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A Public Health Approach to Improving the Lives of Adult Learners: Introduction to the Special Issue on Adult Literacy Interventions

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Abstract

Addressing the literacy needs of adult basic and secondary education learners must form a core part of a broader public health effort to increase educational and health outcomes for these individuals and their families. Adult learners constitute a significant proportion of the overall adult U.S. population and a proportion that impacts, directly and indirectly, on the physical and economic health of millions of families and society writ large. Enhancing the literacy skills of low literate adults has proven difficult, hampered by the relative dearth of research data on struggling adult learners and effective intervention approaches, the contextual challenges of delivering intensive interventions, limited personal and systemic resources, and competing demands on learners' time. We propose a systems level view of adult low-literacy as one that holds promise and provides a basic framework for providing coordinated, comprehensive, and integrated services, but that requires additional research to support. Informed and coordinated efforts with the pre-kindergarten to twelfth grade education system and health and labor services sectors is needed if we are to improve the lives of these adults and their families.

Keywords

Adult Literacy; adult basic education; intervention; public health; education

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Increasing the adult literacy skills of the U.S. and world population should be a central tenet of a broad public health effort to meet the needs of struggling, low-literate adults. In 2004, the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development in collaboration with the U.S. Dept of Education's Office of Vocational and Adult Education and the former National Institute for Literacy (subsequently referred to as ED-NICHD-NIFL partnership) jointly sponsored research to help tackle the literacy needs of struggling adult learners. This investment grew out of the recognized need to focus on these learners, and the belief that developmental and intervention focused efforts with adult learners could be informed by the existing scientific knowledge base built primarily in kindergarten to grade twelve (K-12). This special issue focuses on the intervention efforts and results of four of the six projects supported through that ED-NICHD-NIFL partnership.

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DEFINING THE NEED: BACKGROUND ON ADULT LITERACY RESEARCH AND THE ED-NICHD-NIFL PARTNERSHIP

The ED-NICHD-NIFL partnership sought to identify and study the instructional needs of learners in adult or family literacy settings. Therefore, the partners, along with other offices at the US Dept. of Education, held a research workshop that brought investigators from the fields of adult and family literacy as well as other related disciplines together to articulate the current state of knowledge and identify gaps in reading research with low-literate adults. Although a full discussion of the meeting results is outside of the scope of this article, the clear consensus supported the need for additional research focused on adult and family literacy and recognition of the relative dearth of existing data addressing issues of instructional or programmatic effectiveness (e.g., see Kruidenier, 2002, and Venezky, Oney, Sabatini, & Jain, 1998, for similar discussions). The participants agreed that, although it was clear that there are unique challenges to improving adult literacy, the field could fruitfully draw upon the research findings on reading development and instruction developed for younger readers (K-12). The workshop participants recognized a broad based need for research on learner (population) characteristics, development and validation of interventions, assessment tools and approaches, motivation and engagement, use of technology to support learning, and focus on non-native English speakers in this low-literate adult population. In essence, there was a call to develop a “systematic, programmatic, multidisciplinary” scientific effort to address the educational needs of these learners¹. Based on these identified needs, the Partnership published a research solicitation; four of the projects funded through that solicitation report findings in this issue.

Recognition of the sheer scale and diversity of the needs of adult learners is important (see Lasater & Elliot, 2005; Miller, McCardle, & Hernandez, 2010; Tamassia, Lennon, Yamamoto, & Kirsch, 2007; also see Alamprese, MacArthur, Price, & Knight, this issue; Greenberg, Wise, Morris, Fredrick, Nanda, & Pae, this issue; Hock & Mellard, this issue; Sabatini, Shore, Holtzman, & Scarborough, this issue). Nationally, the results from the National Assessment of Adult Literacy (NAAL) provide a sense of scale of the literacy challenges facing adult learners in the U.S.; these nationally representative results estimate that there are approximately 30 million adults with below basic literacy skills² in English (Kutner, Greenberg, Jin, Boyle, Hsu, & Dunleavy, 2007). The label “below basic” literacy skills indicates only “simple and concrete literacy skills”; literacy skills at this level clearly serve as a significant impediment to employment, to access health related information, to full civic engagement, and to the ability to support the learning needs of children and youth (e.g., Miller, Hernandez, & McCardle, 2010; Tamassia et al., 2007). In fact, even those who attain Basic literacy skills are insufficiently prepared for many of today’s employment demands, let alone the technically demanding jobs anticipated in the coming decades.

Critically, from a public health perspective, we see significant health disparities when examining performance for various ethnic and historically at-risk groups. Adults with the lowest literacy levels are more likely to live in the lowest income households making less than \$10,000 per year (Kutner, Greenberg, Jin, Boyle, Hsu, & Dunleavy, 2007). Blacks and Hispanics are overrepresented in the lowest performance categories with 24% of Blacks and 36% of Hispanics performing at Below Basic literacy levels (Kutner, Greenberg, & Baer, 2005). If we look at English language learners, defined here as individuals who spoke a language other than English before initiating schooling, approximately 61% of these adults

¹For a full description of the workshop discussion, please see the meeting summary posted online at: http://www.nichd.nih.gov/publications/pubs/upload/afl_workshop.pdf

²The estimate of 30 million is based upon performance on the prose literacy scale. The estimates are 27 and 46 million adults that performed below basic levels on document and quantitative literacy respectively (e.g., Kutner et al., 2007).

scored in the Below Basic literacy levels. If we broaden our view of populations that may be at risk for poor health outcomes and look at individuals reporting that they receive Medicare or Medicaid, approximately 27% and 30% respectively perform at Below Basic literacy levels. To effectively utilize our health care system and have high levels of civic engagement, we need higher functional levels of literacy in the populace. Reflecting the risk associated with lower levels of functional literacy, individuals who did not complete high school or who possessed a GED (General Educational Development) also had lower health literacy scores on the NAAL (Kutner, Greenberg, Jin, & Paulsen, 2006). Also, individuals with Below Basic prose literacy skills are significantly more likely to report multiple disabilities. The educational attainment of low-literate individuals limits their ability to reach their full potential and to live healthy and productive lives (see National Center for Health Statistics, 2010, for a discussion relating education to health outcomes).

Given the scope of the continuing need, we argue that a broader public health perspective will be needed to address these learners' needs and that a concerted multi-pronged effort may prove promising to help us "move the needle" and improve the lives of these learners. Regardless of whether one views the learning needs and challenges of adult basic education (ABE) and adult secondary education (ASE) learners in an educational, public health, economic, or national security lens, a more holistic response to these learners' needs, one that integrates research and expertise across disparate disciplines, is needed.

Increasing the evidentiary base must be a part of any public health campaign focused on adult literacy. Applying what was known from the K-12 reading research literature and extending it to adult ABE learners was a logical step for the field given the relative dearth of data in the adult literacy research field when the adult literacy research consortium began (e.g., Kruidenier, 2002). For the ED-NICHD-NIFL partnership effort, this emphasis on bringing other data to bear made scientific and pragmatic sense given the dearth of evidence on, and availability of instructional approaches with proven efficacy for the adult population. Standard instructional practice for adults was and often continues to be significantly less structured than the interventions presented in this special issue or those seen in the K-12 environment. This relative lack of structure reflects in part the limits of the evidence base for the ABE and ASE populations. Fortunately, the extant research literature on younger learners had recently been systematically reviewed through the efforts of the National Reading Panel (NICHD, 2000). This panel report enumerated the important components of reading and what was known about how to effectively instruct children in these componential skills. A subsequent effort to systematically examine the research literature on adult literacy (Kruidenier, 2002) revealed the dire need for new and experimental research efforts in this area. Despite some of the challenges and inherent limitations in extrapolating from this literature and the challenges in addressing the needs of this particular population of learners, the K-12 literature was a useful springboard for designing immediate intervention efforts for low-literate adults.

FACTORS AFFECTING THE SUCCESS OF ADULT LITERACY PROJECTS

Before discussing the articles in this special issue, it is important to highlight some of the factors that may impact individual enrollment and attendance as well as structural challenges at the adult literacy institutional level that face learners attending classes or researchers conducting projects in these settings. At the level of the learner, motivation(s) for attending ABE/ASE classrooms can vary markedly (e.g., Merriam, Caffarella, Baumgartner, 2007; Greenberg, 2008); for example, individuals may be pursuing additional education to obtain a General Educational Development diploma, to improve their employment opportunities or prospects, or for more personal reasons such as being able to read the Bible or other religious texts or help their children with their homework. The reasons that learners may be

in need of remediation also can differ substantially. Low-literate learners are more likely to report learning difficulties or learning disabilities as well as other health conditions than those with higher literacy levels (e.g., Kutner et al., 2006; 2007). Learners also have a range of educational experiences before entering into the ABE program and important factors such as the nature and quality of literacy instruction are generally unknown. For non-native English speakers in particular, the range of educational experiences (both in years and quality) can be quite disparate, depending upon the individual learner and the education system in the country of origin.

Basic logistics and life events can limit one's ability to participate fully in adult literacy training opportunities. Adult educational services provided to parents whose children attended Head Start illustrated some of the difficulties. As background, the Head Start program is mandated under its performance standards to provide "opportunities for continuing education and employment training and other employment services through formal and informal networks in the community" (Head Start Act, 2007). However, an evaluation of the Head Start program designed to deliver additional services to parents (Family Service Centers) found that the parents who sought out additional education services met or exceeded basic literacy competencies, suggesting many of the parents with the greatest needs for these services were not being reached or taking advantage of these opportunities (Swartz, Bernstein, & Levin, 2000). Even the parents who did take advantage of the additional services reported a variety of barriers to accessing them, including limited transportation options, employment responsibilities, and lack of affordable child care in line with challenges faced by many adult learners.

Structurally, the adult literacy service settings face their own challenges. Many of these aspects have been articulated in other publications (e.g. Belzer & St. Clair, 2007; Dirks & Jha, 1994; Greenberg, 2008). These include: open enrollment of students (in some classrooms) where students can begin study at any point in the course; multiple levels of ability within single classes due to low enrollment; high levels of attrition, which interfere with efforts to monitor and analyze instructional dosage and student progress, in programs and research studies; limited class schedules available to students; and limited budgets for staffing and professional development. All of these affect both the quality of the educational experience for the learner and the practical aspects of trying to study a consistent cohort of students.

FOUR ADULT LITERACY INTERVENTION PROJECTS

The four intervention projects that make up this special issue focus precisely on addressing the literacy needs of struggling adult learners, taking these challenges into account to the extent possible.

In the first article, Greenberg and colleagues examine the effectiveness of various reading instructional interventions targeting ABE learners whose word reading skills fell between the third and sixth grade reading levels. The basic premise of the study was that these learners would benefit from a "combination of explicit and implicit instruction" (p. 6). To examine this, four approaches were tested with the instructional elements deriving from the SRA/McGraw Hill Direct Instruction Corrective Reading program (Engelmann, 1999) and the Extensive Reading approach (Krashen, 1993), which included explicit and implicit instructional emphases, respectively. The four tested approaches included emphases on decoding and fluency (DF); decoding, comprehension, and fluency (DCF); extensive reading (ER); decoding, comprehension, extensive reading and fluency (DCEF); and a counterfactual that involved standard adult literacy instructional approaches, which tend to be less explicit and systematic than all but the ER approach examined here.

Greenberg and Colleagues

Greenberg and colleagues screened 1,174 individuals for eligibility; of the 629 who qualified for the study, 277 individuals participated through the midpoint assessment. Participants included an approximately even mix of native (49.1%) and non-native (50.9%) English speakers; the majority of participants were African American (57%) or Hispanic (23.5%). Individuals were randomly assigned to condition and, on average, four learners were assigned to each instructional group. Classes met four times per week for two hours each meeting. Participants could attend up to 100 hours of instruction; actual attendance was significantly lower than this maximum. To ensure minimal levels of instructional dosage for analysis purposes, participants had to have attended at least 30 hours at the midpoint and sixty or more hours at the endpoint. Individuals were assessed at pre, mid and post-treatment intervals; a six month post-intervention follow-up was completed by a subset of participants as well. Unfortunately, the results did not suggest a benefit for any one program over standard practice for these learners, despite the alignment of some of the intervention approaches with known deficits for these learners. Despite the lack of differentiation by condition, learners did make modest gains across all interventions. This lack of a benefit of explicit instructional approaches over “business as usual” is surprising. Implications of this finding as well as the consistency of findings across papers will be discussed in detail following the discussion of findings for all four articles.

Sabatini and Colleagues

The second article, by Sabatini, Shore, Holtzman, and Scarborough, examines the potential benefit of supplementing current instructional practice with adapted explicit phonics and guided reading instruction for low-literate adults. Adaptations of three existing reading programs (Corrective Reading [CR] (Engelmann, 1999), RAVE-O (e.g., Wolf, Miller & Donnelly, 2000), and Guided Repeated Reading [GRR] (Shore, 2003)) supplemented existing adult literacy instruction for participants. Participants were required to be either native English speakers with word recognition skills below the seventh grade level or non-native English speakers with sufficient English skills to potentially benefit from the program. Of the 300 eligible learners, 148 individuals completed at least ten supplemental tutoring sessions and the post-tests. Pre-test, midpoint, and post-test data were collected as well as structured interview data to garner background information (including educational experiences). Participants were primarily African American (83%), included roughly equal numbers of Hispanics (9%) and white Caucasians (8%), and were predominately female (67%). Individuals were randomized to groups³ and instructional sessions provided by trained tutors were presented three times a week for 10–18 weeks; the goal was to obtain at least a minimum dosage level for each participant. Attendance ranged from 12–63 sessions with an average of 35. The focus of the three supplemental tutoring programs differed substantively. CR focuses heavily on word level skills with particular emphases on decoding and spelling; instruction is explicit and systematic in this approach. RAVE-O combines phonics instruction and fluency training with a more extensive fluency focus. Finally, GRR focuses on strengthening fluency skills through guided repeated reading of texts, with limited embedding of phonics instruction.

Similar to participants in the Greenberg et al. study, participants in all three of these supplemental programs showed small to moderate gains in literacy skills. However, none of the supplemental programs showed a clear benefit over the other two programs. Sabatini and colleagues also examined the profiles of those individuals who persisted (persisters) through the intervention and compared them to those who had left the intervention and found that the persisters tended to be older, on average, with poorer pre-test performance on basic reading

³See Sabatini et al. (this issue) for a full description of sampling and randomization procedures.

indices. It may be that the older learners are likely to be more mature and motivated to continue than younger learners, consistent with reports of higher drop-out rates from adult education programs for younger adult education students as well as less realistic expectations for outcomes from these programs (e.g., Flugman, Perin, & Spiegel, 2003; Harting, 2006). However, other possibilities remain.

Hock and Mellard

The third article in this issue, by Hock and Mellard, focuses on explicit strategy instruction within ABE instructional contexts, using a modified version of the SIM (Strategic Instruction Model; Center for Research on Learning, 2009; Schumaker & Deshler, 1992), adapted for low-literacy adult learners. The SIM has demonstrated efficacy with adolescent struggling readers and was a logical target for extension to use with low-literate adults. Specifically, the instruction focused on one of four instructional strategies: Bridging (decoding and identifying new words), Building Fluency (oral reading fluency), Prediction (increasing reading comprehension by building self-questioning or inquiry skills while reading), and Summarization strategies. Participants were at least sixteen years of age or older, U.S. citizens or eligible to work in the U.S., who had withdrawn from secondary school without obtaining a degree or had literacy or mathematics skills below the eighth grade level.

Three hundred seventy-five learners were randomly assigned to an experimental condition or control condition (e.g., business as usual in these settings). The sample was diverse, with a mix of African-American (45%), White non-Hispanic (33%), and Hispanic (5%) individuals, who were predominantly female (63%). The hours of instruction planned ranged from 19–34, depending upon the instructional strategy that was being emphasized. This breaks down to a four-days-per-week schedule with 50–60 minute blocks per session. This instructional intensity reflects the researchers' efforts to deal with the constraints of the environment and learners' attendance patterns. Despite attempts to facilitate full participation, attrition was similar to the other studies, ranging from 40–50%. For this study, Hock and Mellard primarily judged intervention efficacy through assessments of passage comprehension. However, other assessments were administered to measure growth that specifically aligned with the instructional strategy emphasized. Similar to the results of the other studies in this issue, there was a lack of differentiation among the instructional conditions and the counterfactual. Given the data supporting the use of SIM with struggling adolescent learners (Bulgren, Schumaker, Deshler, Lenz, & Marquis, 2002; Faggella-Luby, Schumaker, & Deshler, 2007; Fritschmann, Deshler, & Schumaker, 2007; Schumaker & Deshler, 2006), it is surprising that differences between one or more of the instructional conditions and the counterfactual were not present. This paper adds to the growing evidence, including that of the other manuscripts in this special issue, as to the difficulty in substantially improving literacy performance when intervening with low literate adult learners.

Alamprese and Colleagues

The final intervention article, by Alamprese, MacArthur, Price and Knight, focused on developing and examining the efficacy of a structured decoding curriculum, which included an emphasis on spelling and the relation of learner characteristics to performance. Beyond the importance of spelling to broader literacy development, the inclusion of spelling derived from input from adult learners participating in earlier design experiments who expressed a strong desire to improve their spelling skills. Given this interest, integrating spelling into the decoding curriculum was expected to improve learners' motivation to participate and engage in instruction. This intervention was explicitly designed as part of comprehensive literacy instruction that would include vocabulary and comprehension.

As with the other interventions in this issue, the Alamprese et al. study included learners from multiple adult literacy program sites. This study had a particularly large geographic range (12 states). The design included intervention and control classrooms; control classrooms used their existing reading instruction but not a specific decoding curriculum. Programs (16 in total) were randomly assigned to condition. A comparison group of seven ABE programs whose instructors used K-3 structured curricula adapted for use with ABE learners were included for supplemental analyses. Study participants were those enrolled in low-intermediate level ABE classrooms; out of the 561 learners that were pretested, pre and post-tests were available for 349 learners. Participants were primarily female (66%) and demonstrated a broad ethnic distribution (35% White non-Hispanic, 24% Hispanic, 24% African American, 15% Asian). English speakers born or educated in the U.S. comprised about two thirds of the participants. Attrition was comparable to other studies. Like those in the Hock and Mellard study, learners who left the instructional program were generally younger; however, they were also less likely to have a high school diploma, and more likely to be native speakers of English and Hispanic than those that remained. The instructional programs lasted approximately 30 weeks, with the mean number of hours that learners received being 50, 60, and 65 hours in the treatment, control, and comparison classrooms respectively. Neither differences in instructional hours nor attendance differentiated among conditions. Learners were assessed on a range of literacy skills at pre- and post-tests and also completed structured background interviews at both time points.

The intervention results for the Alamprese et al. study were globally similar to the other studies. Learners made small to moderate gains across treatment conditions; however, in the treatment condition, a small effect for the treatment was found on one of the proximal decoding measures in comparison to the control group, but not on other measures. On the one hand, decoding was one of the targets of this intervention, so differential movement is promising; however, given the concomitant emphasis on spelling, one would have expected to see differential movement on this skill as well. Interestingly, the intervention showed differential impact between native versus non-native English speakers, with native English speakers benefiting more from the treatment intervention, primarily on word recognition and decoding measures.

These four well designed and carefully implemented studies clearly illustrate for low-literate adults the challenges in making large gains in literacy skills and in seeing these translate into functional gains in componential reading skills, particularly in reading comprehension. Thus, one might ask what the takeaway messages are from these studies, and where one should go from here. Critically, it is important to recognize at a practice, research, and policy level the difficulty in improving the skill levels of adult learners. One can generate a range of hypotheses about factors that may have worked against these projects (e.g., dosage, attrition); these four articles discuss these and others challenges in substantial detail. To build an integrative, collective, and sustained approach to address the needs of low-literate adults, there must be a growing appreciation of the challenge in generating robust gains in literacy performance for these struggling adult learners. The sheer number of low-literate adults and the societal and personal impact of low literacy (e.g., economic, civic, and health) are too large to ignore (e.g., Kirsch, Braun, Yamamoto, & Sum, 2007).

ADULT LITERACY VIEWED FROM A PUBLIC HEALTH PERSPECTIVE

The challenge of ensuring literacy skills to low-literate adults echoes in many ways other educational and health challenges that show similar significant health disparities and that appear equally recalcitrant to improvement. We argue that the challenges facing adult literacy practitioners and researchers overlap in meaningful ways with the challenges faced in other areas of public health that are epidemic in scale, such as obesity, and will require a

systemic response if we are to adequately address them. To contrast the challenges posed by the obesity epidemic with those in adult literacy, we need to first give a brief background and sense of scope of the obesity epidemic. In the U.S., approximately one of every three children is overweight or obese, and attempts to reverse this trend have not proven successful to date (Ogden, Carroll, Curtin, Lamb & Flegal, 2010). Children who are obese tend to remain obese through adulthood (Serdula et al., 1993), making childhood a crucial time for prevention and intervention efforts.

Obesity in children confers a number of significant health problems during childhood and adolescence, such as hypertension, insulin resistance, type 2 diabetes, fatty liver disease, and orthopedic complications, as well as psychosocial problems (Daniels, 2009). In addition, obese adults have a significantly elevated risk for chronic conditions including cardiovascular disease, stroke, type 2 diabetes, certain cancers (National Institutes of Health, 1998). At first glance, the cause of obesity appears simple: calories consumed exceed calories expended; however, obesity typically manifests from a complex interplay of factors from the individual level to the societal level. More specifically, the global crisis of obesity is a reflection of the interaction between changes in the broader socio-environmental context and biological predisposition (Huang & Glass, 2008; Huang & Story, 2010). From an evolutionary perspective, humans have been designed to seek energy dense foods (high in calories, starches, fats and sugars) because of the energy requirements of a large brain (Cunnane & Crawford, 2003), and to store fat to protect against famine (Song, Altarejos, Goodarzi, Inoue, Guo, Berdeau et al., 2010). We find processed, energy dense foods extremely palatable and rewarding, and their overabundance in the environment makes it difficult to resist overconsumption. However, there are numerous factors beyond diet and physical activity which have contributed to this epidemic, such as access to healthy, affordable foods, food marketing, and the man-made “built environment” (e.g., buildings, parks, roads, and transportation systems). In addition, there are significant health disparities in obesity, such that individuals from certain racial and ethnic minority populations are at increased risk, as are individuals from low socio-economic status (SES) backgrounds (Singh, Kogan, Van Dyck, & Siahpush, 2008). Currently, the most vulnerable populations end up having the highest rates of obesity.

The majority of prevention and intervention efforts for childhood obesity have thus far focused on behavior change at the individual or family level. And like interventions for low-literate adults, these studies tend to fall short of demonstrating significant or sustainable change (Summerbell, Waters, Edmunds, Brown, Campbell, 2005; Young, Norman, Lister, Drummond, & O’Brien, 2007). This is, in part, because it is extremely difficult to change behavior without changing the context in which it occurs. In the case of childhood obesity, societal defaults make our environment an “obesogenic” one: low nutrient, high calorie foods are ubiquitous and inexpensive, and opportunities to be physically active (versus sedentary) are relatively infrequent. To address the multiple levels of influence that affect the contributors to obesity (from the individual to the policy level), interventions must also be multilevel, and target change at the social, environmental and/or policy level.

One might argue that there are different complexities with childhood obesity than with low-literate adults, and such an argument would admittedly be correct; however, there are also important parallels to be drawn between these two situations. Similar interplays between individual, community, and societal factors may contribute to the very modest improvements in response to interventions that we see in low-literate adults enrolled in the adult literacy programs. This is to say that for meaningful change and improvement to occur one cannot simply address change at any one level (e.g., the individual or the community), but rather that we need a multi-level, multi-pronged focus on prevention (primarily, for literacy, the pre-K-12 education system) and treatment to address the needs of current and

future adult learners and improve the outcomes of the next generation of adult learners – today’s children. Just as we must intervene to prevent obesity in children, as this has long-term, negative consequences and can lead to obesity in adults, so must we prevent adult low-literacy by improving the pre-K-12 education system. However, prevention is not the entire story, as we must not forget those who are already in or moving into adulthood, who are obese, or who lack sufficient literacy skills. In order to meet our current and future students where they live and work, increased and enhanced usage of technology will likely be necessary to deliver interventions and supplemental services at the dosage level necessary to positively impact skills and to help provide supports as individuals transition in and out of formal education and intervention venues due to life events (e.g., Askov, 2004; Askov & Bixler, 1998; King, 2010; Wagner, 2009).

For a true public health model to be put in place, improved coordination and goal setting must occur between pre-K-12 and post-secondary educational institutions (including ABE/ASE settings). Moving toward a model of continuous improvement of skills necessitates improved alignment and transitioning of goals and intervention efforts. The development of such a model would be a useful and necessary first step but would be insufficient to align educational institutions with other service providers in the public health and labor arenas. A range of challenges will be faced in such an alignment effort, some institutional in nature others more pragmatic; however, smaller yet important steps can help ease the transition. One likely challenge is language usage and how an understanding of need is generated. On the public health side, broadening common operational definitions of health literacy could enable meaningful exchange and enhanced interactions between educational and health care service providers. Health literacy often translates functionally to “health knowledge”; expanding this definition to include skills that are more likely to be transferrable across settings (e.g., literacy – a.k.a. reading and writing) could help bridge functional language challenges across research and practice communities and identify common ground to improve the overall health outcomes of at-risk, adult learners and their families (see also Rudd, Kirsch, & Yamamoto, 2004). We can leverage entry points for at-risk families, such as Head Start, to better service their current and future needs. These points allow for meaningful engagement with parents and caregivers who may be in need of services as well as enabling the education community to address the primary goal of meeting the needs of at-risk children preparing to enter the K-12 system (e.g., Aikens et al., 2010; Swartz et al., 2000). This approach broadly aims to systematically and systemically integrate service delivery across providers and to use existing public health frameworks, such as Head Start, to reach our adult learners and their families.

With regard to training and coordination of services, broad structural supports enabling a lifelong quest for learning will be paramount. To use the analogy of technology, we should be thinking not just about “pull” technology but “push” technology as well; by this we mean giving serious consideration to implementing societal supports that would facilitate learners’ pursuit of continuing education and training. Health, work schedules, travel logistics, and so forth can all limit individual access and utilization of career, personal, and health enhancing services. Revisiting and reinventing how we serve adult learners will be necessary to reach the range of learners that could benefit from currently (and potentially) available services. Although significant costs could be incurred in such an effort, the value added economically in terms of future income and reduced health expenditures could reduce the overall “cost.” These supports could also be integrated into broader public health efforts to address other risk and health factors that may limit low-literate adults’ effective engagement with the health care system and participation in civic, work, and family life. To balance the necessary research and practice efforts with continued structural improvements in adult literacy and public health services, we must re-examine how the continuum of care and services is

delivered and funded, as well as reconsider and research societal incentives and structural supports to facilitate and encourage continued learning throughout adulthood.

In essence, we argue for a life-long development model for all learners, with some efforts inherently more intensive than others based upon the learners' needs and goals. The societal and broader public health goals are often highlighted publically but fail to be targeted to the goals of individual learners; bringing public health interventions to specific at-risk groups and individuals must be more broadly supported, consistent, specific, and sustained in an integrative manner. If we are to truly engage and motivate learners to participate in such a life-long development model, we need to ensure that learners' goals are integrated throughout the process and that ambitious but attainable goals are set, with both short-term and long-term benchmarks. The hope is that moving to such a model would allow us to serve a much larger proportion of the individuals in need of enhanced literacy skills than are currently enrolled in any given year.

In order to inform a transition to a multi-tiered service delivery model, for both adult literacy and obesity, continued research efforts are needed both within levels (e.g., classroom instructional delivery) and across levels (e.g., coordination of services between public health and educational services) – in essence a complex systems approach. Both prevention and intervention strategies are required, and both need to tackle the challenge of modifying the socio-environmental context in which children and families live in order to support individual level change. It is useful to keep in mind that we are not arguing that all research can or should be systems level in approach. In fact, our argument is just the opposite. In order to move forward with a coordinated systems level approach, we need to continue concerted efforts focused within specific levels, for instance a continued focus on designing and refining interventions appropriate to the context and technologies that are available and feasible for usage with adults.

To address the relative dearth of data on struggling adult learners, we need continued focus on some of the core issues involving literacy learning trajectories for these individuals, examination of technology-enhanced solutions for delivering instruction or instructional support information to learners, and development of new and enhanced intervention models for these learners that balance individuals' personal goals with the need for an educated and engaged populace. These learners will need to find meaningful improvement in aspects of their lives that are important to them and these aspects may or may not always align well with broader societal goals and broader public health interests.

Moving toward this type of model inherently involves differentiation of instruction. Differentiated instruction is a challenging, but in our view, necessary, step forward for adult literacy programs. It is certainly the case that differentiation is occurring in classrooms today; however, layering on the expectation of evidence-based practice and what we hope will be a quickly evolving body of knowledge surrounding effective instruction for low-literate adult learners will challenge even some of the most able instructors. Such transitions must be part of a structured and ongoing professional development effort for adult literacy instructors and should facilitate a transition toward the development of integrated learner and public health goals. This should allow the field to transition to a model closer to timely, goals-targeted delivery of services to our adult learners.

To meet our current and future students where they live and work, increased and enhanced usage of technology will likely be necessary to deliver interventions and supplemental services at the dosage level necessary to positively impact skills, to help provide supports as individuals transition in and out of formal education and intervention venues due to life events, (e.g., Askov, 2004; Askov & Bixler, 1998; King, 2010; Wagner, 2009). Technology

will likely be a necessary bridge to allow programs to provide the types of rich differentiation and continuity of care/services that these learners need and at the same time remain nimble enough to meet both learners' personal goals and broader community or societal goals. This type of transition not only requires an increase in research on instructional content and delivery for adult learners but also will require enhanced investment in the area. Unfortunately, increased funding will be difficult if the economic climate remains tepid in the U.S. These realities are not often considered in balance with the personal and societal costs related to this population's higher utilization of health care services and risk for lower economic productivity given their educational limitations. Given the true cost to individuals and society of not acting, we must find creative ways to address the problem of adult low-literacy.

CONCLUSION

Continued attention must be given to the socio-environmental context where such interventions would be delivered. Although not always framed in this context, attention to the needs and goals of the learners balanced with the structural realities of the venues where instruction is delivered is what in general occurred in the development and testing of the interventions in this special issue. And important information was gained. Adults can make progress, but the challenges to service provision and dosage maintenance must be addressed if we are to enable larger gains and faster learning progression. Yet, as crucial as this work is, work within a single level will not be sufficient and must be balanced with research examining effective and efficient solutions for the overall organization and delivery of services to this high-risk population. We must develop mechanisms that would allow for efficient linkages of services at local, state, and federal levels. In contrast to the current situation, a wide variety of stakeholders needs to be engaged throughout the process, including policy makers, educators, health care professionals, community organizations, business leaders, and researchers to help develop and sustain an integrated service delivery model. Only in this way can we move the indicator needle into the better-than-basic level of literacy for all adults.

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