally, conclusions and recommendations for adult literacy instruction would be grounded in clear research findings demonstrating the efficacy of the recommended approaches. When rigorous demonstrations of efficacy do not exist, the next best approach would be to
recommend both instructional practices consistent with available evidence on adult literacy and rigorous efficacy studies to confirm these recommendations. Findings from research on cognition and learning with the target population would also be most useful.

The present situation is more complex. There is a surprising lack of research on the effectiveness of the various instructional practices for adults seeking to improve their literacy skills. The lack of relevant research is especially striking given the long history of both federal funding for adult education programs, albeit stretched thin, and reliance on developmental education courses to remediate college students’ skills. Few studies of adult literacy focus on the development of reading and writing skills. There is also inadequate knowledge about assessment and ongoing monitoring of adult students’ proficiencies, weaknesses, instructional environments, and progress, which might guide instructional planning.

Similarly, basic research on adult cognition and learning is constrained for our purposes. It relies on study samples of convenience (college students in introductory psychology courses) or elderly populations, and it does not usually include adults with relatively low education or literacy skills. In addition, it is well known that literacy research has focused mainly on young children first learning to read and decode text. Major research efforts launched by the U.S. Department of Education, the National Institute of Child Health and Human Development, and others on the development of literacy in adolescence and adulthood are too new to have produced numerous peer-reviewed publications. As discussed in Chapter 2, research is emerging with adolescents on topics that we think are important to pursue with the target population given their literacy development needs (e.g., academic or disciplinary literacy and discussion-based approaches). More research is needed with adolescent and adult populations to evaluate the effectiveness of instructional practices and specify learning trajectories and the interaction of factors—cognitive, social, linguistic, economic, neurobiological—that may affect literacy development in subpopulations of adolescents and adults who vary greatly in literacy development needs, education levels, socioeconomic status, linguistic background, and other characteristics.

Given the dearth of relevant research with the target adult population, this report draws on what is available: extensive research on reading and writing processes and difficulties of younger students, emerging research on literacy and learning in adolescents and adults with normal reading capability, and extremely limited research on adult literacy learners. Until the necessary research is conducted with adults who receive literacy instruction outside the K-12 system, the committee concluded that it is reasonable to apply the wealth of available research on learning and literacy with other populations. Findings from this research provide guidance about the reading and writing skills to target with instruction and principles for designing instructional practices, technologies, assessments, and preparation for teachers. With our conclusions, we
recommend a program of research and innovation to validate, identify the boundaries of, and extend current knowledge to improve instruction for adults and adolescents outside school and create the supports needed for learning and achievement.

The request to the committee stressed the need for guidance from research to inform the design of instructional curricula and practices for use in programs, and not broader improvements to adult education delivery systems or access to programs—important as such improvements might be. In drawing conclusions from the research and recommending a more systemic approach to research, practice, and policy we focus on five main issues: (1) robust principles of learning, reading and writing instruction, and motivation that have emerged from the behavioral, social, and neurocognitive sciences; (2) the variability in the profiles of adult learners; (3) the variability of instructor preparation; (4) the existence of many different types of programs that have varied literacy development aims and practices; and (5) the instructional and other supports that enable adults to persist in programs and practice skills outside the classroom. We urge attention to these issues in research and policy because they impinge directly on the quality of instruction, the feasibility of completing the recommended research, and the potential for broad dissemination and implementation of the practices that emerge as effective from research findings.

CONCLUSIONS

Adult Learners and Learning Environments

Conclusion 1: The population of adult learners is heterogeneous. Optimal reading and writing instruction will therefore vary according to goals for literacy development and learning, knowledge and skill, interests, neurocognitive profiles, and cultural and linguistic backgrounds. The contexts in which adults receive literacy instruction also are highly variable with respect to (1) place and purpose of instruction, (2) literacy development aims and practices, and (3) instructor preparation.

Learners have diverse instructional needs, varying motivations for acquiring greater literacy, and diverse educational, economic, linguistic, and cultural backgrounds. Some adults have specific neurocognitive challenges associated with disability that have not been addressed with the appropriate interventions, and others simply have not had the social and educational environment as children that would support learning to read and write well and with proficiency in multiple contexts and domains. Moreover, adult learners vary, sometimes substantially, in the level of facility they have already attained.
The contexts in which adults receive literacy instruction are highly varied. People who need to develop their literacy skills receive instruction in many different types of programs, including adult basic education, community colleges, general educational development (GED) programs, workplace literacy programs, university remedial education programs, citizenship programs, English language learning programs, basic skills and job training centers, among others. While some of the adults receiving literacy instruction may have attained certain levels and forms of literacy, they lack the range and level of reading and writing skills required for education, work, parental and family responsibilities, and other purposes. The literature on adult literacy indicates that a wide range of largely untested theoretical frameworks, practices, texts, and tools are used in literacy instruction with adults. At present, there are neither clear objectives for the development of literacy skills nor standards for curricula and practice that take into consideration research on component reading and writing skills, valued literacy tasks linked to learning goals, and the social and cultural backgrounds and motivations of learners. Programs also differ in whether they provide or facilitate access to services for transportation, child care, and psychological counseling, which might affect the ability of certain segments of the population to engage in and persist with learning.

Instructors vary in their knowledge of reading and writing development, assessment, curriculum development, and pedagogy. The training instructors receive is generally limited, and professional development is constrained by lack of funding, inflexible locations, work, and other life demands. To be effective, however, the instructors must reliably assess learners’ skills, plan and differentiate instruction, and select and adapt materials and learning activities to meet the skill development needs of learners who differ greatly in their neurobiological, psychosocial, cultural, and linguistic characteristics, as well as in their level of literacy attainment. Thus, teachers need to have the requisite tools for instruction and the technical knowledge and expertise, professional development, and ongoing supports as needed for effective implementation. This training and support must include knowledge and skills for teaching adults with disabilities. Teachers of English learners need access to specific help in understanding their students’ capabilities and challenges, communicating with them effectively, and using available support techniques to help them engage with English texts. They also need to understand how adults develop proficiency in a second language and have knowledge of the characteristics of English language.

Principles of Effective Literacy Instruction

Conclusion 2: Effective literacy instruction:
• targets (as needed) word recognition, fluency, vocabulary, reading comprehension, background knowledge, strategies for deeper analysis and understanding of texts, and the component skills of writing;
• combines explicit teaching and extensive practice with motivating and varied texts, tools, and tasks matched to the learner’s skills, educational and cultural backgrounds, literacy needs and goals;
• explicitly targets the automation and integration of component skills and the transfer of skills to tasks valued by society and the learner; and
• includes formative assessments to monitor progress, provide feedback, and adjust instruction.

Students who have not mastered the foundational component skills of reading and writing require instruction targeted to their skill level and practice with reading and writing in amounts substantial enough to produce high levels of competence in the component skills. As discussed in Chapter 2, a large body of research with K-12 students has identified the major components of reading and writing and principles of instructional practice that are important to typically developing and struggling learners. A sizeable literature on efficacious interventions for struggling learners in K-12 education points to additional principles for developing literacy and overcoming specific areas of difficulty among adults:

(1) Interventions that directly target specific learning difficulties in the context of broader reading and writing instruction result in better literacy outcomes for struggling readers and writers.

(2) Intervention must include explicit instruction to support generalization and transfer of learning, with abundant and varied opportunities for practice.

(3) Struggling learners require more intense instruction, more explicit instruction, and even more opportunities to practice inside and outside the classroom.

(4) Attributions, beliefs, and motivational profiles of struggling learners must be understood and targeted during instruction.

(5) Intervention should be differentiated to meet the particular needs of adults, including those with disabilities. Research is needed to test whether and when subgroups of adult learners might benefit from different types of instruction.
Decades of research points to principles of learning (see Box 4-1 in Chapter 4) and motivation (see Box 5-1 in Chapter 5) that warrant inclusion in the design of adult literacy instruction. The principles are derived from research with both adults and younger populations and converge with findings from research on effective literacy instruction for K-12 students. The research has not included samples of low-literate adults, however; further efforts are needed to design and evaluate the effectiveness of instructional approaches consistent with these principles for adults who need to develop their literacy.

**Conclusion 3:** Although knowledge of effective literacy instruction for adults is lacking, research with younger populations can be used to guide the development of instructional approaches for adults if the instruction is modified to account for two major differences between adults and younger populations: (1) adults may experience age-related neurocognitive declines that affect reading and writing processes and speed of learning and (2) adults have varied and more substantial life experiences and knowledge and different motivations for learning that need attention in instructional design. Research with adult literacy learners is required to validate, identify the boundaries of, and extend current knowledge to identify how best to meet the particular literacy development needs of well-defined subgroups of adults.

Except for a few intervention studies, the study of instruction in the component literacy skills and processes has not been a priority in research with adults, nor has the research incorporated knowledge of the practices that develop reading and writing skills in K-12 students. Research even for younger populations is not complete with respect to understanding the components of literacy, interrelations among the components, how to most effectively develop each component, or why literacy may not be sufficiently developed in every adult. Significant research remains to be undertaken with individuals of all ages to develop more comprehensive models of adult reading comprehension and of adult writing to guide assessment and instruction. Similarly, questions remain about fluency and its relation to other components of literacy, and the best ways to teach vocabulary remain to be fully tested. Significant work remains to be done to identify the social and contextual factors that affect the literacy development of adolescents and adults, neurobiological mechanisms of reading and writing development, and age-related changes in reading and writing processes, all of which have implications for the design of instruction and development of assessments to measure progress.

Yet the practices already validated to develop reading and writing skills in younger students should work for older students, provided that the instruction is modified in two ways.
First, findings from cognitive science and aging show that the increased knowledge and decreased speed and information processing capacity of cognitive processes that occurs with age may, at the margin, require some tuning of instruction for older learners. Second, although general principles of motivation should apply to learners of all ages, the particular motivations to read or write are often different at different ages. Instruction for adolescents and adults may need to be designed differently to motivate these populations to persist.

Compared with children progressing through a more typical trajectory of literacy development, adolescents and adults may have more knowledge and possess forms of literacy while still needing to fill gaps in component skills, acquire content knowledge, and develop types and levels of literacy proficiency needed for education, work, and practical life. Engagement of learners in higher levels of literacy and learning need not wait until all the gaps in lower level skills have been filled, however. Scaffolds, such as prompts and visual displays, can provide the supports learners need to engage with texts and develop complex thinking usually prohibited by the lack of fully fluent foundational skills. To become facile in executing component skills for particular purposes, adults require both explicit teaching and plentiful opportunities to practice skills typical of those needed to achieve functional goals. For this reason and for increased motivation, it is important to facilitate the development and integration of component skills as much as possible using texts, activities, and tools that relate to the adult learners’ interests, learning goals, and everyday functional literacy needs.

**Conclusion 4:** Literacy development is a complex skill that requires thousands of hours of practice to reach the levels needed for full opportunity in modern life, yet many adults do not persist long enough in adult education programs or developmental education courses. Many factors—instructional, cognitive, economic, and social—affect persistence. At present, research does not indicate which methods are most effective in supporting adults’ persistence and engagement with instruction. Enough is known, however, from research on motivation, literacy, and learning with other populations to suggest how to design motivating instructional environments, create more time for practice, and ensure that the time is efficiently used. The efficacy of these approaches will need to be tested rigorously.

A most significant challenge to the design of literacy development opportunities for adults is getting the adults to participate and persevere. Findings show low completion rates for developmental education courses in college, lack of persistence in adult education programs, and high rates of attrition from research studies on instructional effectiveness for adults with low- to intermediate-level skills. Moreover, even if completed, the available programs cannot, by
themselves, provide enough practice to build needed facility levels. Future interventions must be designed on the assumption that a main reason for the lack of substantial progress is that significant portions of the needed practice have not occurred for adults with inadequate literacy.

Motivation involves multiple factors that are related but not identical. First, the adult needs to be present for and persist with instruction. Convenient instructional opportunities may be critical to supporting repeated access. Many adult literacy programs are offered at specific sites, often sites that low-income adults cannot easily reach. Accordingly, the total time spent going to a class, attending the class, and going home may be much longer than the time spent in the literacy-enhancing activity. This challenge to access and participation suggests that if some literacy instruction or practice could be provided to adults in forms they could access at home, the yield from whatever time they choose to invest would be much higher. Certainly, as discussed later, information technologies can be exploited for this purpose.

Time for learning competes with time for work. Transportation from home to a study site and child care responsibilities can be major barriers. Increased access to child care and transportation and other social services, such as counseling, may help with retention of learners in programs and with their persistence in literacy practice. Financial support and incentives may be necessary even for highly motivated learners. Although research on the factors that motivate adults to persist in literacy programs is limited, we encourage the development and testing of approaches that have been used with some success to motivate adherence to health promotion programs (e.g., weight loss, smoking cessation). Reminder systems used in health care may also prove of benefit in encouraging repeated presence for classes.

Having some level of choice in the source, location, and form of instruction is likely to increase motivation. For this reason and because effective literacy is built up over thousands of hours, it is extremely worthwhile to include out-of-class practice opportunities in any program. Technology has the potential to expand time for practice beyond what institutions can afford to provide via human instructors. Substantial innovation may be required, however, to provide adults with access to technologies. In some cases, community-based centers with computers that afford some level of privacy or computer loan programs so that students can work at home may be helpful for increasing access and retention. Just as schools sometimes team with other institutions to provide after-school learning opportunities, adult literacy programs may need to team with a range of other entities to provide easily accessible learning time in addition to formal classes “on campus.”

Second, when present in the instructional setting, adults need to be motivated and engaged with learning through the instructional interactions, texts, tasks, and tools available in their learning environment. Learners are more engaged and more likely to persist when literacy instruction and practice includes valued learning activities designed to scaffold progress. As
described in Chapter 5, research shows the importance of setting clear goals and a path toward longer term goals. To engage in and persist with learning, learners need help to set realistic goals and expectations about the amount of effort and practice required. Learners can underestimate the amount of practice and effort required to achieve fluency and often need help with monitoring their progress and regulating their behavior toward goal attainment. Instruction also needs to help learners develop self-efficacy and feelings of control and autonomy. Thus, learners are likely to benefit from realistic expectations about the amount of practice needed to achieve literacy development goals and feedback that allows for recognizing both progress and the amount of work needed to achieve the next goal.

Even when learners are eager to improve their literacy, they can possess deeply rooted and maladaptive attributions and beliefs about their literacy skills as a result of past experiences with learning in school, past failed attempts at remedial literacy instruction, and labels assigned to them based on skill and background. Because adult literacy learners have a history of failure and embarrassment at reading and academic learning, it is important to explore through research whether persistence might be increased through learning communities. Collaborative learning arrangements, both group learning and learner interactions via online environments, are promising ways to increase engagement.

**English Language Learners**

**Conclusion 5:** The component skills of reading and writing in English and the principles of effective literacy instruction derived from research with native English speakers are likely to apply to English language learners. Consistent with principles of learning, effective instruction meets the particular skill development needs of English learners, which differ in several respects from the needs of native speakers, and uses utilizes existing knowledge of content, language, and literacy whether in the native or the English language.

English language learners are the largest subgroup of adults enrolled in adult education programs. Although treated as a monolithic category, in reality they vary dramatically in what they need to become more literate in English. Some are literate in a first language and hence may need little practice in recognizing or spelling words or even basic comprehension skills. Many are U.S. citizens who speak English well but have low to intermediate English literacy skills. Others are recent immigrants who lack basic literacy skills in any language. Some English learners may be challenged by the lack of opportunities to use and be exposed to English.
The principles of effective literacy instruction discussed in Chapter 2 for typically developing learners should apply to English learners as well. Instruction will need to target, however, the particular skill development needs of the specific English learner, which can differ depending on the degree of literacy in a first language. For example, English learners show weaker vocabulary and comprehension relative to native English speakers but often show relative strength in decoding, especially if they are literate in their first language. Some of those learning English may benefit from some cultural background knowledge to support their learning and performance, for example, in reading comprehension.

Adult English language learners who can read fluently in their native language often can use some of their first language and literacy skills to facilitate learning to read and write in their second language. This means that adult literacy instruction would be most effective if tailored to the level of literacy they have developed in their native language.

A particular challenge to address in adult literacy instruction for English learners is developing their language and literacy skills at the same time. Second language learning past childhood can be difficult and differs from language learning at younger ages in two important ways: it usually is learned via explicit instruction more than through implicit learning, and it also usually is more closely tied to reading.

Experiences in second language instruction with young language learners, high schools, and colleges suggests several principles that may be effective with adult language learners, although these principles await systematic evaluations in adult education contexts. These include a balanced and integrated focus on oral language, reading, and writing; providing meaningful, genuine, and relevant materials and tasks; utilizing learners’ first language strengths; a focus on both form and meaning; providing frequent and explicit feedback; providing opportunities to experience and apply linguistic structures in varied contexts, including outside the classroom; and being sensitive to learner’s existing levels and readiness as new linguistic concepts are introduced.

**Assessment**

**Conclusion 6:** Improved adolescent and adult literacy programs require the development of measures and comprehensive systems of assessment that (1) include measures of language and literacy skills related to a range of literacy forms and tasks, domain knowledge, cognitive abilities, and valued functional as well as psychological outcomes; (2) include measures for differentiated placement and instruction, diagnosis, formative assessment, and accountability that are all aligned to work toward common learning goals; and (3) produce information at learner,
classroom, and program levels that is useful to learners, instructors, program administrators, and policy makers.

Three types of assessment are needed: diagnostic, formative, and accountability assessment. The different forms of measurement serve different purposes. Diagnostic assessment gives detailed information to instructors about which skill components the learner possesses and which need to be developed. Formative assessment provides the information needed to improve instruction by focusing attention on skills that need to be improved as instruction progresses. Accountability assessment provides funders and the public with a sense of how well the program and systems that serve adult literacy learners are working. There is a focus on the development of effective diagnostic and formative assessment of learners’ progress during the course of instruction, so that it can be focused efficiently and improved continually. Instructors also need training in how to use diagnostic assessments to guide instructional choices and formative assessments to improve instruction.

To be feasible to implement, classroom instruction must share common elements whenever possible while being differentiated enough to meet each learner’s needs for skill development and practical goals for learning, and thus assessments are needed to help differentiate instruction. Although some attempts have been made to assess adults’ profiles for instructional purposes, the reliability and validity of any particular approach to assessing profiles of skills and other characteristics for the purpose of planning instruction remains to be established (see Chapter 3).

The validity of measures for both practice and research needs attention with respect to (1) the suitability of the measures for adults, (2) comprehensive coverage of the multiple dimensions of component skills (especially those most likely to be weak in adult learners), and (3) the measurement of reading, writing, and language skills that society demands and values. To elaborate: there are no satisfactory ways to comprehensively assess the range of literacy skills that adults bring to instruction and their growth over time. The use of grade level equivalents to measure skill levels and gains needs to be rethought because adults begin instruction with widely varied skills that do not fit neatly into grade level categories. Longitudinal research would help to inform the development of valid measures for adults by elucidating patterns and variations in the growth of adults’ literacy skills across the lifespan and in response to instruction.

In both research and practice, better measurement tools are especially needed to more adequately assess all aspects of reading comprehension. The measures that are available and that have been used in the few intervention studies focus on a narrow range of skill (e.g., very low or intermediate). To evaluate effective instructional practices, measures used in research must have sufficient breadth and complexity to measure the important dimensions of literacy and language.
Sufficient breadth and depth of measurement is important for testing hypotheses about how particular practices affect learners’ growth and address specific areas of reading and language difficulty. Use of only a single composite score on a standardized assessment, by contrast, or measurement of a narrow skill set should be avoided to maximize understanding and return on investment, especially in large-scale effectiveness research. There is a need to conceptualize and develop multidimensional measures in tandem with the development and testing of integrated reading comprehension models and comprehensive approaches to instruction. In doing this work, attention is needed to construct validity. Across studies, the same measures have been used to assess different constructs, and different measures have been used to assess the same constructs, indicating a need to systematically clarify both the constructs that are important to assess and valid ways to define and measure them.

The same comprehensive and multidimensional approaches are needed for research and assessment of writing and writing development. Moreover, because writing assessment is often costly and time-consuming, considerable attention needs to be devoted to developing valid automatic computerized scoring systems that will prove useful to teachers and learners alike.

Studies must measure outcomes of literacy instruction that have external validity, meaning that they measure component skills needed to perform valued literacy tasks for education, work, and other life goals. Measurements of growth in the ability to use and compose texts for these purposes are needed for both print and digital text forms.

There are many reasons why people think that universal literacy is important, so studies need to measure the extent to which all the goals of interest are realized. These might include such outcomes as GED attainment and job improvement, self-confidence, continuing one’s education, civic engagement or participation in other aspects of social life, avocational engagement in literate activity, and so on. Although more needs to be known about how to reliably assess them, such noncognitive outcomes contribute to a complete view of the effectiveness of adult literacy instruction. Despite a long history of psychological and sociocultural research on the constructs of motivation, engagement, and persistence, the best ways to measure the related constructs still need to be determined or developed for use in studies with the target population.

**Technology**

**Conclusion 7: Technologies for learning can help to resolve problems facing adult learners caused by time and space constraints. Technology can assist with multiple aspects of learning and assessment that include diagnosis, feedback, scaffolding, embedded practice with skills in meaningful tasks, tracking of learner progress, and**
accommodations to create more effective and efficient instruction. Given the costs of human labor, technology also may offer a more cost-effective means of achieving the extended levels of practice needed to gain reading and writing facility.

Technologies for learning, including social networking tools, have advanced to the point that literacy instruction and practice no longer needs to be offered only in the traditional classroom. Technology has the potential to scaffold literate activity to make learning more efficient. Technology also can assist with assessment, especially by leveraging recent model tracing, Bayesian network, and natural language processing advances. Technology can be used for placement, feedback, and tracking of learner progress for more effective and efficient instruction. Writing is improved by intelligent tutoring systems and automated scoring systems that diagnose and give feedback on language and discourse deficits at multiple levels. Technology also can assist with accommodation, and in particular text-to-speech and speech-to-text technologies can help to support both reading and writing development.

Many adult learners can benefit from technology that can guide, coach, or scaffold engagement with literacy tasks. For example, electronic texts might include software routines that monitor how long various pieces of a text are engaged and use that information to provide prompts that encourage persistence in deep processing. Pop-up questions can allow students to self-assess the depth of their engagement.

Technology tools exist or could be developed to link the instruction and practice of specific literacy skills to particular tasks and purposes designed to meet goals of the adult learner. Technology can be leveraged to create motivating environments for acquiring reading and writing skills that include virtual worlds, animated agents, and multiparty simulations or games that simulate or have a close correspondence to the learners’ everyday lives.

Developing the literacy skills for using collaborative communication technologies can be motivating as well as valuable because they help learners maintain connections with important people in their social world and develop the pragmatic understandings needed to comprehend and compose texts for effective communication. Although some adults may be somewhat familiar with these tools, the rich use of collaborative technologies will require training, not only for students but also for their instructors, and they may enhance persistence in literacy programs that use them.

The human resource cost of education, as well as other cultural opportunities, tends to rise faster than the general cost of living. This means that deeper levels of instructional support by human teachers may be less feasible to support publicly as time passes. Technology can leverage human teaching, especially to provide more and deeper opportunities to engage texts. In addition, given the temporal barriers many adult learners face to increase literacy opportunity,
technology can make added literacy engagement opportunities more accessible and more portable.

**Conclusion 8: Society increasingly requires broader, more intensive and more complex forms of literacy given new communication technologies. Adults need to be able to use contemporary tools of literacy and become facile with forms of reading and writing that are valued and expected for education, work, health maintenance, social and civic participation, and other life tasks.**

Literate practice always involves tools and technologies. Society has moved from pen and paper to digital forms of expression through information media and multimodal communications. To be functionally literate today, an adult will need to also have made this move. Adults need opportunities to learn valued literacy skills, which include the tools and forms of communication and information seeking that have resulted from the information revolution and which society now expects adults to possess as part of being literate and skilled.

Research is just beginning to examine practices and proficiencies related to the use of new information and communication technologies that are now part of being literate in 21st century society (see Appendix B). Various theories regarding digital media and learning offer ideas about how to develop proficiencies related to these technologies to meet adults’ learning goals. An important direction for research in the next decade will be to investigate online reading, writing, and learning to identify the underlying cognitive, social, and cultural mechanisms involved in learning, engagement, and performance with technologies. The features of instructional practices and learning environments must also be identified that promote technology-related literacy proficiencies for adult populations with different levels of literacy.

Specific questions for research include: What are the competencies involved in reading and writing online and comprehending and creating multimodal texts? What instructional materials and programs are effective in developing digital literacy skills? How should the development of digital literacy skills be incorporated into adult literacy programs: for example, what is the most effective ordering and configuration of media and modalities in the teaching of reading and writing certain digital multimodal texts? Should literacy development always begin with print-based texts or should it start with texts in multimodal and digital media? How should learning environments be structured to help adults with diverse educational, economic, cultural, and linguistic backgrounds and familiarity with information and communication technologies develop their digital literacy?
Formative and intervention research is needed to determine how adult learners use digital literacy practices in informal and work contexts. For example: How do adults with a need to further develop their literacy take up and use Web 2.0 technologies (wiki-writing, social networking, blogging) in their everyday lives? How might these new technologies be used for collaboration in literacy instruction to develop desired skills?

New forms of assessment are needed to measure adults’ proficiency with digital and multimodal forms of literacy. A coherent approach is required to specify instructional goals for digital and multimodal forms and design the necessary measures and assessment tools for assessing these skills.

**Conclusion 9:** There is a lack of research and data of the kind required to better define, prevent, and remediate problems that adolescents and adults enrolled in instruction outside compulsory schooling are experiencing with developing their literacy skills in the United States.

This report provides priorities for literacy research with adults in light of the gaps in current knowledge of adult learners, effective instruction, and adults’ learning environments (see Box 3-2 in Chapter 3). It also points to additional priorities for research with English language learners (see Box 8-1 in Chapter 8). As discussed in Chapter 3, the lack of relevant research on adult learners is due to several factors that have affected both the quantity and the quality of the information available. Key among these is that the level of funding has been insufficient and too sporadic to systematically accumulate knowledge and stimulate sophisticated uses of new technologies. To provide an adequate research base for better adult literacy improvement efforts, several things are needed:

- First, exploratory studies are needed to identify approaches that show promise of effecting substantial improvement.
- Then, support is needed both to develop scalable instructional programs reflecting that promise and to test these new approaches rigorously.
- Finally, further research may be needed to ensure that general findings are applicable to the entire range of adult literacy learners or to specify for whom they work.

Methodological improvements and development of standard protocols for collecting information about adult learners, instructional interventions, and instructional environments are...
required to yield an interpretable body of information about adults’ literacy skills and the practices and other conditions that support adults’ learning.

RECOMMENDATIONS

In Chapter 1 we present the conceptual framework that guided our synthesis of research and gathering of other information on adult literacy (see Figure 1-2). The framework also specifies the major categories of variables that require attention in a comprehensive and systematic program of research to develop adults’ literacy skills. Although many important specific hypotheses remain to be tested about how best to support adults’ learning, this figure conveys that the overall research effort must be multifaceted in order to provide an adequate answer to the primary question: What instructional practices (interactions, texts, tools, etc.) and other supports for learning are effective for developing component and valued functional literacy skills, for which learners, and under which conditions? Implementing the recommendations will require productive collaborations among researchers from multiple disciplines, along with partnerships including these researchers, instructors, program administrators, and the learners themselves. It will also require attending to systemic constraints and political realities that are largely beyond the committee’s purview, as well as strong leadership of the U.S. Department of Education, especially the Office of Vocational and Adult Education and the Institute of Education Sciences, the U.S. Department of Labor, and other sponsoring research agencies. A sustained and systematic research effort is needed that begins with well-designed pilot studies of instructional practices and other interventions. Funds will be needed first to adopt and evaluate promising approaches at initial test sites. In the same time frame, advances in measurement and assessment must be made, which will require the collaboration of programs.

Recommendation 1: Federal and state policy makers should move quickly to build on and expand the existing infrastructure of adult literacy education to support the use of instructional approaches, curricula, materials, tools, and assessments of learners consistent with (a) research on reading, writing, learning, language, and adult development; (b) research on the effectiveness of instructional approaches; and (c) knowledge of sound assessment practices.

Although the evidence is mostly on groups not quite identical to the target group (children still in school, students in college who participate in psychological studies, and the elderly), a substantial body of research exists to guide the selection and implementation of instructional practices in reading, writing, and oral language for adolescents and adults with
literacy development needs that range from minimal to substantial. Thus, some practices warrant application immediately, based on evidence from other populations, while research is undertaken to assess the extent to which they produce improvements for various segments of the adult population.

Recommendation 2: Federal and state policy makers should ensure that professional development and technical assistance for instructors are widely accessible and consistent with the best research on reading, writing, learning, language, and adult development.

The variability in instructor preparation is a clear impediment both to ensuring instructional effectiveness on a broad scale and conducting the needed research. There is a critical need to ensure that instructors possess knowledge and skills that are consistent with the most reliable research on literacy development and learning.

Although recommendations about specific mechanisms for delivering instructor preparation are beyond the charge to the committee, it is worth noting that instructors experience many of the same constraints on their professional development (lack of funding, inflexible locations, work and other life demands) as those who participate in literacy programs. Given these constraints, options to consider include online courses supported by the U.S. Department of Education to deliver instruction in the science of teaching reading and writing and a process that involves researchers and practitioners in the development and evaluation of professional development content, to ensure that it is consistent with the most recent research and validated best practice. Education and technical assistance efforts for instructors themselves need evaluation to determine whether they result in more effective implementation of taught practices and continuous improvement of offerings. It may be possible to offer a collection of professional development modules that serve both high school and adult literacy instructors, even if subsets of the modules need to be specialized for one group or the other. Along with such programming, attention must be given to providing appropriate incentive structures to ensure that instructors needing the support take advantage of it. There is also a need for data to identify the characteristics of teachers associated with effective implementation of literacy instruction across the four general types of literacy education programs (basic education, secondary education, English as a second language, and developmental education in colleges).

Recommendation 3: Policy makers, providers of literacy programs, and researchers should collaborate to systematically implement and evaluate options (instructional
components, technology components, social service components, incentives) aimed at maximizing persistence with literacy learning.

Achieving literacy requires thousands of hours of practice. The problem of high attrition from instructional programs (as well as the relatively brief length of those programs altogether) must be resolved if adults are to receive sufficient amounts of practice and instruction and if reliable evidence is to accumulate on the instructional methods that are effective when adults engage with learning. Although research documents the challenges that adults experience with persistence and engagement, it does not provide clear evidence about specific practices and policies that address these challenges for particular groups of adults. Systematic implementation and evaluation of various approaches is required to identify the mix of strategies that will engage learners of different backgrounds for the large amounts of time required for instruction and practice to be effective. The interventions should be developed with consideration of the factors that are likely to cause attrition and lack of perseverance. Programs can then select strategies that are most appropriate with an understanding of the specific situations of their students.

**Recommendation 4:** To inform local, state, and federal decisions aimed at optimizing the progress of adult learners, the committee strongly recommends strategic and sustained investments in a coordinated and systemic approach to program improvement, evaluation, and research about adult literacy learners.

A variety of federal units currently play a role in the education of adult learners and in research to understand and intervene with this population. Key among them are the Office of Vocational and Adult Education and the Institute of Education Sciences of the U.S. Department of Education, the U.S. Department of Labor, the National Institute of Child Health and Human Development of the National Institutes of Health, and the Department of Defense. Other agencies that might play a role in shaping and monitoring adult literacy education efforts include the National Institute on Aging of the National Institutes of Health and the National Science Foundation. However the proposed research and programmatic changes are implemented, they will benefit from a coordination infrastructure that ensures continued focus on the primary goal of producing a better educated workforce and citizenry.

The five goals used in the Institute of Education Sciences’ approach to research and development is very close to the research strategy needed, although more attention will be required to defining subgroups of learners that require specific variations in instructional approaches to meet their needs. The sequence includes exploration, innovation, efficacy testing, scaling up, and assessment development. Some of the practices of the National Institutes of
Health and the National Science Foundation that represent focused, long-term strategy might also be helpful, including registries for related research findings and possibly the designation of multidisciplinary centers to pursue synergistic programs of work that are guided by an overarching research plan and regularly reviewed by an advisory group of scientists for adherence to the plan.

**Research Design**

The research called for in this report should meet the following requirements:

- Research should address the diversity of populations for whom literacy improvement is a concern, including high school dropouts, low-literate English language learners with varying levels of first language literacy, students with documented disabilities, students in career and technical education, academically underprepared college students, and other adults who fared poorly in the K-12 system.
- Research should use rigorous designs and integrated multidisciplinary perspectives that can clarify the effective components of instructional practice and why they work, with adequate experimental power to clarify both what does and what does not work for specific subgroups of the population. Planned variation experiments would be one approach that is valuable for this purpose. The research should include detailed qualitative and quantitative information on learner and instructional contexts, because the diversity of learners and instructional contexts may affect whether the results generalize.
- Research should include longitudinal designs to determine which approaches produce substantial and durable literacy improvement and to track the developmental trajectories of students in an instructional program to provide some insight into what types of individual differences might be instructionally relevant.
- Research should use the best methods for reducing attrition known to be effective in conducting research with difficult-to-study populations.
- Research should determine that the approaches and effects are achievable and sustainable in the instructional context and thoroughly analyze the instructional practices, the instructors, the instructional environment, and provided supports.

**Priorities for Basic and Applied Research**
As the committee notes throughout this report, a substantial program of research is required to better articulate the specific literacy needs and challenges of adult learners, the literacy demands they face, and the cognitive, neurological, linguistic, social, cultural, and systemic factors that affect their learning. This research should address the following aspects:

- **Characteristics of literacy learners:** The range of specific literacy needs of the population needs to be better understood, including competencies in a native language that can support the development of English literacy and the challenges to learning faced by specific subgroups of English learners. Done well, such research would provide a stronger basis for the differentiation of adult literacy instruction and for grouping of learners who need substantially different learning opportunities.

- **Specification of the literacy skills required in today’s society:** The specific literacy skills required for meeting certain educational or career milestones need to be documented, including the literacy skills associated with knowledge building, collaborative problem solving, and effective use of new communications media. This information would permit a move from indexing the success of adult literacy instruction using traditional measures, which are based mostly on the learning that typically occurs in elementary school, to the assessment of literacy skills and levels required for adults’ educational and economic success and full social and civic participation.

- **Cognitive, linguistic, and neural underpinnings of instruction:** The underlying cognitive, linguistic, and neural functions need to be further developed as part of instruction for both typical adult literacy learners and those with learning disabilities. Such research would allow better adaptation of instructional approaches to cognitive differences among children, adolescents, and working-age adults and the specific challenges faced by some adults trying to become more literate.

- **Contextual influences on literacy development throughout the life span:** This would include research on the multiple paths of literacy development and, more specifically, the ways in which various forces (cognitive, linguistic, social, cultural, instructional, and systemic) interact to affect typical and atypical literacy development from childhood through adulthood. This research would provide knowledge about the population needed to better address the challenges that adult learners experience in developing their literacy skills outside K-12 education.
Priorities for Translational Science

Translational science bridges the gap between the type of knowledge derived from small-scale, controlled research and that required for implementation in large systems that serve diverse individuals in diverse contexts. To improve adult literacy instruction, translational research is needed in four areas to inform the selection and use of practices and products that effectively develop valued literacy skills: (1) instructional approaches and materials grounded in principles of learning and instruction derived mainly from other populations, (2) supports for persistence, (3) technologies to assist with and expand opportunities for learning, and (4) assessments of learners and their instructional environments.

The research will need to include a strong instructor training component and thorough description and analysis of the practices used and instructor characteristics to inform improved instructor recruitment, training, professional development, and ongoing supports required to deliver instruction effectively. It should include large-scale data collection and information gathering. Strong leadership will be required from the U.S. Departments of Education and Labor and other sponsoring research agencies. Partnerships will need to be developed among interdisciplinary teams of researchers, practitioners, curriculum developers, and administrators to systematically build this knowledge and to identify and address barriers to implementation.

Instructional approaches and materials  New and modified approaches to remedial literacy instruction are needed that both develop the skills that society demands for education, work, social and civic participation, and health maintenance and apply the principles of learning, cognitive and neural function, and motivation derived from research with other populations to diverse subgroups of adult learners. An interdisciplinary effort involving researchers, practitioners, and curriculum developers is needed to create a coherent system of literacy activities, practices, texts, and tools that are linked to the particular literacy development needs of the learner.

The effort should address the need for appropriate texts for practicing reading skills to develop fluency and accumulate useful knowledge. Adolescents and adults lack a sufficient range of high-interest texts matched to assessed proficiencies and designed to develop literacy skills while developing knowledge needed to achieve broader goals. “Authentic” (real-world) materials often contain too many literacy elements that learners have not yet mastered and so can be overwhelming and frustrating if presented without substantial scaffolding; there is a need to develop materials and evaluation strategies that instructors can use to select materials that present appropriate challenges to learners according to their skill levels. One promising possibility is to add to existing online work environment tools that can scaffold developing literacy. Tools already exist that scaffold the comprehension of free-standing texts, and it should
be possible to build similar tools into basic work systems that allow adults to stretch their literacy levels and thus gain added literacy practice.

**Persistence** It is vital to study the mix of practices, program components, and policies that support persistence with literacy instruction and that would also serve to reduce the high rates of attrition reported in research studies with the population. Research should be conducted to identify how to maximize persistence and progress by designing programs that attend comprehensively to the cognitive, social, cultural, psychological, and motivational needs of the learner. Literacy is a skill requiring thousands of hours of practice. Adults with inadequate literacy skills have not had sufficient practice and often have not found learning in school to be pleasant. Research should be conducted to encourage attendance, sustained practice, and engagement with instruction. This research should apply and extend current knowledge, focusing in particular on aspects of the learner, the learning environment, learning activities, texts, and materials that affect persistence. In addition to understanding persistence in programs, work is needed to determine how to facilitate persistence with specific literacy tasks.

**Technology** Developing and identifying effective uses of technology are important for several reasons. First, technologies can free literacy practice from being dependent on a specific learning location. This is important because learning is usually limited for adults as a result of limited program funds and locations available (a few hours of instruction are offered a few days per week), participants’ work schedules, and other life demands.

Second, technologies can help to standardize instructional offerings across the many places of instruction that have shared populations with common literacy development needs and learning goals. Third, technologies have the potential to provide some of the scaffolding needed for progress with literacy skills and engagement with complex texts and tasks while filling gaps in lower level reading skills. Intelligent interactive media should be developed to motivate and scaffold practice by adults with literacy needs and incorporate specific work and life goals and interests.

Fourth, technology has the potential to help overcome the high cost of intelligent human labor, in this case literacy instructors. For example, web-based and automated evaluation, diagnosis, and prescription of further learning opportunities could be developed both to support instructors and to support adults in reading practice. Technology for use in classrooms must also be engineered to be accessible to the instructors with appropriate instructor training.

**Assessment of learners and instructional environments** A valid, coherent, and comprehensive system of assessment should be developed for diagnosis, planning instruction, and accountability. The system should comprehensively assess knowledge, skills, and valued psychological and functional outcomes. It should be aligned to produce different but linked forms of measurement for assessing learning at the learner, classroom, and program levels. The
system should generate information that is appropriate and useful for the particular purposes and audiences: learners, instructors, program administrators, or policy makers in local, state, and federal governments. Effective assessment tools would address all of the components of literacy and map onto the primary valued learning outcomes for adult remedial and basic education. The needed assessments would, among other things, measure the ability to comprehend and use text meaning for purposes (e.g., for academic learning, health maintenance, civic participation, work). Valid measures must be developed that are (1) appropriate for use with adults and for learners’ cultural and linguistic backgrounds, (2) provide comprehensive coverage of the multiple dimensions of component skills, and (3) measure the reading, writing, and language skills that society demands and values.

Few studies examine the characteristics of programs in adult education associated with improved learner outcomes. One reason for this lack of research is that few measures are available to assess learning environments in adult education. Such work is just beginning even for K-12 schooling. Thus, in addition to better measures of adult outcomes, standard ways of measuring the quality of the educational environment are needed that are derived from research on language, learning, and literacy. These measures would assess instructional interactions, texts, and implementation of instruction and contextual factors (e.g., content of teacher preparation, uses of technology outside school) that support or constrain the implementation of effective practices and adults’ opportunities to learn and practice new skills.

Large-Scale Data Collection and Information Gathering

Information about the literacy skills of adults in the United States and in the diverse systems that offer adult literacy instruction should be gathered and analyzed on a continual and long-term basis to know whether the population is becoming more literate and whether efforts to improve literacy are effective at a macro level as well as in specific individual efficacy studies. Allocations of funding for adult literacy programs signal an understanding of the magnitude and importance of the literacy problem in the United States. Yet the only assessment tools used at the federal level to evaluate the effectiveness of adult literacy education programs are global accountability measures that relate only superficially to the specific literacy proficiencies that need to be developed. In addition, these measures do not convey how much more literate U.S. society is as a result of investments in adult literacy instruction or how to focus efforts to improve instructional practices and adult learning. While current efforts to survey literacy in the U.S. population and collect information on adult literacy programs and learners are important, there is a need to modify them to track progress in the components of
reading and writing that have been identified in research and proficiency in performing important literacy tasks. There is also a need to gather data on the instructional interactions, materials, and tools used in literacy instruction to better understand current practices, plan the appropriate professional development of instructors, create effective out-of-classroom learning opportunities, and better match literacy instruction to emerging literacy demands for work, education, health, and functioning in society. Finally, it is important to have data on the personal writing and reading goals of the adult learner population, so that the gap between broad social goals and personal goals can be negotiated. It may be productive to embed questions relating to literacy in broader longitudinal surveys.

CONCLUDING THOUGHTS: LEADERSHIP AND PARTNERSHIP

The current approaches to adult literacy instruction represent well-intentioned and partly productive efforts of adult literacy program providers, community colleges, state agencies, and the U.S. Departments of Education and Labor, operating under several constraints. Although it is wise not to change practice without rigorous experimental confirmation that a new approach is more effective, the available research on literacy and learning with other populations strongly indicates that better approaches to instruction are possible. The request to this committee—to synthesize the knowledge base on learning and literacy to inform instructional practice and develop a more systemic approach to research, practice, and policy—is a necessary step to improve adult learning in the United States. The relevant agencies should encourage research that is sufficiently focused and sustained to accumulate knowledge about how to improve adult literacy instruction and make substantial progress in adults’ literacy.

Meaningful change will be difficult, however, given the current level of investment, the need for substantial instructor training as part of any change in current practice, the needed research and innovation, and the extent of additional learning that many adults will require. Success will depend on a strong partnership of school districts, states, and the federal government. It will also require strong and sustained partnerships between researchers and practitioners at various levels.

Although many federal programs and agencies contribute to adult education services, it is the Office of Vocational and Adult Education in the U.S. Department of Education that administers the Adult Education and Family Literacy Act, enacted as Title II of the Workforce Investment Act, which is the principal source of federal support for adult basic and literacy education programs for those who are at least 16 years old, not enrolled in high school, and lack basic skills, a high school diploma, or proficiency in English. The law specifies that agencies eligible to provide adult literacy instruction consider whether the programs they choose to fund
use practices that research has “proven to be effective in teaching individuals to read” (Workforce Investment Act [WIA], Title II, Section 231 (e4) (B). It also gives the secretary of education the authority to establish and carry out a program of national leadership activities to enhance the quality of adult education and literacy programs nationwide (WIA, Title II, Section 223). Thus, current legislation provides the authority and one possible source of existing funds for collaborating with other appropriate funders.

The nature of the work to be done will require partnerships among researchers, practitioners, curriculum developers and administrators to systematically build the needed knowledge and tools and to identify and address barriers to implementation. Major employers, existing training and education organizations, faith-based groups, and other community groups will need to be enlisted to help in the effort. A number of organizations have been started by business and civic groups to promote literacy, especially “21st century literacy,” but these organizations have, for the most part, been advocates for change rather than participants in effecting change. Just as government must play a role in sponsoring the needed research, providing program incentives, and monitoring progress, it also will be important for the business community to move from a role of advocacy alone to also providing input into literacy requirements, providing onsite learning opportunities, being accommodating of needed research on effectiveness, and helping to provide incentives to boost motivation to complete literacy programs. Substantial national leadership will be needed to sustain investment and strategic direction through periods of uncertainty and economic variability. Having an educated, literate workforce is essential to the preservation of the U.S. economy in the information age.

As with any field, the dissemination of knowledge and effective practice from research to policy makers, administrators, and instructors in the field of adult literacy is a subject of

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1The Adult Education and Family Literacy Act (which is Title II of WIA) aims broadly to help adults become literate and build the knowledge and skills for employment and self-sufficiency, completion of secondary education, and full participation in the educational development of their children. The legislation directs how federal funds are distributed by formula to states, defines goals for adult programs, and defines core indicators of performance. The Office of Vocational and Adult Education contributes an estimated 25 percent of the total funds used for adult literacy programs. States must provide matching funds to qualify for the allocations made on the basis of census data. States competitively award most of the funds to local institutions to provide adult literacy programs and retain 12.5 percent for overall program improvement. Federal funding for programs has remained relatively level since 2001, with an annual appropriation of about $560 million. An additional sum is provided annually for research, technical assistance, and other national leadership activities, which in 2010 were funded at 13.3 million, or .021 percent of the total $628.2 million adult education and family literacy budget (U.S. Department of Education, 2010).
inquiry in its own right. The committee hopes that those with a mission to improve adult literacy will, as part of acting on the recommendations in this report, participate in the steps needed to identify and address the factors that will affect the conduct of the recommended research and the implementation of the findings into widespread practice.