Learning to Achieve

WORKFORCE LITERATURE REVIEW

Learning to Achieve

A Review of the Research Literature on Employment Experiences and Outcomes for Youth and Adults With Learning Disabilities

Status of Empirical Research and the Implications for Adult Education

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Table of Contents

Introduction

Numerous researchers and practitioners have noted the diverse challenges that children and youth with learning disabilities (LD) face during their school years. These challenges include obstacles to literacy, academic achievement and social relationships (Bradley, Danielson, & Hallahan, 2002). With major federal laws mandating access to education, employment and public accommodations, many of these individuals receive interventions and supports that enable them to either overcome their challenges or be less affected by them. Other children and youth manage to develop their own compensatory strategies—in a sense, they create their own self-help programs (Singleton, Horne, & Simmons, 2009).

Sadly, still others struggle without the benefit of such tools. As noted author and self-advocate Dale Brown put it, "People think they'll outgrow a learning disability. But I haven't. And I haven't met anyone who has" (Brown, personal communication, June 13, 2009). The challenges encountered by children with LD are very likely to follow them into adulthood. Individuals who have compensatory strategies or who have had access to support in order to develop these strategies have a fighting chance to apply those tools in their adult roles as learner/student, employee, parent and so forth. Others may find themselves at a distinct disadvantage and face frequent disappointments, frustrations and lost or squandered opportunities (Kortering & Braziel, 2002; Lee, 2005).

As Gregg (2007) states, "The adolescent and adult population with learning disabilities (LD) continues to be underserved and underprepared to meet the demands of postsecondary education" (p. 119). Gregg refers to well-documented evidence of dismal postsecondary outcomes of people with LD, a population for whom dropout rates are two to three times higher than their peers (U.S. General Accounting Office, 2003; Young & Browning, 2005). Enrollment in college and postsecondary training is one-tenth the rate of the general population (Stodden, 2005; (Wagner, Newman, Cameto, & Levene, 2006; Young & Browning, 2005) and people with LD constitute 20 to 60 percent of persons accessing welfare programs (Burgstahler, 2009; Young & Browning, 2005). Other studies found in this review document similar postsecondary struggles in the workplace, with higher unemployment and underemployment rates compared with the general population. Many adults with LD will experience a lifetime of lower earnings (Dickinson & Verbeek, 2002).

The challenges for individuals who only discover in adulthood that they have LD are particularly unique (Singleton et al., 2009). In a report of a 2009 study titled "Windows of Reflection: Conceptualizing Dyslexia Using the Social Model of Disability," Macdonald points to the dilemma faced by people who have been diagnosed as having dyslexia as adults—and the ramifications of the disability on their lives—both as an innate lifelong condition and as a newly acquired label. Macdonald theorizes that the dominant conceptual frameworks that guide research on dyslexia are based on educational and medical/psychological models. Hence,

research may be skewed toward a view that presents dyslexia solely in terms of neurological and learning dysfunction. In response, Macdonald's study was designed to examine dyslexia in adults as a sociological paradigm by delving into the "life narratives" of the subjects. "Using a social model approach, the study illustrated some level of institutional and structural barriers that seem to facilitate discrimination of people with dyslexia in education and employment" (Macdonald, 2009, p. 359). Macdonald's perspective is particularly relevant for working-class adults with LD (e.g., dyslexia) who are trying to make a meaningful life for themselves beyond school but who may lack confidence and skill in pursuing rewarding employment opportunities and who may have experienced external barriers such as a lack of specialized teaching or access to assistive technology.

Vast research has been conducted on school-aged children with LD and on those who go on to college. Some studies have described the employment rates for people with disabilities and general information about their jobs. However, little empirical research has focused on the experiences of career seekers and employees with LD (Corley & Taymans, 2002). How do adults with LD perform in their jobs, what problems do they encounter and to what extent are workplace accommodations requested and provided? How do disclosure and self-determination figure into the equation? (Gregg, in press; Price, Gerber, & Mulligan, 2007). Since the inception of the Americans with Disabilities Act (ADA), great efforts have been invested in disability awareness training programs for employers, such as the work by Pimentel, Baker and Tilson (1991), but what has the payoff been for career seekers with LD? This has yet to be ascertained through rigorous research.

In *Learning to Achieve*, the literature review on learning disabilities, Paul Gerber (2009) presented two thorough literature reviews on "Transition and Adults with Learning Disabilities" and "The Impact of Learning Disabilities on Adults." He concluded there was a dearth of research, rigorous or otherwise, on how LD impacts adults' career lives. This literature review builds upon the research review and analyses conducted by the previous six authors of *Learning to Achieve*. While there were some overlaps in this review's search terms, it focused primarily on the term "employment," with "adult education" and "career development" as secondary terms. Where the previous authors devoted substantial attention to K–12 and transition-age youth with LD, this review specifically targeted research on adults.

Chapter 1
Literature Search

The expansive range of topics related to employment experiences and outcomes for individuals with learning disabilities and the implications for adult education—coupled with the extant work compiled and analyzed by the National Institute for Literacy (NIFL) in *Learning to Achieve,* required a multifaceted approach to searching the literature. While the goal was to identify empirical studies conducted from 1999 to 2009, the reviewers also searched post-ADA-era research documents beginning in 1990. Selected works included those reflecting significance to the field of learning disabilities and postsecondary outcomes, particularly employment.

All searches were confined specifically to LD, as well as specific learning disabilities that affect literacy and math skills—dyslexia, dyscalculia, dyspraxia, auditory perceptual deficit and visual perceptual deficit. Other than brief references regarding limitations of searches or findings, the reviewers followed the methodology of the *Learning to Achieve* authors and excluded attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) from these subsequent analyses. However, the reviewers included both ADD and ADHD in the initial search as a means to identify as many findings as possible related to employment of people who may also have LD. Literature that emerged from the search using those terms has been clearly identified. Works that focused on general disabilities, whether described as "mild," "moderate," "severe" or "high incidence," were excluded unless data for subjects with LD were reported separately. Standards set by the Council for Learning Disabilities Research Committee (1993), a set of guidelines created for investigators to apply when designing and implementing research studies in the field of learning disabilities, were used to vet research.

Data Collection

SEARCH TERMS AND LIMITATIONS

The search of the literature was guided by the following four questions.

Question 1: To what extent has empirical research been conducted to describe the employment/career experiences and outcomes of adults with LD, and how can these research findings inform the instructional strategies used by adult educators?

Question 2: What is known about the experiences of people with LD in adult education—or adult education instructors and/or employers' experience, successes and needs in working with this population?

Question 3: What evidence-based practices used by adult educators in the workplace can be adapted for use by non-workplace adult educators that impact work readiness and workplace skills for both young adults during transition from school to work, as well as for adults with LD preparing for entry into or already in the workplace?

Question 4: To what extent does the empirical research provide guidance to adult service providers working with adults with learning disabilities whose services focus on employment, preparation and support?

The following terms were used for all searches:

1. Adults with learning disabilities and workplace
2. Employment and adults with learning disabilities
3. Employment and adults and dyslexia, dyscalculia and dyspraxia
4. Employment and adults with auditory perceptual deficit
5. Employment and adults with visual perceptual deficit
6. Employment and adults with attention deficit disorder
7. Employment and adults with attention deficit hyperactivity disorder
8. Supported employment and adults with learning disabilities
9. Customized employment and adults with learning disabilities
10. Employment and veterans with learning disabilities
11. Vocational rehabilitation and adults with learning disabilities
12. Unemployment and adults with learning disabilities
13. Work release and reentry programs and adults with learning disabilities
14. Job training and job placement and adults with learning disabilities
15. Adult education and employment outcomes and adults with learning disabilities
16. Work readiness and adults with learning disabilities
17. Adult education and adults with learning disabilities
18. Adult education and work readiness and adults with learning disabilities
19. Career development and adults with learning disabilities
20. Adult education and adults with learning disabilities and out-of-school settings
21. Disabled student services and learning disabilities and adult education
22. Universal design and adult education;
23. Temporary Assistance for Needy Families (TANF) and welfare-to-work and learning disabilities
24. Continuing education and adults with learning disabilities
25. Training and development and adults with learning disabilities

Databases Searched

The search focused on citations generated from searches of relevant computer databases, including the Education Resources Information Center (ERIC); National Institute of Health's MEDLINE; U.S. Department of Labor, Job Accommodations Network's Searchable Online Accommodation Resource (SOAR); PsycNet; and Questia.

Web Sites Searched

Seven categories, aligned with the reviewers' research questions and search terms, were used to conduct a search of the national Web sites listed below.

a. **Learning Disabilities** – National Center for Learning Disabilities (NCLD); National Joint Committee on Learning Disabilities (LDOnline.org); American Speech-Language-Hearing Association; International Dyslexia Association; and Learning Disabilities Association of America.

b. **Adult Learning and Continuing Education** – National Center for Adult Learning and Literacy; National Reporting System for Adult Education; National Center for Education Research Institute for Education Sciences (IES); National Center for Education Research; American Association of Adult and Continuing Education; National Adult Education Professional Development Consortium (NAEPDC); Adult Education Research Conference (AERC); Council for Adult and Experiential Learning; National Center for Community Education; System for Adult Basic Education Support (SABES); and Association for Non-traditional Students in Higher Education.

c. **Special Education** – U.S. Department of Education (Office of Special Education and Rehabilitative Services [OSERS], National Institute on Disability and Rehabilitation Research [NIDDR], National Center for Special Education Research and National Longitudinal Transition Study-2 (NLT52)); and Special Education Assessment Professionals.

d. **Vocational Education and Career and Technical Education** – U.S. Department of Education, Office of Vocational and Adult Education (OVAE); Association for Career and Technical Education; National Center for Career and Technical Education; Institute on Education and the Economy (Teachers College, Columbia University); National Career Development Association; and Vocational Evaluation and Career Assessment Professionals.

e. **Workforce Development** – Disability and Business Technical Assistance Centers (DBTAC); U.S. Department of Labor (Job Corps, Office of Disability Employment Policy, Employment and Training Administration, Bureau of Labor Statistics/National Longitudinal Survey); U.S. Department of Justice; and National Collaborative on Work and Disability–Adults.

f. **Business/Industry** – Society for Human Resource Management (SHRM); Social Security Administration; U.S. Small Business Administration; U.S. Chamber of Commerce; and Service Corps of Retired Executives.

g. **Other** – National Institute of Mental Health; National Institute of Child Health and Human Development; National Governors' Association; and Outreach and Technical Assistance Network (California only).

Chapter 2
View Of The Research

Literature that addressed one of the four research questions was included in the initial pool of materials. The preliminary search yielded a significant body of literature that had been presented previously by the *Learning to Achieve* authors, particularly in the areas of accommodation, self-disclosure and higher education. In the final selection of literature, there were only eight instances of overlapping documents. Previously cited references are noted in Tables 1 and 2 as well as Appendix 1.

Coding Procedure

INCLUSION AND EXCLUSION CRITERIA

In 2001, the Institute and the National Center for the Study of Adult Learning and Literacy (NCSALL) convened a panel of experts on adult literacy research and practice, charged with identifying and evaluating research related to reading instruction for low-literate adults, aged 16 and older, who were no longer being served in secondary education programs (Mikulecky, Smith-Burke, & Beatty, 2009). Owing to the severe lack of scientifically based research on this topic, the panel subsequently determined that published reports would be categorized, in descending order of empirical rigor, as (1) emerging principles, (2) emerging trends, (3) ideas or (4) comments. Qualitative studies were allowed if they met specific stringent standards. The reviewers borrowed from this classification scheme and developed a four-tiered system to assign documents that emerged from the literature search, using the 25 previously noted search terms.

Tier 1 Criteria

This tier included empirical research conducted in the United States and published in peer-reviewed journals. These quantitative studies used experimental or quasi-experimental designs incorporating comparison groups, random selection of subjects and inferential statistics. Further, studies in this category were able to prove or disprove a priori hypotheses, indicate cause and effect, or point to a statistically significant reason as to why an outcome may have occurred. They also clearly described counterfactuals or events that would have happened to study subjects in the absence of study interventions or treatments.

Tier 2 Criteria

This tier included (1) quantitative studies that were descriptive in nature, demonstrated differences between or among groups being studied or statistical correlations between variables; (2) meta-analyses of extant research; and (3) qualitative studies, provided they used stringent methodologies,

incorporating multiple data sources, strict processes for coding and analyzing data and other methods espoused by notable researchers such as Yin (2009) and Huberman & Miles (1994). Case study designs fell in this latter category.

Tier 3 Criteria

This tier included (1) non-research peer-reviewed literature published in journal articles, books, text-books, monographs and reports, including both descriptive and evaluative design; (2) papers and presentations delivered at professional confer-ences; (3) non-peer-reviewed briefings, position and opinion papers; and (4) content from national Web sites. Also included were (5) empirical studies conducted in English-speaking countries outside the United States published in American or for-eign peer-reviewed journals, regardless of a differ-ence in standards.

Tier 4 Criteria

This tier included published or self-published literature from self-advocates and self-advocacy grassroots groups or popular sources such as Web sites, blogs, newsletters and networks, provided they related directly to the questions guiding this review.

No limitations in the initial search were imposed as to the following:

a. Size of the study

b. Type of subjects

c. Type of study (e.g., experimental versus descriptive)

d. Type of adult education setting studied (e.g., workplace, General Educational Development (GED) programs, vocational education, com-munity colleges, high schools and adult high schools, re-entry programs from institutional-ized systems such as the correctional system or military, community-based learning centers, or federally funded workforce development initia-tives such as Job Corps)

e. Type of educational degrees and credentials of adult educators studied no matter the setting (see d. above)

f. Country of location of the study

g. Type of employment setting studied (supported, customized or competitive employment)

Subjects are referred to in two age categories:
1. Adults – older than 18 years of age; and

2. Young adults – ages 11 to 17

Rationale for inclusion in the search:

International research. Research conducted outside the United States was excluded from the Tier 1 and 2 research studies with the exception of three stud-ies comparing findings on U.S. adults with LD to those from other English-speaking countries. They were included for informational purposes as they may have the potential to inform future research in the United States. These three studies are identi-fied in Tables 1 and 2, as well as in Appendix 1. All other international studies are referenced in either Tier 3 (if cited) or Appendix 2 (if reviewed and excluded). The exclusion of the international work, no matter the rigor applied, was determined by the differences in standardized definitions for disability. For example, in the United Kingdom LD is not separated from other categories of disability such as mental retardation and developmental disabilities.

Institutes of higher education. While institutes of higher education as settings, both for the delivery of adult and continuing education and for postsecondary and employment outcomes for individuals with

LD, were included in the literature search, findings and recommendations have been noted separately from other adult education settings. Research that focused on college students or graduates was excluded, with the exception of studies related to career development, transition to employment, employment outcomes or accommodation strategies that might translate to the adult education or workplace environment.

Employment settings: The primary search for literature relates to competitive employment. However, the reviewers recognize that many individuals with disabilities, including LD, may need additional supports and resources in order to obtain and retain employment. While this literature search contributes to previous searches on supported employment completed under the auspices of the Institute, the literature search indicates that customized employment has emerged as a significant phenomenon over the past few years. The characterization of the types of workforce development activities applied in customized employment seems to be at a tipping point, ripe for future research. For adults with LD served through customized employment approaches, the use of evidence-based findings may inform instructional strategies used by adult educators.

Specific factors in employment outcomes were used to refine the search selections, such as access to employment, comparison of pay rates between adults with LD and non-LD counterparts, job advancement, continuing education and unemployment. Other factors included challenges that employees with LD encountered on their jobs that they perceived were due to their disability, and accommodations that were requested, granted or denied. On-the-job training, job satisfaction and job advancement experiences with potential implications for adult learners were also included in the search.

Strengths and Weaknesses in the Research Base

Using the 25 search terms, and including relevant documents that met the criteria devised for the four-tiered system of classifying the search results, an initial base of 1,606 documents was identified. The reviewers then determined which of the four questions might best be addressed by each document. The criteria for the four tiers were subsequently applied to the selected documents for further categorization. While full abstracts and key identifying terms helped further hone the document selection process, only the Tier 1 and Tier 2 sources were synthesized, enabling us to make specific practice recommendations for adult educators contained in section V. Tier 3 and 4 documents, while not part of the analysis per se, have been used in the general discussion sections of this paper.

Documents ultimately reviewed and synthesized are noted in Table 1: "Studies Included in the Literature Review Related to Employment Experiences and Outcomes for Young Adults and Adults with LD," which includes the author(s), year published, title of study, content identifier, participant identifier, number in sample, learner characteristics and study design. This table only includes studies, therefore some publications in Appendix 1 are excluded. Appendix 2 lists excluded documents, with rationale for exclusion.

Question 1: **To what extent has empirical research been conducted to describe the employment/career experiences and outcomes of adults with LD, and how can these research findings inform the instructional strategies used by adult educators?**

This question focused the search specifically on employment outcome studies yielding data on employment rates, types of employment, employee satisfaction and, most importantly, *issues and barriers* faced by adults with LD—and the accommodations requested and provided to address those barriers. Literature that focused solely on work readiness or career and workforce preparation was excluded.

Question 2: What is known about the experiences of people with LD in adult education—or adult education instructors' experiences, successes and needs in working with this population?

In searching for empirical research that responded to this question, this review's focus was quite narrow. The reviewers wanted to find out whether or not, or the extent to which, studies have been conducted on the direct experiences of adults with LD in accessing and benefiting from adult education programs (including basic academic instruction, specific occupational training, or GED or other high school equivalency programs). The reviewers also wanted to learn if any studies have captured the direct perceptions or experiences of adult educators who have taught adults with LD. Since employers in some cases will directly provide or arrange for their employees to receive adult basic education classes, the reviewers also were alert to any related research directly involving employers (refer to Table 1.).

Question 3: What evidence-based practices used by adult educators in the workplace can be adapted for use by non-workplace adult educators that impact work readiness and workplace skills for both young adults during transition from school- to- work as well as for adults with LD preparing for entry into or already in the workplace?

The reviewers' primary interest here was *adult basic education* programs, courses or training sessions

that companies provided "in house." Would any available empirical research findings be potentially useful for adult educators identifying and working with people with LD who have low literacy? The reviewers recognize that many employers may partner with adult education provider agencies and are well aware that there are many federal, state and local initiatives to encourage school-business partnerships. However, neither of these was central to this search. The reviewers also excluded searches on employer staff development and training programs because this would have taken us too far afield, into the areas of corporate human resources, training and development.

Question 4: To what extent does the empirical research provide guidance to adult service providers working with adults with learning disabilities whose services focus on employment, preparation and support?

It is not uncommon for adult basic educators, who are charged with teaching essential academic and remedial subjects, to also be called upon to provide basic instruction in other functional life skills, such as developing resumes, completing job applications, preparing for interviews, conducting follow-up activities and communicating effectively. Meeting the unique needs of learners with LD is overlaid on these instructional responsibilities. Clearly this imposes great demands on adult educators, particularly those with limited to no experience or skill sets necessary for serving this population. For job training and placement programs, such as those mandated under the Workforce Investment Act (WIA), the same may be true. Direct service providers may not have the knowledge base or practical experience to accommodate and instruct learners with LD. The field is replete with curricula, programs, materials, strategies and resources geared toward K–12 teachers, college instructors and other professionals. It is unknown how many

of these resources are based on sound empirical research or the extent to which instructors of adult basic education and work preparation programs are using these resources.

Once the search was completed, documents were grouped according to their highest relevance to one of the four guiding questions and then further classified them into the four-tiered configuration.

Final results of the search related to guiding questions.

The following 112 documents were subsequently identified and classified by tier. Note that no documents were found related to guiding question three using the search methods described.

- **Tier 1** – None of the identified research studies met the standards for Tier 1. They were not quantitative studies using experimental or quasi-experimental designs that incorporated random selection of subjects and inferential statistics demonstrating causality.

- **Tier 2** – Fifty-seven of the studies met the Tier 2 criteria. Of these, 39 were quantitative descriptive or correlational studies (seven of which were longitudinal studies), four were meta-analyses and three were research synthesis or literature reviews. Eleven of the studies used qualitative methodologies (nine qualitative case studies and two qualitative focus groups).

- **Tier 3** – Fifty-one studies met the Tier 3 criteria. They addressed most closely guiding questions 1, 2 and 4.

- **Tier 4** – Four studies reviewed met the Tier 4 criteria.

A caveat is offered here. While other studies may exist related to the topic of adult education and employment for adults with LD, the studies synthesized were those identified using the search methodologies and terms described. Indeed, other relevant literature might have emerged using other terms.

As noted qualitative researcher Robert Yin expresses it, all empirical research has a story to tell (2009). The process of conducting this literature review was heavily influenced by the extensive work of the *Learning to Achieve* authors. The reviewers sought to avoid duplicating the story drawn by these authors, or using sources cited in their chapters; rather, the intent was to use these current reviews as a starting point. This review reflects a summary of key extant themes from *Learning to Achieve* combined with this review's findings from the literature, which focused primarily on experiences and outcomes for adults with LD—in the workplace as well as adult education settings. From here the reviewers discuss implications and suggestions for adult educators (in non-college settings) who find themselves teaching adults with LD, many of whom are also categorized as "low literate."

When the reviewers refer to adult education, it is important to set the context of the discussion. Kruidenier (2002), in "Research-Based Principles for Adult Basic Education Reading Instruction," suggests that researchers must tread carefully when generalizing K–12 research to adult populations. This concern is certainly emphasized in the *Learning to Achieve* literature review on learning disabilities and in the work of Lynda and Stan (2000). Within the realm of adult education research there are further pitfalls. Taymans (*Learning to Achieve*, 2009), cautions that studies of individuals with LD in higher education (two- and four-year colleges)—comprising a substantial body of evidence-based literature—may not be generalizable to individuals with LD who are non-college-bound or have low literacy. Consider the implications of that challenge, combined with the observation by Mikulecky and others (2009) that findings about the experiences of the general

adult population in pursuing the GED credential may not generalize to adults with LD, particularly those who exhibit low literacy and poor functional academic performance. To further complicate matters, Mikulecky and others, as well as Schwartz (*Learning to Achieve*, 2009), remind us that adult education for learners of English as a second language is an entirely different animal. These experts share the point of view that more research on adult literacy and learning is essential. Otherwise, "it is a game of guesses" (Mikulecky et al., 2009, p. 39).

To assist in describing various themes emerging from these findings, the reviewers have included a conceptual framework (figure 1): "Outcome Settings for Adults with Learning Disabilities." The framework is divided into three broad phases: entitlement, eligibility and competition. Entitlement refers to the kindergarten through high school years, when all children and youth diagnosed with disabilities have the right to free and appropriate public education under the Individuals with Education Improvement Act; access to accommodations via section 4 of the Rehabilitation Act; and the ADA. While they may be entitled to services or protections under these federal laws, not all students with LD are identified, assessed or accommodated by the educational system; for a variety of reasons, they may slip through the cracks.

Figure 1.

Conceptual Framework
Outcome Setting for Adults with Learning Disabilities

| ENTITLEMENT | ELIGIBILITY | COMPETITION |

EXPERTISE

Adult Education & Job Training Programs ★

EXPERTISE

High School

Workplace ★

EXPERTISE

College 2-4 Yr ★
PS & Tech Education

EXPERTISE

Vocational Rehabilitation ★

EXPERTISE

Justice System ★

EXPERTISE

IDEIA REHAB ACT ADA A.T.ACT WIA

⬆ HIGH ⬇ LOW EXPERTISE of setting in providing assessments, instruction, accomodation, for individuals with learning disabilities.

★ SELF-DISCLOSURE of LD required for accomodation (assumes self-determination, and knowledge of rights under law).

Youth with LD will exit secondary education in one of three ways: with a regular diploma, with a special education completion document or by dropping out. From this point, they enter what is commonly referred to as the eligibility system, where they must typically meet particular criteria to be accepted into and participate in certain programs or services, which include college (two- and four-year), career and technical training institutions, vocational rehabilitation services, adult education and certain job training services. The ultimate goal or societal expectation is for most citizens to join the workforce— the competition phase in figure 1. These phases coincide with such legislation as the Rehabilitation Act, the ADA, the Assistive Technology Act and the WIA. The justice system is also included in the framework, since some youth and adults with LD find themselves adjudicated.

Figure 1 also depicts the general expertise level common to practitioners within each outcome setting. The *Learning to Achieve* authors thoroughly described the literature documenting the widely varied levels of expertise of professionals within these settings in providing assessments, instruction and accommodation for individuals with LD. For example, at the high school level, as with most colleges and certainly with vocational rehabilitation, there is a high level of professional expertise. This is not generally the case for the justice system, the workplace or adult education.

Chapter 3
Report of Findings

Following are the findings that resulted from this review and analysis of the literature, organized by the four guiding questions. Overall, the reviewers concur with the authors of *Learning to Achieve*: Empirical research on adults with LD in the workplace and in adult basic education is sparse, particularly studies on adults who have low literacy skills. No studies were identified that used rigorous quantitative or qualitative inferential methods. Rather, the short list of studies relied on descriptive designs, few of which yielded definitive responses to the guiding questions. Table 2 contains a brief summary of the major findings of the 57 reviewed studies related to employment experiences and outcomes for young adults and adults with LD. Among these studies were four that included in their samples representatives from business and industry. These may be useful in prompting further investigation into the impact of employer perceptions, knowledge and attitudes on the recruitment, hiring and retention of people with LD. While these four studies were not LD-specific, they appear to suggest the kind of employer-focused study that could quite readily be conducted on a larger scale, with a focus on LD.

Findings for Question 1

To what extent has empirical research been conducted to describe the employment/career experiences and outcomes of adults with LD, and how can these research findings inform the instructional strategies used by adult educators?

The vast majority of the research documents came from the field of transition for youth with disabilities from school to adult life, and used longitudinal or point-in-time follow-up designs. Most of the studies examined post-high-school outcomes that included not only employment but also participation in higher education. The concepts of self-determination, disclosure and accommodations emerged as dominant variables in many of these studies. It appears that identification of predictor variables is central to a number of studies that have sought to answer the question, "What interventions, internal and external forces, demographic characteristics and programs positively impact the post-high-school lives of youth with disabilities?"

PREDICTOR VARIABLES

In December 2009, David Test and colleagues reported on a meta-analysis they conducted of extant transition studies. They identified 42 variables predictive of successful post-high-school outcomes for youth with diverse disabilities (including LD), and classified them into 16 categories (Test et al., 2009). All of these variables indicated positive correlation with measures of successful employment outcomes:

1. Career awareness
2. Community experiences
3. Exit exam requirements/high school diploma status
4. Inclusion in general education
5. Interagency collaboration
6. Occupational courses
7. Paid employment/work experience
8. Parental involvement
9. Program of study
10. Self-advocacy/self-determination
11. Self-care/independent living
12. Social skills
13. Student support
14. Transition program
15. Vocational education
16. Work study

The conclusions from this meta-analysis bolster the findings and conclusions of Benz, Lindstrom and Yovanoff in their 2000 study of former special education students. Using a purposive sampling technique, the researchers drew their subjects from a database of 13,160 youth ages 15 to 21 who had received special education services in Oregon high schools during the 1997/1998 school year. They found a number of similar variables associated with transition services that were predictive of successful postsecondary employment. As with Test and others, these predictor variables included participation in vocational education and paid work experience, competence in functional academics, community living skills, personal-social skills, self-determination skills, transition planning and graduation from high school (Benz, Lindstrom, & Yovanoff, 2000).

While youth with LD are included in the meta-analysis conducted by Test and colleagues, most of the studies' findings are reported in the aggregate. Only one study, by Fourqurean, Meisgeier, Swank and Williams (1991), focused solely on subjects with LD. In 1991, these researchers conducted a follow-up study of 175 young adults with LD who had exited four selected high schools between 1986 and 1989. The primary intent of their descriptive study was to examine a set of variables, which they theorized would predict postsecondary employment success. In addition, they wanted to describe the employment adjustment of these youth in the initial years following high school. Eighty-six percent of the young adults in the sample were employed. Most of the jobs were part-time and classified as entry level and unskilled. Of the respondents, 13 percent were enrolled in college or technical trade school, and 26 percent of that subgroup self-reported that they had completed at least one semester of postsecondary education.

RATES OF EMPLOYMENT AND EARNINGS

Edgar (1995), in a pioneering study of 84 high school graduates with LD studied five and 10 years after school exit, found that 74 percent were employed, with 84 percent of that group employed full time. Males with LD were employed at almost the same rate, and in as well-paying jobs, as nondisabled males. Females with LD were parenting at twice the rate of nondisabled females, and many were single mothers on welfare. Three years later, Goldstein, Murray and Edgar found that compared with nondisabled young adults, LD graduates actually showed higher annualized earnings in the early post-high-school years. However, this changed as time went on, leading the researchers to surmise that lower earnings of the adults with LD might in part be due to the fact that non-LD students were more likely than those with LD to attend postsecondary educational institutions immediately upon exiting high school, rather than going to work (Goldstein, Murray, & Edgar, 1998).

A year earlier, these researchers had investigated the experiences of 289 high school graduates with

LD and 610 graduates without disabilities, at five- and 10-year intervals, and found the individuals with LD were significantly less likely than their counterparts to have attended any type of postsecondary school, much less to have completed such a program (Murray, Goldstein, & Edgar, 1997). Arriving at similar conclusions, Mellard and Lancaster (2003) noticed that during the first four years following graduation, young adults with LD tended to earn more than their peers without LD. However, this phenomenon reversed by the fifth year of working. One contributing factor may be the discrepancy between these two groups in completion rates for college or other specialized training and the types of education and training they received. Adults without LD were more likely to attend and complete either two- or four-year colleges, which is tied statistically to long-term earnings for the general population (Johnson, Zascavage, & Gerber, 2008). Dickinson and Verbeek (2002) compared outcomes of 53 "college-able" adults with LD and 41 peers without disabilities eight to 15 years after college exit and reported finding no significant differences between the groups on various measures of employment success. This appears to contradict the findings from a study by Vogel and Adelman (2000) that revealed, at a statistically significant level, that college graduates with LD (n = 97) earned less than their non-LD peers (n = 1,130). They subsequently examined potential reasons for this and concluded that the differences were primarily due to productivity issues, although the issue of discrimination may have played a part—something they suggested warranted further research.

Seo, Abbott and Hawkins (2008) examined the employment outcomes of students with and without LD at ages 21 and 24. The results showed no significant differences between the groups on either rates of employment or amount of earned income. The only discernable difference was that young adults with LD were more likely than their non-LD peers to receive public assistance, such as food stamps, Supplemental Security Income, and unemployment compensation. Results from the National Longitudinal Transition Study-2 (NLTS2) found that: (1) youth with other health impairments or LD were more likely to be employed at the time of the interview (68 percent and 64 percent, respectively) than youth with orthopedic impairments, mental retardation or emotional disturbance; (2) youth with LD, speech/language impairments or other health impairments (73 percent to 80 percent) all were more likely to have had a job at some time since high school than youth with orthopedic impairments or mental retardation (40 percent and 52 percent, respectively); (3) youth with emotional disturbances, LD or other health impairments had held more jobs, on average, than youth with orthopedic impairments; and (4) youth with LD had held more jobs than youth with mental retardation (Wagner, Newman, Cameto, & Levine, 2006).

SELF-DETERMINATION AND IMPACT ON WORK

Many of the studies of employment outcomes for adults with LD identified self-determination as an important factor in successful post-high-school adjustment—particularly as it relates to an individual's confidence and comfort level in disclosing their disability to an employer for the purpose of requesting and receiving reasonable accommodations.

In their 2003 study of 89 university graduates with LD, Madaus, Ruban, Foley and McGuire found that the independent variables of self-efficacy characteristics, along with self-regulatory strategies, were significant predictors of employment satisfaction. Parents, teachers and others often play a vital support role in the lives of children and youth with disabilities, including those with LD. As these youth transition to adulthood and postsecondary educational and employment settings, a number of key variables are associated with their ability to

request accommodations and supports. These are self-efficacy, self-advocacy, and self-determination (the ability or power to make decisions for oneself). Without this ability, adults with LD may not be able to access the help they need for instruction, testing and completing other essential tasks. Once accommodations are made, being able to self-regulate, or monitor one's progress—and seek additional supports if needed—is also an important personal compensatory strategy. Building upon their research on employment satisfaction, Madaus, Zhao and Ruban (2008) studied 500 graduates with LD from three institutions of higher education and determined that perceptions of employment self-efficacy were a much stronger predictor of overall employment satisfaction than factors such as salary and length of tenure on the job.

Price, Gerber and Mulligan (2003) examined the workplace experiences of 25 adults with LD to ascertain their knowledge and awareness of the ADA, how its provisions could benefit them and how the law might personally impact them. More than two-thirds of the sample had never heard of the ADA, and the others expressed little confidence in using it for self-advocacy purposes. Overall, they were not inclined to disclose their LD to their employers, even if they encountered difficulty on the job due to the LD; therefore, accommodations were rarely if ever implemented. One finding was quite fascinating and fundamental to this topic. More than half of the sample expressed the belief that they no longer had LD. It is a catch-22 situation. Unless an employee discloses the need for a reasonable accommodation, the employer is not obligated by law to consider providing it. By the same token, if the employee with LD needs the accommodation and does not request it, the job could be jeopardized.

Gerber and Price (2003), Price, Gerber and Mulligan (2003, 2007) and Madaus (2008) and others have identified the limited extent to which adults with LD are aware of their rights and obli-

gations under the ADA, particularly regarding their reluctance to request accommodations. Witte (2001) gathered data from 85 college graduates with LD. The resulting picture was that two-thirds of these individuals reported being poorly informed on all questions asked about the ADA. Only half of the group reported that they had received some type of information and instruction on the ADA during their time in college.

Madaus (2008) observed that 73 percent of his study respondents reported that having LD affected their job in some way; however, only 55 percent said they had disclosed their LD—and only 12 percent reported having ever requested an accommodation. Of this subgroup, 28 percent indicated that a formal accommodation request was denied. Respondents who did not self-disclose were asked to describe the reasons for this decision. The most common response was that there was no reason to or need for accommodations (61 percent), followed by a concern for negatively influencing relationships with supervisors (30 percent) or co-workers (29 percent). Twenty percent indicated that they were concerned for their job security. Four percent reported not disclosing in a current job because of problems caused by a previous disclosure. Self-disclosure is a thorny issue for many adults with LD, requiring the individual to weigh the advantages versus the risks. Feeling confident in one's ability to disclose appropriately also calls upon a high degree of self-determination. The reasons that individuals needed to self-disclose and request reasonable accommodations are less well researched and documented.

Throughout the literature, there was a resounding chorus that self-determination is a pivotal skill (both as a process and an outcome) in the successful adult adjustment of people with LD. Terms under this concept include self-acceptance, self-understanding, self-advocacy and self-disclosure. Indeed, finding help, assistance, support and accommoda-

tions hinges on the individual's ability to disclose his or her need for such. The degree to which adults with LD feel competent, confident and comfortable in making such disclosure varies from individual to individual and circumstance to circumstance. All of the *Learning to Achieve* authors, particularly Gregg, Hock and Gerber, highlight the notion that self-determination—as an umbrella concept that covers self-disclosure—is a skill that can be taught. However, Gerber cautions that self-determination for adults may require a skill set quite different from that of the adolescent. For adults with LD, requesting accommodations in postsecondary education and training settings—and on the job—can be daunting and often poses a risk. These adults must continually weigh the rewards versus the risks.

In their respective *Learning to Achieve* chapters, Gregg, Hock and Gerber (2009) each addressed the issue of self-disclosure of disability, which is essential if adults are to request a reasonable accommodation on a job, assistance from disabled student services at the college level or modified instruction from an adult basic education instructor. Self-disclosure assumes that individuals have self-determination skills and knowledge of their rights and responsibilities under appropriate laws. As depicted in figure 1, for all settings *except* high school, it is incumbent upon an individual with LD to self-disclose the desire for an accommodation. In their reviews of research on accommodation, these researchers reach the same conclusions, that adults with LD are unlikely to identify their needs for accommodations, modified instructional strategies or assistance on the job, perhaps to avoid being perceived as less than capable, carrying the stigma of special education or jeopardizing their careers.

Wehmeyer and Palmer (2003) published the results of a study of 94 youth with disabilities three years after they had exited high school to ascertain how their levels of self-determination may have impacted their adult outcomes. Although excluded from this study because LD was not separated from other disabilities, Wehmeyer and Palmer's results indicated that students who were more self-determined were more likely than those with lower self-determination attributes to achieve better outcomes across the domains of employment, access to health and other benefits, financial independence and independent living.

PERCEPTIONS ADULTS WITH LD HAVE OF THEIR DISABILITY AND IMPACT ON CAREERS

A number of studies have sought to learn more about the interpretations that adults with LD have of their own lives. In that vein, one study explored the employment-related experiences of educators with LD (Vogel, Murray, Wren, & Adelman, 2007). The researchers theorized that by having a further understanding of the personal perspectives of these educators, the field would gain important insight into the accomplishments, barriers, support needs, effective compensatory strategies and accommodations for adults with LD in other professional careers.

What do adults with LD have to say about their own experiences, through their own lenses and with their own unique voices? Dale Brown (2004, 2009) and Jonathan Mooney, author of "Learning Outside the Lines," are two highly regarded professionals who have written and spoken extensively about the lifelong challenges they continue to experience because of their learning disabilities, and the strategies they have used to overcome or lessen the effects of these barriers. Interviewing 100 young adults with LD who had attended a two-year postsecondary program designed for people with LD, Harth and Burns (2004) found the majority of graduates reported they were doing well in terms of employment. As in Brown and Mooney, these individuals recounted many stories of academic and social frustrations during their K–12 years. Several themes emerged across

these stories, including the importance of self-determination skills; career exploration; high expectations along with supports tailored to their needs; caring adults; modified instruction; a variety of options for further education, training and employment; and a feeling that they were valued as individuals who would contribute to their communities.

Christopher Lee (2005) describes his personal history in an article entitled "Evolution". As an adult, he has discovered for himself effective ways for managing his language and memory barriers through assistive technology, graphic organizers and gathering supportive people around him who understand his unique style of communicating and achieving his objectives. Of particular interest to this discussion, Lee describes how he designed a personal action plan that included customized instructions for himself in how to modify tasks and use technology to accommodate his learning styles and needs. He is a staunch advocate of assistive technology and believes that too many people with LD, at all ages, do not take full advantage of available assistive technology or simply do not know how to access and use it. (Assistive technology is defined in The Improving Access to Assistive Technology for Individuals With Disabilities Act of 2004.)

Logan (2009) theorizes that people with dyslexia may in fact have unique strengths as entrepreneurs because they are free to set up their businesses in a manner that plays to those strengths, without the restrictive expectations of standard work environments. While her initial research was conducted in Great Britain, she subsequently replicated her study on a smaller scale in the U.S., surveying 36 respondents with dyslexia who operated their own small businesses. Logan concluded that these individuals used a host of compensatory strategies, such as delegation, creativity and use of portable communication devices. These are precisely the kinds of options overlooked by many adults with dyslexia that would help them overcome a feeling of failure and attain meaningful life goals (Bergen, 2006; Tanner, 2009).

Barriers to the Job Search and Limited Access to Job Opportunities

In seeking research to address Question 1, the reviewers were particularly interested in studies identifying the specific barriers that people with LD face in their efforts to find, get and keep jobs; the extent to which they experience challenges on the job due to their LD (or others' misperceptions); and how they handled these challenges. Little information emerged from the literature.

In a paper summarizing the status of the recruitment and hiring of people with disabilities by the federal government, Domzal (2009) points to the concerns of the National Council on Disability that significant barriers to equal employment opportunities remain. Despite laws, regulations, policies and such hiring initiatives as the Schedule A exemptions (a specialized hiring authority that allows federal hiring officials to appoint qualified people with disabilities non-competitively after furnishing a certification letter documenting disability status), the number of federal employees with disabilities, including those who have disclosed their LD, is low. The report cites 10 recommendations for the Office of Personnel Management, including encouraging people with disabilities to apply for jobs through marketing campaigns, reducing the two-year probationary period for employees with disabilities under Schedule A to one year, establishing mandatory disability-related training for federal agencies and conducting an array of evaluations and surveys. None of the recommendations calls for comprehensive research, and certainly there would seem to be a need to investigate the number of adults with LD who avail themselves of Schedule A opportunities, as well as their general experiences in finding and retaining employment with the federal government.

Alston, Bell and Hampton (2002) focused their research on youth with LD and their entry into the science, technology, engineering and mathematics (STEM) occupations. They surveyed 140 parents of students with LD and 323 teachers in an effort to identify factors that may encourage or hinder entry into those courses and career paths. Parents expressed concern that teachers of these more rigorous courses will not make appropriate instructional modifications or provide essential accommodations. They also had the perception that employers would resist hiring their sons and daughters because of their LD. Finally, both the parents and teachers concurred that students with LD are simply not being encouraged to pursue these more demanding, yet rewarding courses. This study was used to demonstrate the need for early development of self-advocacy, such as educational course selection, that impacts career development and long-term employment.

SUMMARY OF FINDINGS FOR QUESTION 1.

A review of transition longitudinal and follow-up studies identified considerable discussion on intervention variables that were predictive of positive post-high-school outcomes, including postsecondary education and employment. Test and others (2009) identified 42 such variables, all of which had a positive correlation with employment. Chief among these variables was paid work experience. Several studies investigated employment rates and earnings. For example, there were indicators that in the first several years after high school exit, young adults with disabilities were earning as much if not more than their non-LD peers. One rationale for this was the fact that young adults without LD are more likely than those with LD to go directly into college after high school; youth with LD are more likely to go right to work.

Very little empirical research was identified on the direct career experiences of people with LD and their issues in setting career goals, finding further

education and training to meet these goals, navigating the job search process, negotiating terms of employment, handling job requirements and expectations, dealing with social aspects of the workplace, and striving for career advancement. Few data were available on job satisfaction. A number of studies alluded to problems people with LD faced on their jobs in terms of their need for accommodations and reluctance to request them. The researchers identified several contributing factors, such as fear of disclosing their disability to an employer (retribution, stigma, discrimination, loss of opportunity) and limited knowledge of their protections under the ADA. The researchers concurred that these issues fell under the umbrella of self-determination and self-advocacy. Ironically, in one study the employers were of the opinion that they would encourage employees with LD to disclose so their employers would have an opportunity to support them and maximize their contributions.

The personal stories from individuals with LD provide insight into their unique talents and fortitude, as well as life concerns, challenges, successes, compensatory strategies, hopes and aspirations beyond what professionals, parents, employers and the general public may perceive. The authors were unable to garner these personal insights from rigorous research; rather, they came from a handful of documents that fell into the Tier 3 and 4 categories. This would certainly suggest an area ripe for further research.

For nearly 30 years, educators in the United States, along with many other stakeholders and policymakers, have paid close attention to the question, "What is the best way to prepare school-aged children and youth with disabilities for life as adults?" This inquiry has created a veritable industry, commonly referred to as school to adult life transition. Paul Wehman has been one of the leaders of the transition movement. His textbook "Life Beyond the Classroom: Transition Strategies for Young

People with Disabilities" (2008) is now in its fourth edition. It is a resource widely used in teacher preparation programs and as a field reference guide. One chapter is devoted exclusively to youth and adults with LD. Wehman and many others have stressed the importance of gathering follow-up data on the experiences and outcomes of youth and young adults with disabilities as a way of informing transition policy and practice. It makes perfect sense that a critical outcome variable would be employment. Indeed, the literature is well stocked with reports of follow-up studies and program evaluations.

However, as Cobb and Alwell (2009) point out, few studies meet minimal standards of methodological rigor to adequately determine the efficacy of transition efforts. These researchers conducted a meta-analysis of 31 studies of transition interventions delivered across a wide variety of disabilities, using the transition framework developed by Kohler and Field (2003). Cobb and Alwell conclude that the findings of their review support the efficacy of what is identified in the framework as

student-focused planning and student development intervention in improving the transition-related outcomes for youth with disabilities. However, their own caveat should be heeded. While these findings emerged from strong and thorough program evaluations and descriptions, few are substantiated by rigorous empirical research methods. It should also be noted that many follow-up studies identified by the authors combined subjects with LD, ADHD, emotional and behavioral disabilities, and intellectual disabilities, thereby confounding the usefulness of these studies in informing policy and practice for serving people with LD.

Clearly, there are broad implications beyond this guiding question. However, these findings may be useful to adult educators as they teach their students with LD about the various laws outlined in figure 1 and their rights and responsibilities under these laws, and provide strategies for building self-determination skills so that their students can take full advantage of supports to enable them to meet their further education, training and career goals.

Findings for Question 2

What is known about the experiences of people with LD in adult education or adult education instructors' experiences, successes and needs in working with this population?

In their respective chapters, Taymans and Hock point to sources that indicate the lack of basic literacy skills is a phenomenon that affects approximately 20 to 30 percent of adults in the United States. Census data reveal that as many as 40 million adults do not have a high school credential or the equivalent. Hock uses the definition of literacy as cited in the WIA, Section 203 (12): "an individual's ability to read, write, and speak in English, compute, and solve problems, at levels of proficiency necessary to function on the job, in the family of the individual, and in society." Of these adults, 3 million participate in

diverse federally funded adult education and training programs. Adult basic education (ABE) is the most common of these programs. For those who are 16 years of age and older, adult secondary education (ASE) and GED instruction may provide options for gaining literacy as well as access to higher education and more lucrative career opportunities.

It has been estimated that up to 30 percent of adult education participants have diagnosed or undiagnosed LD. In the literature reviewed, discussions of the construct of LD revealed vastly different meanings when applied to children and youth in

K–12 than to adults. As Gerber noted in chapter 7 of *Learning to Achieve*, "There are many good examples of successful adjustment where adults with LD have achieved a good quality of life—finding their niche by focusing on their strengths and compensating for weaknesses within their individual profile." That said, the authors also identified studies indicating that a significant proportion of adults with LD struggle mightily (Gregg, 2007; Lindstrom, Doren, Metheny, Johnson and Zane, 2007; Macdonald, 2009; Rojowski, 1999; Trainor, 2007).

In this review, few empirical studies or other documents were identified from Tiers 3 and 4 that specifically addressed the experience of people with LD in adult education, or adult education instructors' experiences in working with students with LD. What emerged were studies of the challenges of identifying and assessing adults with LD who may not have been diagnosed during the K–12 years, or who may not self-disclose their disability. Like the authors of *Learning to Achieve*, this review found ample discussion in the literature about the definitions of LD and the negative ramifications of multiple definitions used by different sources. In a comparative study of six English-speaking countries, including the United States, Vogel and Holt (2003) saw similar issues and recommended that all countries included in the study adopt legislation and polices with a uniform definition and access to formal means of identifying and assessing adults with LD or specific learning disabilities (SLD) after funding or documentation of LD through educational systems is no longer available (pp. 222–223).

For reference, Appendix 3 contains definitions of LD and SLD from national-level sources.

CHALLENGES FACED BY ADULT EDUCATION STUDENTS WITH LD

In a brief to the National Governors' Association regarding service provision to welfare recipients with LD, using studies conducted in Ohio, Kansas and Washington, Brown and Ganzglass (1998) indicated that between 25 percent and 35 percent of participants in a former federal welfare-to-work program had LD. In the Washington study, more than 85 percent of the participants identified as having LD had not been previously identified by the public school system. The failure of some schools to identify LD among young girls is one explanation researchers offer for the significant number of welfare recipients with LD. In addition, this issue brief cited the entry requirements of occupational training programs as a reason for most low-academic-functioning recipients' referral to non-work-related ABE programs rather than occupational training programs that produced more positive results. Most programs did not attempt to identify the prevalence of LD in the populations they served. Consequently, many individuals referred to ABE programs did not succeed, dropped out and did not pursue further training. It is critical that enrollees with LD be identified and assessed as soon as possible so that pre- and post-employment services can be tailored to their learning needs (Brown & Ganzglass, 1998).

"Why are we still seeing them as children?" is both a rhetorical question and the subtitle of a report by Lynda and Stan (2000) in their examination of adult education and LD. The premise of their in-depth case study of three individuals is that the very underpinnings of effective adult education coincide with the practices currently held out as exemplary in the fields of K–12 education of students with LD. This includes vocational/technical training, postsecondary education and career development while always considering the unique strengths and challenges of the individual.

Alfred and Martin (2007) conducted a descriptive study of barriers to self-sufficiency among former welfare recipients in Wisconsin, in which they surveyed 69 welfare agency staff (case managers) and 41 employers. The agencies or their

contractors provided five types of educational services including soft-skills training, employment-skills training, educational programs (e.g., GED, basic literacy skills, English as a second language), financial assistance for postsecondary education (FAPSE) and mentoring programs. The study identified several barriers that hindered the target group's progress toward becoming self- sufficient. These were categorized as situational, education/ learning, personal and disability-related issues. The study referred to "learning, mental and physical" disabilities. Although there was no specific reference to LD, it is very likely a significant portion of this group did have LD, given the observations of the *Learning to Achieve* authors.

IDENTIFYING ADULT EDUCATION STUDENTS WITH LD

Common sense would tell us that before adult educators can meet the unique needs of students with LD, they have to know who those individual students are and what challenges they face. The educators also need to have the knowledge and skills to assess, teach and accommodate these students.

Documenting evidence of disability can be problematic for adult educators as well as students with LD. "Many adults with LD may have no access to school records (e.g., they attended school in another area or did not maintain records from childhood) or to resources needed for a professional diagnosis" (Patterson, 2008, p. 56). Singleton, Horne and Simmons (2009) tackle the critical question of how dyslexia can be identified in adulthood when this learning disability affects each individual so differently. Just as some adults with dyslexia have high literacy skills, others who do not have dyslexia exhibit extremely low literacy. Two issues are particularly problematic, according to these researchers. First, how to distinguish adults with dyslexia from those who have literacy challenges unrelated to LD or other cognitive factors? Second, is there an efficient

way adult educators can deliver accurate screenings? In this study, 70 adults with dyslexia and 69 without dyslexia were compared on their performance on three computer-based tests of phonological processing, lexical access and working memory that are not considered conventional measures of literacy (Singleton, Horne, & Simmons, 2009). There were significant differences between the two groups on the results of all three tests.

These researchers then developed an abbreviated version of the tests for easier and time-effective administration. Further analysis demonstrated that the combined scores from the adapted instruments significantly differentiated the two groups. This study appears to support the use of this modified assessment and screening tool by adult educators, and suggests the need for care when applying new practices and technology in identifying and assessing individuals with LD to ensure that participants' rights are not violated. It also provides one response to Lancaster and Mellard's (2005) concern that identifying LD is extremely complex, particularly in ABE settings, owing to limited personnel with the requisite skills (Brown & Ganzglass, 1998; Patterson, 2008; Sparks & Lovett, 2009).

Brown and Ganzglass (1998) developed an issue brief for the National Governors' Association that provided information on states that train caseworkers to screen clients who are suspected of having LD so that these individuals might be referred to vocational rehabilitation counselors or LD specialists for further diagnosis. The brief also emphasizes that states should understand the legal requirements for screening, transitional planning and accommodation, and how these provisions can be used to develop education and training programs, as well as promote job placement, employment retention and career advancement.

Mellard (1999) developed the Adult Learning Disabilities Screening (ALDS) battery, one of few screening measures that have been validated for this

population. In 2005, Lancaster and Mellard reported further validation of an Internet-based version of ALDS, called e-ALDS, in their study of 122 adult education participants. Applications of new technology, such as the comparison study to validate the e-ALDS, by vocational rehabilitative services or ABE, which often use different SLD definitions and criteria, are often understaffed and have limited resources to identify and assess SLD (Lancaster & Mellard, 2005).

Several studies in the reviewers' analysis concluded that differing definitions of LD and the manner in which adults with LD are identified and assessed can have a detrimental impact on postsecondary outcomes, particularly on employment and adult education, for adults with LD who were not previously identified as having LD. When defining LD, schools systems use the Individuals with Disabilities Education Act (IDEA) definition that focuses on the profile of children with LD. Rehabilitation services use a slightly different definition that focuses on needs of adult learners and workers, while postsecondary educational settings combine the definitions of the ADA with the language in section 504 of the Rehabilitation Act (Taymans, West & Sullivan, 2000). How learning disabilities are identified through assessment is the focus of the *Learning to Achieve* chapter by Swanson. From this author's interpretation of the research, the primary purpose of assessment for adults is to provide them with documentation of their LD in order to access accommodations. In addition, cognitive processing measures and verbal intelligence were seen as valid components in assessing adults with LD.

Over the years, there have been a number of attempts to address the ongoing challenges of defining LD. In 1999, 10 constituent groups were convened and charged with developing consensus statements to essentially build a framework for understanding this population. In *Learning to Achieve*, Hock described the action taken in 1992

by the Council for Learning Disabilities to update its guidelines with standards for using the term "learning disabilities" in reports and studies (2009, p. 199). These guidelines also spelled out how study participants with LD should be described. Based on the findings from his review of the literature, Hock concluded that researchers should adhere more closely to the suggested standards.

Different definitions of SLD are also applied in adult agencies such as vocational rehabilitation services or adult basic education. Most of the legal protections and provisions for adults with LD in the workplace and classroom fall under a broad definition that has been subject to many interpretations (Covington, 2004). LD is not a single disorder, but is a term that refers to a group of disorders. Yet despite a significant amount of scientific research and increased knowledge about various types of LD, there still is no commonly accepted definition of chronic learning difficulty (McCleary-Jones, 2007). In addition, identifying individuals with SLD is a complex task, particularly for adult populations (Lancaster & Mellard, 2005), especially when identifying a SLD, such as dyslexia (Macdonald, 2009), or when individuals have multiple learning disabilities (such as ADHD or emotional/behavior disorders).

ASSESSMENT, INSTRUCTION, INTERVENTION AND SUPPORT STRATEGIES

Assuming that adult educators have identified students with LD, one would logically ask whether these instructors have the skills set and resources to assess the abilities of these students, provide effective instruction, facilitate accommodations and monitor progress. Most of the literature on these topics focuses on K–12 and higher education, not adult education.

Assessment
Through their research on 311 participants in adult education programs, in which 89 (20 percent)

self-reported having a specific LD, Mellard and Patterson (2008) found data to suggest that adult educators should have at their disposal as many diagnostic or clinical teaching strategies as possible, in order to effectively serve students with SLD. The participants in this study, which took place over a 30-month period, met the following criteria. They were at least 16 years old at the time of the study, had withdrawn from high school without earning a diploma or other certificate of completion, and were considered to have low literacy based on certain measures. More than three-fourths (n = 242) of the study sample had no secondary education credential. Twenty-four participants had been employed in the prior year, and the average household income was close to the federal poverty line for a family of four. Those who did have a credential reported participating in adult education as a means for building their literacy skills in order to prepare for further education, improve their employment opportunities and for something as basic and important as helping their own children with their schoolwork.

The tools used to measure reading comprehension were the Woodcock Reading Mastery Test–Revised and the Comprehensive Adult Student Assessment System (CASAS) reading assessment, which have been found valid and reliable for assessing adult basic skills gains as required by the Adult Education and Family Literacy Act, under the WIA, and for identifying the specific learning needs of low-literate individuals (Posey, 2005). The mean reading level of respondents with SLD was third-grade equivalent, compared with fifth-grade equivalency for those without SLD. Members of the latter group were more inclined than their counterparts without LD to perceive themselves as being very limited career-wise because of low literacy. The authors suggest that instructional decisions need to be made on a case-by-case basis, just as they are for K–12 students with LD, and that a more comprehensive assessment pro-

file of academic functional skills would greatly assist adult educators in meeting the needs of this group.

Mellard and Patterson (2008) suggest that more comprehensive assessment profiles of academic skills and abilities can help instructors provide individualized instruction. They recommend a diagnostic or clinical teaching approach for learners with SLD focusing on very specific skills and considerations of the cognitive processes associated with SLD (e.g., phonemic awareness, memory and executive functioning) (p. 143). The authors also observed a phenomenon related to age. Participants who were in the age range of 46 to 55 were more likely than younger participants to identify themselves as LD. The authors postulated that the needs of learners with SLD in middle age may differ from those of young adults who had recently participated in secondary education (i.e., more explicit support for study skills, test-taking skills and computer literacy).

Intervention and Support Strategies

The theme of assisting youth with LD who face multiple life challenges, such as low socioeconomic status (SES) and history of academic failure, is well documented in the professional literature. In 2002, Schoen, Mallik and Stoll evaluated a model vocational training program for out-of-school youth who had LD, emotional and behavioral disorders, psychiatric disabilities or a combination of these. This model program, Expanding Horizons, provided a variety of services in partnership with the local community college. The services included a baseline assessment of academic functioning; GED preparation or enrollment in ABE classes with program staff monitoring and ensuring attendance and job placement services. The authors gave the program high overall ratings, citing examples of participants who had completed ABE classes and transitioned to GED preparation, earned a GED, and/or became employed. They cited a range of entry-level

jobs, hours per week (average 30) and hourly earnings that averaged just above minimum wage.

Since this evaluation looked at a program serving youth with disabilities other than or concomitant with LD, it must be considered a caveat to this review. The reason for its inclusion here is its practical implications for adult educators working with students with LD. This includes: ensuring up-to-date academic assessment data are available; students who are ready for GED instruction are encouraged and supported to take the classes; ABE students connect career exploration, job-seeking training and work experiences with functional academic work; and follow-along support services are provided.

In the Journal of Adolescent & Adult Literacy, Pannucci and Walmsley (2007) reported on their descriptive study on the literacy needs of 23 adults with LD, all of whom were living in poverty and had dropped out of high school with less than eighth-grade reading levels. They also identified a comparison group of 10 adults with LD who had experienced challenges in school, graduated from high school and now considered themselves to be successful in their careers. Through examination of the respondents' educational records and structured interviews, the authors determined that their findings supported many of the best teaching practices already commonly used in the field, such as connecting learning to the individual's interests and personal purpose for learning.

While their work pertains to college students with LD who are receiving disability support services, Lock and Layton (2008) found results that may have implications for low-literate adults with LD and those who are enrolled in ABE or job-training programs. This study investigated the relationship between grade point averages and active attendance and participation in formal, individualized tutoring sessions for 530 students with LD. In essence, the authors substantiated their theory that students with LD who actively used individualized tutoring

along with other supplementary support services were more likely to demonstrate higher academic achievement that their counterparts. It would seem reasonable that some version of this intervention might positively impact the outcomes for adults with LD who demonstrate low literacy, and would merit further study. Tutoring for low-literate adults is one of four recommendations Brown and Ganzglass (1998) offer to adult educators.

Accommodations

Learning to Achieve highlights the issue of accommodations as central to the discussion of how to best serve adults with LD. In figure 1, this review emphasizes that in all adult settings it is incumbent upon the individual to self-disclose his or her LD in order to request accommodations or to take full advantage of available resources and support services. Herein lies the conundrum. Many adults with LD who received K–12 special education services are very reluctant to continue to carry what they perceive as the stigma of LD after they leave high school. For other adults, who may have had a history of school struggle and failure, the issue may be one of never having been diagnosed with LD. The issue of accommodation is complex. It encompasses assessment/screening to identify LD, self-determination, or having the self-awareness, the confidence and courage to seek and obtain help, access to and training in use of assistive technology, modifications to curricula and instruction, knowledge of rights and responsibilities under the law (e.g., ADA, the Rehabilitation Act, WIA), and performance evaluation.

In her introduction to *Learning to Achieve*, Taymans concludes that there is a research base on accommodations for assessment and instructional purposes that appear effective for helping adults with LD. However, many accommodation strategies frequently cited in the literature do not have an empirical evidence base, notwithstanding

their status as promising practices. Swanson finds that research on instruction for adults with LD is thin at best. Of those studies, few would be considered experimental and none would meet the standard established by the What Works Clearing House (U.S. Department of Education, Institute of Education Science/National Center for Education Evaluation and Regional Assistance).

When the authors of *Learning to Achieve* discuss the literature on accommodations, they frequently refer to "instructional strategies", suggesting that the manner and mode in which instruction is delivered for adults with LD are themselves accommodations. In other words, it may be difficult to separate accommodation from instruction for this population. The literature is replete with non-evidence-based materials and resources, widely used by practitioners for teaching people with LD. Through their respective literature searches, Swanson, Gregg and Hock identified numerous instructional strategies and accommodations. But again, reports of the effectiveness of these strategies are anecdotal in nature, promulgated by professional development programs and practitioner networks rather than empirical study. These strategies included the use of technology (Gregg); problem-solving integrated with schema training or graphic organizers; and self-regulation and strategic learning techniques (Hock), among others. Regarding literature on technology-based strategies, Gregg states that availability is less problematic than the issue of too many individuals with LD who receive inadequate training in how to use these strategies.

One instructional strategy that is regarded as highly effective, albeit controversial in some professional circles, is extended time (or elimination of the time requirement) for people with LD to complete specific tasks or assignments. This strategy can be applied to education, training and work settings. Nowhere is it debated more hotly than in the area of test accommodations (Gregg, 2007; Lindstrom &

Tuckwiller, 2008; Ofiesh & Bisagno, 2008), usually as it relates to high-stakes mandatory testing under No Child Left Behind and the Individuals with Disabilities Education Improvement Act, but also with regard to higher education entrance examinations and course performance evaluation. It remains to be seen if this issue is less controversial in the area of the GED coursework and evaluation, or when it comes to adults with LD who fall in the low-literacy category and participate in the most basic adult education and job-training programs.

Lesaux, Pearson and Siegel (2006) investigated the effects of timed and untimed testing conditions on the reading comprehension performance of 64 adults, 22 of whom had a clinical diagnosis of reading disability. Forty-two participants had normal reading abilities and served as the comparison group. Taking a reading comprehension test under both timed and untimed conditions, significant differences emerged. The comparison group performed the same under timed and untimed conditions, whereas the participants with reading disabilities all performed better under untimed conditions. The authors suggest that this bolsters the argument in support of extra time (or untimed tasks) as a legitimate and appropriate accommodation for adults with reading disabilities.

Learning to Achieve also covered the concept of universal design. This review found another study that provides strong support for universal design for instruction (UDI). Burgstahler and Moore (2009) conducted a research study with 13 focus groups with a total of 53 post-secondary students with disabilities and 14 focus groups with a total of 72 personnel from student service offices on campuses nationwide that identified access problems encountered by students with disabilities. Participants in focus groups identified a need to increase staff comfort level in working with students who have disabilities as well as to increase staff knowledge and skills regarding disabilities, especially "invisible"

disabilities that are not disclosed by service users; communication and accommodation strategies; rights and responsibilities; campus resources; and issues unique to specific offices.

In a 2009 classroom guide, Burgstahler suggests eight examples of how teachers can apply UDI. They can adopt inclusive practices. These include: inviting students through a syllabus statement to discuss disability-related accommodations and other special learning needs; encouraging regular and effective interactions between students and the instructor; ensuring that communication methods are accessible to all; ensuring that facilities, activities, materials and equipment are physically accessible; using multiple, accessible instructional methods; allowing students to choose from multiple options for learning such as lectures, collaborative learning options, hands-on activities, Internet-based communication, educational software or fieldwork; ensuring that course materials, notes and other information resources are engaging, flexible and accessible for all students; early access to a syllabus to enable students the option of advance reading and working on assignments before the course begins or to allow time to arrange for alternate formats, such as audio books; providing specific feedback on a regular basis; regularly assessing student progress using multiple accessible methods and tools, and adjust instruction accordingly; and planning accommodations for students whose needs are not met by the standard instructional design (pp. 2–3).

Educators need instructional materials, techniques and strategies flexible enough to meet a diverse range of learning needs. In the issue brief "Unleashing the Power of Innovation for Assistive Technology," published by the National Center for Technology Innovation (NCTI), universally designed learning (UDL) is described as providing "a blueprint for creating flexible goals, methods, materials, and assessments that accommodate learner differences. The term 'universal' does

not imply a single optimal solution for everyone. Instead, it is meant to underscore the need for multiple, customizable approaches to meet the needs of diverse learners" (2009, p. 1).

Private industry has been a leader in the research and development of universal design (UD) products for computers and other types of technology that lend themselves to the UDL environment (Center for Applied Special Technology, retrieved January 5, 2010; Center for Universal Design, retrieved January 5, 2010; Jana, 2009). Adult educators should not only consider applying UDL in instruction and support strategies, but also helping to transfer its use to employment settings to improve employment outcomes of youth and adults with LD.

In "Underserved and Unprepared: Postsecondary Learning Disabilities," Noel Gregg concludes that "Creating universally designed learning environments (UDL) will be central to any discussion of accommodating learning environments for adolescents and adults with LD" (p. 226). Gregg also observed, "UDL extends universal design from a physical space to a pedagogical space (Gregg & Lindstrom, in press).

AWARENESS, ACCESS, AND USE OF ASSISTIVE TECHNOLOGY IN AE AND WORKPLACE

The lack of awareness of assistive technology (AT) by adults with LD, and the lack of knowledge in how to use it, is echoed in *Learning to Achieve* and the work of Burgstahler and Moore at the University of Washington (2009), who identifies numerous ways that AT can be used for youth and adults with LD, and by Okolo and Bouck (2007), who reviewed 122 articles that met certain inclusion criteria for research-based publications about AT as it applies to an array of learners in diverse settings. Capacity building and multidisciplinary partnerships for collaborative research were among the top priorities identified in the studies,

followed by improved staff development on the iden-
tification, access and uses of AT. Okolo and Bouck
make an intriguing observation about the potential
uses of emerging technologies such as gaming, and
the extended possibilities of mobile devices such as
cell phones and personal digital assistants, noting that,
to their knowledge, no empirical studies have been
conducted to date. The self-advocate Christopher Lee
puts forth the theory that as we learn more about how
the brain works, the education system will undergo a
paradigm shift and become better at listening to what
people with LD have to say about their experiences
and needs, which in turn will influence how educa-
tors meet those needs (2005).

SUMMARY OF FINDINGS FOR QUESTION 2.

By some estimates, as many as 40 million adults in
the United States lack functional literacy skills, and
many of these people lack a high school diploma or
its equivalent. A subset of that group, approximately
3 million, participates in federally funded adult
education and training programs. There have been
findings that as many as 35 percent of these partici-
pants have diagnosed or undiagnosed LD (Mellard
& Patterson, 2008). This raises the question, "What
do we know about the experiences of adults with
LD in adult education and those of the educators
who serve them?" This review identified no rigor-
ous empirical research on the subject and little in
the way of other published research and evaluation
activities to answer this question.

From the literature identified and reviewed, it seems
that a significant barrier for adult educators may be
that they do not know which of their students has LD.
First of all, there are different operational definitions of
LD in various federal statutes that may be confusing to
administrators and instructors in adult education and
training programs. Second, there seems to be difficulty
in identifying adult education students who have LD,
because of problems with implementing screening
and assessment processes, and even disclosure issues.
Without proper identification of students with LD
and their specific needs, it becomes extremely chal-
lenging for adult educators to meet instructional needs.
Assuming that adult educators were aware of students
with LD and their unique needs, a number of studies
looked at methods for assessing, teaching, supporting,
accommodating and monitoring the learning prog-
ress of students with LD. While extensive evidence-
based practices and resources are available at the K–12
and higher education levels that might be effectively
applied to adult education and training settings, to date
there are few studies of what may or may not be hap-
pening for students with LD in adult education.

This review found several studies on the use of
assistive technology by people with LD in educa-
tion and the workplace. However, these studies were
conducted within higher education settings. Whether
these findings are applicable to adult education
remains to be seen through research. The same holds
true for the concept and practice of universal design
and assistive technology, both of which have been well
documented in settings other than adult education.

Findings for Question 3

What evidence-based practices used by adult educators in the workplace can be adapted for use by non-workplace adult educators that impact work readiness and workplace skills for both young adults during transition from school-to-work, as well as for adults with LD preparing for entry into or already in the workplace?

Using the search and selection methods described earlier, the reviewers were able to find only one document, research or otherwise, that addressed this specific question. This may have been because the review had a tight focus on adult basic education programs, courses or training sessions that were *provided "in house" by companies.*

Alfred and Martin (2007) interviewed 41 Wisconsin employers and found that approximately 90 percent of these companies offered or provided basic employment skills training to their employees and 75 percent provided varying levels of support to their workers to enable them to attend postsecondary education programs on or off the worksite. The majority of business representatives who participated in this study perceived these combined efforts as extremely effective in helping low-income workers further develop their skill sets. In addition, employers identified a number of counseling and support initiatives their companies provide. The most frequently used service was counseling for substance abuse. Twenty-five percent of the respondents offered transportation assistance. When asked to describe and evaluate the services they received from welfare agency partners, half of those surveyed said they used the agency for recruitment and placement assistance (48 percent), and approximately 25 percent reported participating in training and mentoring (provided by the agency partner) on how to accommodate and support these workers; they cited mentoring as a valuable resource, as well as help in conducting needs assessments of the target group.

While this study was not LD-specific, what was relevant to this review was the fact that employers, in identifying negative impacts on their businesses, were significantly more likely to be concerned about low literacy and lack of interpersonal skills and motivation than about disability. In sharp contrast, half of the partner agency staff felt that disability was a significant barrier. Training programs such as those offered by Job Corps and TANF aim to prepare individuals for specific occupational areas or to give them a step up to higher education. From this study it would seem that forward-thinking employers, recognizing the value of employees having solid basic skills, offer their employees workplace literacy programs within the context of workplace demands. This area appears to have potential for larger scale, robust research focused on adults with LD.

If the search had been broadened to include organizations that contract with employers to provide adult education, or to employer staff development and training programs that cannot be considered ABE, more literature may have been identified. That said, although confident that the review's initial search terms, which yielded a pool of 1,606 documents, would have captured a few relevant studies, this was not the case.

Findings for Question 4

To what extent does the empirical research provide guidance to adult service providers working with adults with learning disabilities whose services focus on employment, preparation and support?

It is not uncommon for adult basic educators, who focus on essential academic and remedial subjects, to also be called upon to provide basic instruction in other functional life skills such as developing resumes, completing job applications, preparing for interviews, handling follow-up correspondence, communicating clearly with employer contacts and so forth. Overlaid on these demands are the unique needs of learners with LD. The reviewers set out to see if any empirical research had been conducted on which to provide evidence-based information and resources to those professionals. While a very small sample of documents was analyzed, their findings lend themselves to implications for adult educators and employment specialists providing career-related services to students with LD. These services include career assessment and exploration, job search skill training, placement in work experience/jobs and supports (Luecking, 2009).

GENERAL CAREER DEVELOPMENT

In 2008, Scanlon and others published a study of the post-high-school aspirations of urban adolescents with disabilities. The respondents were 39 ninth-grade students, 22 of whom were identified as LD and were served by special education. Students were asked questions concerning their career goals and perceived barriers to achieving those goals. Among the findings: youth without LD were more likely to identify their desired career fields than their peers with LD, who tended to be vague or very general in their responses. The latter group was more likely to report their desire to work, but without specifying an occupation. Regarding barriers encountered by youth with LD in this study, several findings stood

out for the researchers: (1) none of the youth with LD perceived their disability as a barrier; (2) they were less likely than their non-LD peers to identify dropping out and bad influences as a barrier; (3) the barrier with the most responses from both groups of students was school, with issues ranging from their own poor performance—academic and behavioral—to interactions with teachers and high-stakes testing; and (4) the majority of youth in both groups appeared well grounded in their aspirations for adult life—that is, they expressed interest in possibly pursuing a range of viable career fields rather than simply saying they wanted to become famous or own expensive things (Scanlon et al., 2008). These researchers suggested that schools can play a substantial role in helping urban youth with LD to raise their career expectations by facilitating early planning and career exploration. This was similar to the conclusions reached by Tomblin and Haring in their 1999 case study of three students with LD, who reported having a number of employment problems due in part to their lack of preparation, planning and support while in school.

The roles families play in the long-term career development of adults with LD was the focus of a study by Lindstrom, Doren, Metheny, Johnson and Zane (2007). The authors used a multiple-method qualitative case study design to examine how the independent variables of family structure and process might impact career development and employment outcomes of 13 young adults with LD, ranging in age from 21 to 27. Subjects from low socioeconomic status families indicated that the family expected them to contribute financially to the essential household expenses; several had been working as early as age 14. What surprised the

researchers was a counterintuitive finding, namely that family financial instability seemed to encourage these young adults to aspire to higher-level career goals than their parents. There were indications that the young women from low-SES families were expected to assume caretaker roles with younger siblings and other relatives. Their families, while encouraging them to do their best, did not expect them to attend college. These findings may be useful to adult educators. For example, they may encourage them to recognize that their students with LD, like any other students, come from diverse backgrounds and may in fact have higher aspirations than one might expect. Setting a tone of high expectation for adult learners with LD, especially those who have a history of poor academic performance or literacy, may be a powerful tool and intervention.

From the research, there appears to be consensus that women are more likely than men to have lower career expectations for themselves, to earn less money for the same kind and level of work, and to be the primary support for their children. Lindstrom and Benz (2002) conducted retrospective case studies of six successful young women with LD who had graduated from high school and subsequently entered the workforce. While in high school, each of these women had participated in career planning and transition services. Several key elements appeared to favorably influence their career development process: all had an array of training options available to them, positive career guidance and the ability to identify their strengths and abilities that matched particular occupations.

CAREER ASSESSMENT, INSTRUCTION AND SUPPORT STRATEGIES

Having the knowledge, skills and tools to assess the career interests and aptitudes of adult learners with LD, particularly those with low literacy, is a valu-

able asset for adult educators who play a role in the career development of their students. In addition to adult educators having the right tools, including career assessment instruments, participants must be adequately prepared to take them (e.g., Why should I do this? Why is it important?), instruments must be appropriately administered (e.g., ensuring that participants can read the vocabulary and are marking the answers correctly) and the assessment results must be appropriately interpreted to the participant.

In a search on literature pertaining to vocational or career assessment, one would be inundated by hundreds of tools, resources and data. The terrain is extremely wide and diverse. Adult educators are not likely to have the time to review and digest this information, much less apply it. What these practitioners seek are proven strategies and ready-to-go instruments. This was the impetus behind Dipeolu's research article, "Career Instruments and High School Students with Learning Disabilities: Support for the Utility of Three Vocational Measures" (2007). It was the author's intent to do a preliminary check on the reliability and validity of using three well-known career decision-making measures, including the Career Maturity Inventory, for high school students with LD. Eighty-six youth participated in the study, which revealed correlations between each measure in the predicted directions. Modest evidence for construct validity was found, and reliability ranged from 0.5 to 0.06. The researcher suggests that instruments such as Career Maturity Inventory can be useful across a wide group of students with LD, including lower-academic–functioning individuals. Perhaps adult educators working with post–high–school age and older adults could readily use these tools.

Within the broad category of LD, there are of course individuals who find themselves in other life experience categories, such as homelessness, victims of domestic abuse, drug addiction and so forth. Unruh and Bullis (2005) studied 72 females and 276

males with various disabilities, the largest category being LD, who had been incarcerated in juvenile facilities in Oregon. The purpose of their research was to investigate how youth from these detention centers re-entered their communities. While this study did not examine the impact of societal barriers related to gender or previous incarceration, they cannot be discounted as a factor in transition outcomes. Using logistic regression, the authors identified four barrier variables more likely to describe female offenders: (1) a history of running away from home or previous residential placements, (2) a history of suicide risk, (3) prior abuse or neglect and (4) parenting responsibilities. The barrier variables more likely to be associated with the males were (1) a specific learning disability, (b) Attention Deficit Disorder/Attention Hyperactive Disorder (ADD/ADHD), (3) grade retention in public school and (4) an inability to maintain employment.

It is quite common knowledge many life variables can influence the experiences and outcomes of adults with LD, including gender, poverty, race, culture, age and interaction with the justice system (Alfred & Martin, 2007; Lindstrom & Benz, 2002; Patterson, 2008; Trainor, 2007; Vogel & Holt, 2003; Unruh & Bullis, 2005). Effective adult educators are cognizant of and sensitive to the unique needs of their students. Gregg noted, "Sensitivity to the spectrum of ability, gender, ethnic/minority status, and SES represented by the population with LD is also critical to the effectiveness of future transitional models" (2007, p. 225).

The issue of minority status and its association with vocational rehabilitation outcomes for African American adults was the focus of a study by Dunham and others (1998). They identified 119 African American adults with SLD who had entered the vocational rehabilitation system in Missouri. Through document review and analysis, data revealed that the participants in the study were significantly underrepresented among vocational rehabilitation clients. Sixty-two of these clients (52 percent) had successfully secured jobs and retained them for at least 60 days. Fifty-seven (48 percent) were designated as "closed unsuccessfully." The primary reasons for dismissal fell into two categories: "refused further services" or "failure to cooperate." The authors recommend that educators and service providers recognize that cultural differences and perceptions of trust are important motivators of behavior for this population In addition, a significant proportion of African American clients applying for services because of an SLD will have (on average) lower average intellectual abilities (particularly verbal abilities) and significant academic deficits, and training options should be evaluated for available support services (e.g., mentoring) and access to accommodations.

EMPLOYER PARTNERSHIPS

No empirical studies on employers' direct experiences recruiting or working with employees with LD was identified. However, there was some research on employer partnerships with educators. In their 2002 survey of 190 randomly selected Indiana employers, Greenan, Wu and Black found that the majority of employers surveyed expressed a willingness to hire applicants with disabilities, and those who had hired people with disabilities were very satisfied with their performance. Findings from this study that may be pertinent to adult educators and others included (1) improving communication and collaboration among agencies, personnel and resources important to employment transition, such as satisfying assistive technology and equipment needs; (2) considering business and industry recommendations to improve job preparation in vocational programs; (3) integrating appropriate curriculum and instruction to improve job-related skills and motivation for work; and (4) utilizing disability professionals at the university level to provide industry and business with professional training concerning strategies for supervising employees with disabilities.

Gilbride, Mitus, Coughlin and Scott (2007) studied models of collaboration with five stages: coexistence, communication, cooperation, coordination and collaboration. Based on this model, they developed the Consortium for Employment Success (CES) model subsequently piloted in two cities. One of the programs includes career development and job placement activities for people with a range of disabilities that can include LD. Partners within the CES include job placement and employment services professionals who have voluntarily agreed to enter into a structured consortium of employer partners for the purpose of enhancing job opportunities and retention of employees with disabilities. Rather than the more commonly used networking concept, CES partners share resources and a centralized, contractual arrangement through which members work together at an operational level. The authors conclude that most local rehabilitation providers are at the communication stage, characterized by increased understanding and level of sharing, but without a defined mission or plan. Part of their goal is to reach a level of collaboration where decisions and activities of the CES partnership directly influence how service delivery is carried out in their respective agencies.

In an earlier document, Gilbride, Stensrud, Vandergoot and Golden (2003) found that many employers welcomed effective support in meeting their personnel needs and dealing with disability-related issues. Furthermore, employers who received ongoing support and assistance from rehabilitation professionals believed that it increased their ability to successfully hire and accommodate people with disabilities. Gilbride and others (2007) point to research conducted by Millington, Miller, Asner-Self and Linkowski (2003), who asserted that rehabilitation counselors must improve their ability to understand employers' needs and more clearly recognize how employers manage their personnel systems. This finding would seem as applicable to adult educators

as to nonprofit professionals providing career development services. They concluded that rehabilitation counselors must develop the skills necessary to partner with employers during the entire personnel process, and not just focus on the specific hiring event.

The need to provide early work experiences as part of the transition experience was covered thoroughly in *Learning to Achieve*, and additional studies were identified during this literature review, such as the study by Carter and others (2009) of 135 chamber of commerce employers that advocate school-employer partnerships to expand career development and early work experiences of youth with LD. In a 1999 study, Rojewski investigated the experiences of 441 young adults with LD, compared with the experiences of 10,737 young adults without disabilities. The results suggested that the LD group was more likely to report lower graduation rates and to be employed right out of high school rather than attending postsecondary institutions. Their expressed career aspirations were characterized as low prestige in nature; that is, they tended to identify job opportunities that are not likely to lead to career advancement. These jobs require basic skill sets and are likely to be part-time, paying little better than minimum wage.

Lessons emerge from such findings. For example, young adults with LD, particularly those with low literacy, can benefit from career exploration activities, mentoring and encouragement to set high expectations for themselves and to further develop self-determination skills, including goal setting, identifying their positive attributes and knowing how to access support beyond what their families provide. Often, individuals with multiple barriers will benefit from supported or customized employment approaches (Luecking, Cuozzo, & Buchanan, 2006; Luecking, Fabian, & Tilson, 2004; Nicholas, Luecking, & Martin Luecking, 2006).

For youth with disabilities, early work experiences while still in high school have been shown

to be associated with improved transition outcomes (Carter et al., 2009; Luecking, 2009; Test et al., 2009). As described earlier, Carter and associates, responding to concerns from transition personnel that it was prohibitively difficult to locate and engage employers as community partners, surveyed 135 chambers of commerce and other employer networks. They investigated employers' previous experiences partnering with local high schools. The majority of employer respondents had limited prior involvement with school–work programs, although they viewed the idea of such partnerships favorably. Further research into interventions that lead to strong employer partnerships and beneficial work experiences for people with LD would be a valuable contribution to the knowledge base. For adult educators, knowing how to establish collaborative relationships with employers would greatly enhance their effectiveness in supporting their students in pursuing their employment goals.

SUMMARY OF FINDINGS FOR QUESTION 4

The findings for Question 4 fell into several topic areas: general career development; career assessment, instruction and support strategies; and employer partnerships. Most studies focused on adolescents (transitioning youth) rather than adults. However, they are included in this review in order to raise the possibility that the findings could generalize to the adult population or could generate ideas for further research. In searching for evidence–based practices

that adult educators could use to assist their students in career preparation, several emerged as important:

- Career exploration, including work experience
- Raised expectations, along with encouragement and support
- Recognition of the many other life challenges that people with LD may face, in addition to their disability (including issues related to socioeconomic status, gender, race and ethnicity; other concomitant disabilities, and circumstantial issues such as incarceration, substance abuse and limited opportunities.)
- Employer interest in partnerships (reflecting their concern about the negative impacts of low literacy and desire to help cultivate productive workers; their perceptions of what constitutes effective versus ineffective collaborations with education and human services)

Only two research items in this review addressed career assessment, although there is an extensive body of literature on this topic. This was likely due to the fact that the reviewers did not use "vocational or career assessment" as a search term. The reviewers purposely used the term "career development and adults with LD" because it directly addressed the guiding question. Clearly, career assessment needs to be considered a critical part of the adult education and training equation, and this review may encourage further research.

Chapter 4
Discussion, Conclusions and Recommendations

Part IV, presented an overview of the findings from this literature review. A summary of the findings may be found in Table 2. A number of themes are described below, synthesizing the results from the 57 targeted studies. Related to each theme are specific practice recommendations for adult educators working with individuals with LD. The final two sections present recommendations for future research and conclusions.

Theme 1
Facilitate the Development of Self-Determination Skills

Literature on self-determination is bursting at the seams. While credit must be given to the intensity of effort in understanding and documenting this concept, most of what is known about helping people develop self-determination skills is not derived from rigorous experimental or quasi-experimental research. Professionals such as Wehmeyer and associates (2003) have dedicated much of their attention to the construct of self-determination, how it impacts independent and autonomous functioning and how individuals acquire and apply self-determination skills.

Practice Recommendation

- Help young adults and adults with LD develop or build upon existing self-advocacy, self-determination and self-regulatory skills, and apply them in classroom and community settings (Benz et al., 2000; Gerber, 2002; Macdonald, 2009; Madaus et al., 2003, 2008; ; Pannucci & Walmsley, 2007; Price et al., 2003; Scanlon & Mellard, 2002; Scanlon et al., 2008; Vogel & Holt, 2003).

Theme 2
Build Capacity of Adult Educators to Serve Students with LD

Little is known through empirical research about the experiences of adults with LD in adult education and those of the educators who serve them. Many adult education professionals lack a sufficient understanding of LD, how to identify students who may have unique needs because of LD, how to assess their needs, provide modi-fied instruction and accommodations, or monitor learning progress.

Practice Recommendations

- Provide individualized instruction and support that connect learning to the adults' interests, strengths, needs, goals and purpose for learning

(Burgstahler, 2009; Dunham et al., 1998; Gregg, 2007; Luecking et al., 2004; Mellard & Patterson, 2008; Pannucci & Walmsley, 2007; Patterson, 2008; Scanlon et al., 2008).

- Conduct easy-to-administer, time and cost efficient yet valid screening to identify LD among out-of-school adults, and link them to other community-based screening services, as needed, adhering to legal requirements such as licensure, credentialing and confidentiality (Brown & Ganzglass, 1998; Lancaster & Mellard, 2005; Mellard, 1999; Mellard & Patterson, 2008; Vogel & Holt, 2003).

- Access training and continuing education on the types of validated screening and assessment tools, how to use them, how to apply the results and how to ensure understanding of the related legal requirements (Brown & Ganzglass, 1998; Lancaster & Mellard, 2005; Mellard, 1999).

- Provide accommodations, such as extra time during test examinations, to help adults with LD begin to compensate for reading and other education and employment barriers related to their LD (Gregg, 2009; Lindstrom & Tuckwiller, 2008; Ofiesh & Bisagno, 2008; Patterson, 2008; Lesaux et al., 2006; Vogel & Holt, 2003).

- Access training, continuing education and nationally based resources (e.g., U.S. Department of Labor's Job Accommodation Network or Disability and Business Technical Assistance Centers) to increase capacity to provide meaningful and accommodated instruction and support to students with LD (Patterson, 2008).

- Link adults with LD to community resources that can help them address non-disability-related issues, such as childcare and transportation, which may impact their successful participation in adult education and employment (Alfred & Martin, 2007).

Theme 3
Facilitate Accommodations to Meet Unique Needs

Identifying, accessing and implementing effective accommodations in education, workplace and other settings are critical if adults with LD are to address their specific and unique needs. The use of assistive technology, as well as the concept and practice of universal design in adult education and training, and the workplace, holds great promise for people with LD. In this review, several studies on the use of assistive technology and UDI were identified; however, these studies were conducted within higher education settings.

Practice Recommendations
- Help young adults and adults with LD identify and use compensatory strategies such as assistive technology, mentors and tutors (Alfred & Martin, 2007; Burgstahler, 2009; Dunham et al., 1998; Gerber, 2002; Lock & Layton, 2008; Macdonald, 2009; Okolo & Bouck, 2007; Pannucci & Walmsley, 2007; Scanlon & Mellard, 2002; Scanlon et al., 2008; Vogel & Holt, 2003).

- Participate in training on assistive technology and universal design (Burgstahler, 2009; Okolo & Bouck, 2007).

Theme 4

Incorporate Career Development Activities in Adult Education

Only two research documents in this review addressed career assessment, although there is an extensive body of literature on this topic. This was likely due to the fact that "vocational or career assessment" was not used as a search term. Instead, the term "career development and adults with LD" was purposely used to directly address the guiding question. Clearly, career assessment needs to be considered a critical part of the adult education and training equation, and this review may encourage further research.

Practice Recommendations

- Provide career development activities, including the use of validated career assessment instruments, ensuring that the instruments are appropriately administered and making sure that the results are appropriately interpreted to the participant (Benz, Lindstrom, & Yovanoff, 2000; Carter et al., 2009; Dipeolu, 2007; Lindstrom & Benz, 2002; Lindstrom et al., 2007; Rojewski, 1999; Scanlon et al., 2008; Scanlon & Mellard, 2002; Trainor, 2007).

- Build career-related activities into academic programming, both within and outside the classroom (Greenan et al., 2002; Luecking, 2009).

Theme 5

Establish Collaborative Ventures with Employers

Numerous studies have found that work experience, when paired with academic instruction, is a strong predictor of successful employment outcomes. Much has been written about work experiences for transition-age youth and young adults in higher education. However, little empirical research is available on how and the extent to which such experiences are incorporated into the adult education and training settings.

Practice Recommendations

- Expand and improve collaboration and partnerships with business and industry to create "integrated learning" programs that develop literacy skills as well as work-related skills and further partner with ABE and employer staff that provide workplace training (Alfred & Martin, 2007; Gregg, 2007).

- Provide direct services (counseling, consultation, information and referrals) to adults with LD and to employers to increase awareness related to hiring and resolving disability-related work issues. Such services include the application and use of assistive technology in workplace training and communications to maximize the employees' skills, level of productivity and personal job satisfaction (Gilbride et al., 2007; Stensrud, 2007; Vogel & Holt, 2003).

- Expand the involvement of business and industry, and employer networks in providing career development and job placement for adults with LD participating in or exiting adult education, including work experiences (Alfred & Martin, 2007; Baer et al., 2003; Carter et al., 2009; Greenan et al., 2002; Lindstrom & Benz, 2002; Luecking, 2009; Rojewski, 1999; Vogel & Holt, 2003).

Theme 6
Acknowledge the Unique Perspectives and Influence of People with LD

People with LD have many personal stories to tell, but these stories are not being gathered and widely disseminated. As with other groups, professionals often overlook (inadvertently or otherwise) the ideas and contributions these individuals can make to the field in terms of education and services. Their opinions and insights should be sought in the development of modified instruction, identification of effective accommodations, enactment of legislation and policy, input into research agendas and many other aspects of education, training and employment. When people with LD assume leadership roles and positions of influence, the field will see firsthand examples of self-determination. Equally important, perspectives "from the inside" will enrich the field.

Research Recommendations

Based on the findings of this review and subsequent emergent themes, the following recommendations have been developed for further research.

Research Recommendation #1
Improve scientific rigor of research on adults with LD.

In a well-regarded meta-analysis of 13 post-special-education follow-up studies, Levine and Nourse (1998) cautioned that tracking employment rates alone was insufficient and called for gathering data on salary levels, benefits received, number of working hours and types of jobs obtained initially and subsequently. From their perspective, the field also needed to document promotion opportunities of adults with LD and their levels of satisfaction with their careers. Levine and Nourse also noted methodological problems inherent in many of the follow-up studies: (1) aggregating data across disability categories; (2) combining data on graduates who have been out of school for unequal periods of time; (3) ignoring the issue of missing data (subject attrition and incomplete data sets); (4) combining data from different informants; and (5) using nonequivalent databases to make comparisons to a population with no disabilities.

There is an increasing national debate over the need to apply the same scientifically based research (SBR) used in medical and other scientific fields to inform the field of education (Dimsdale & Kutner, 2004; Odum et al., 2005). Federally supported adult education and literacy research activities are increasingly emphasizing experimental studies, and statutes such as the No Child Left Behind Act emphasize the importance of experimental research to identify educational programs that have demonstrated their effectiveness. Additionally, research in the area of adult education and employment for adults with LD should adhere to standards set forth by the Council for Learning Disabilities Research Committee (1993).

Using generic terms like "mild" or "high incidence" confounds efforts to move the field forward in terms of improving post-high-school outcomes, including employment for people with LD. The same is true for studies combining co-morbidity, such as LD and ADHD or psychiatric disorders, unless rigor is applied to adhering to national standards for methodology, definition, and reporting

findings. While some identified studies segregated data across disability categories in part of their findings, often findings and recommendations were made for people with disabilities in general, or for a combination of disabilities included in the study.

Research Recommendation #2
Involve Business and Industry in Research Efforts.

Recruit employers to participate in, and possibly help with funding of, research for employment-related issues for adults with LD such as the study by Greenan and others (2002) and Alfred and Martin (2007). There are global corporations that hold great potential access to large and diverse sample populations of workers with LD (Levine & Norse, 1998). In addition, partnerships with industry-related organizations like the Society for Human Resource Management, or studies examined for this literature review that partnered with chambers of commerce (Carter et al., 2009), and the Small Business Administration (Ruggeri-Stevens & Goodwin, 2007) provide great potential for research partnerships.

Norse and Levine (1998) recommend that future research include specific employment data regarding salary levels, number of working hours, types of benefits provided and by whom, types of jobs obtained initially and over time, promotion opportunities and level of satisfaction. Lindstrom, Metheny, Johnson and Zane (2007) call for a longitudinal design, which would allow for the investigation of job stability, career advancement and changes in employment outcomes over time.

Research Recommendation #3
Expand research on assistive technology in education and employment settings.

Employers might also be involved in further research around developing and testing assistive technology

in the field, including during the transition from adult education or other postsecondary settings to employment settings for training, supervision and other forms of compensatory strategies. In a recent online edition of Wired magazine, author Brian Chen reports that Abilene Christian University has just finished the first year of a pilot program in which 1,000 freshman students each received a free iPhone or iPod Touch, types of "always connected" devices also referred to as "smart phones," to gauge their impact on the classroom (Chen, 2009).

Of particular interest to young adults and adults with LD for future research is how the technology is incorporated differently into the curriculum. For example, some instructors project the discussion questions onscreen in a PowerPoint presentation, then poll students with software that Abilene coded for the iPhone. Students can answer the questions anonymously or tap a button to ask a question if they do not understand, which relieves them of social pressures to appear intelligent in front of their peers. The software can also quickly quiz students to gauge comprehension. This pilot program lends itself to the type of research called for by Okolo and Bouck (2007) on the design and efficacy of assistive technology, impact of specific types of technology-based applications for improving literacy outcomes for students with mild disabilities, studies of emerging technologies such as gaming or mobile technologies (e.g., cell phones) and improved teacher education and professional development (Chen, 2009).

Additional examples of the use of assistive technology with implications for future research include distance coaching (Rock et al., 2009) and curriculum-based virtual field trips as a tool for career development (Elleven, Wircenski, & Nimon, 2006). Documents related to the expanding use of online and distance learning by adults using computers, Web-based sources, and handheld devices were also reviewed, including a paper presented at the American Educational Research Association

promoting connections between academic and workplace learning using information and communication technologies (Brown, 2009; Burgstahler, 2009); use of assistive technology as a model for classroom instruction (Morrison, 2007); and issues related to adult online learners (Cercone, 2008; Donavant, 2009; Ke & Xie, 2009; Park & Choi, 2009; Seale, 2007; Snyder, 2009).

Research Recommendation #4
Conduct further research on life variables that can impact AE and employment.

Many life variables can influence the educational and employment experiences and outcomes of adults with LD, including gender, poverty, race, culture and age. Specific recommendations for future research on learner characteristics and life variables called for by the authors of the reviewed documents include the effectiveness of competing models of transition across learner profiles (e.g., ability, SES, gender, ethnicity/race) for the adolescent and adult population with LD (Gregg, 2007); learner characteristics at the individual level to pinpoint the relation to learner outcomes such as education, including the GED; and employment for adults with LD (Patterson, 2008).

While a number of excellent follow-up studies have been conducted on post–high–school outcomes of transitioning youth with LD—and several meta-analyses have identified predictor variables—little empirical research has been done on the types of issues, barriers and difficulties that people with LD experience when seeking employment or on the job, regardless of literacy levels. Studies have indicated that many adults with LD are not aware of their rights under the ADA and other laws, and are resistant to disclosing their disabilities for fear of being stigmatized or discriminated against. This poses a conundrum: in order to receive accommodations in adult education or the workplace, one must disclose the need for them, and without accommodations, many people with LD will struggle or fail to meet their goals. More needs to be known about the specific issues they face in getting and maintaining work; the accommodation strategies they are receiving; and their occupations, salaries, benefits, career advancement and overall career satisfaction.

Chapter 5
Conclusion

Our society expects that most working-age citizens will be meaningfully employed and paying taxes, taking care of family and home, engaged in education and training, and/or contributing their time through volunteer service. Being gainfully employed and having a livelihood are essential for most of us. Having a career that allows us to use our talents and interests—and that challenges us to develop our skills sets and to expand our experiences—is something for which to strive. Certainly there are roadblocks along the way for everyone; however, for youth and adults with LD—particularly those who may have low literacy and academic skills and perhaps other disabilities or life challenges—the goal of achieving self-sufficiency through employment may be out of reach.

This is precisely why it is critical for K–12 professionals, adult educators and service providers to have the knowledge, skills and abilities to identify the needs of these individuals, help them recognize and build on their strengths, set high expectations and goals, and then offer instruction and interventions along with accommodations and supports so these goals can be met. It is also why adults with LD must have self-determination skills, so they can identify their aspirations, figure out their personal obstacles and seek assistance when needed. They must understand their disability and see the benefits of helping others, including employers, understand it as well. Finally, the employer community must be willing to provide work experiences for adults with LD who are in the exploratory stage of their career development, and be open to recruiting from this very large talent pool. The laws pertaining to education, rehabilitation, workforce development and employment may provide the mandates, but real action comes from individuals pulling their own weight—and working collaboratively to create opportunities.

Conducting rigorous research on the interventions and outcomes of efforts to accomplish the above is essential to informing our field specifically and the public in general. It certainly is imperative for policy making and program funding. This literature review makes it quite clear that there is a lot of room for sound empirical research on the four questions that guided this review. The good news: there is no shortage of substantial questions to drive this research effort.

Table 1.

Review of the Literature on Employment Experiences and Outcomes for Youth and Adults with LD

Author(s)/Study	Content	Participants	Number	Learner	Design
QUESTION 1: To what extent has empirical research been conducted to describe the employment and/or career experiences and outcomes of adults with LD, and how can these research findings inform the instructional strategies used by adult educators?					
TIER 1: EMPLOYMENT OUTCOMES Peer-Reviewed Quantitative Studies Using Experimental or Quasi-experimental Designs with Comparison Groups, Random Selection of Subjects and Inferential Statistics No studies identified met the standards for Tier 1 empirical research.					
TIER 2: EMPLOYMENT OUTCOMES Quantitative Studies (Descriptive), Meta-Analyses, Qualitative Studies, Including Case Studies					
Alfred, M. V., & Martin, L. G. (2007). The development of economic self-sufficiency among former welfare recipients: Lessons learned from Wisconsin's Welfare to Work Program.	Staff & employer perspectives work	W2 agency staff & employers	n=69	LD included in results	Descriptive
Alston, R. J., Bell, T. J., & Hampton, (2002). Learning disability and career entry into the sciences: A critical analysis of attitudinal factors.	Career entry into sciences; attitudes	Parents of LD (P) Teachers of LD (T)	n=140 (P) n=323 (T)	LD	Descriptive
Baer, R. M., Flexer, R. W., Beck, S., Amstutz, N., Hoffman, L., Brothers, J., Stelzer, D., & Zechman, C. (2003). **A collaborative followup study on transition service utilization and post-school outcomes.**	Predictive factors in employment	Special education graduates, 12 to 17 years	n=85	LD	Descriptive
Benz, M. R., Lindstrom, L., & Yovanoff, P. (2000). Improving graduation and employment outcomes of students with disabilities: Predictive factors and student perspectives.	Career development & outcomes	High school students with disabilities (SWD)	n=709 (SWD)	SLD	Descriptive 2-year Post-Graduation
Dickinson, D. L., & Verbeek, R. L. (2002). Wage differentials between college graduates with and without LD.	Employment wages	College graduates	n=97	LD	Descriptive
Edgar, E. (1995). *First decade after graduation*. Special Education Programs (ED/OSERS) Final Report.	Employment outcomes	High school graduates	n=84	LD	Descriptive LS 5 & 10-year
Fourqurean, J. M., Meisgeier, C., Swank, P. R., & Williams, R. E. (1991). Correlates of postsecondary employment outcomes for young adults with learning disabilities.	Employment outcomes	Those who exit four high schools	n=175	LD	Descriptive High School & first few post years
Gerber, P. J. (2002). Navigating the beyond-school years: Employment and success for adults with learning disabilities.	Employment preparation & outcomes	Successful people	n=70	LD	Descriptive
*Gerber, P. J., Price, L. A., Mulligan, R., & Shessel, I. (2004). Beyond transition: A comparison of the employment experiences of American and Canadian adults with LD.	Employment outcomes	Adults	n=25 U.S. Adults w/LD	LD	Descriptive

Author(s)/Study	Content	Participants	Number	Learner	Design
*Goldstein, D. E., Murray, C., & Edgar, E. (1998). Employment earnings and hours of high-school graduates with learning disabilities through the first decade after graduation.	Wages	High school graduates	n=70	LD	Descriptive (LS 1 to 10 years)
Greenan, J. P., Wu, M. Black, E. L. (2002). Perspectives on employing individuals with special needs.	Employer attitudes	Indiana businesses	n=190	Employers	Descriptive
Greenbaum B., Graham S., & Scales, W. (1996). Adults with learning disabilities: Occupational and social status after college.	Competitive employment	Adults, college attendees & graduates	n=49	LD	Descriptive
Harth, R., & Burns, C. (2004). Vocational outcomes for young adults with multiple learning disabilities.	Outcomes including employment	Attendees of two-year postsecondary program	n=100	MLD	Descriptive (first 15 years of program data)
Levine, P., & Nourse, S. W. (1998). What follow-up studies say about post-school life for young men and women with learning disabilities: A critical look at the literature.	Post school outcomes	Youth	n=13 follow-up studies	LD	Meta-analysis
Lindstrom, L. E., & Benz, M. R. (2002). Phases of career development: Case studies of young women with learning disabilities.	Career decision making	Young women	n=6	LD	Qualitative Case Study
Logan, J. (2009). Dyslexic entrepreneurs: The incidence; their coping strategies and their business skills. **NOTE: Comparison study in United Kingdom (UK) & US**	Entrepreneurs; Work styles	Adults with & without self-reported LD	n=36 US study	SLD/D	Qualitative Case Study
Madaus, J. W. (2006). Employment outcomes of university graduates with learning disabilities.	Employment outcomes	University graduates	n=500	LD	Descriptive
Madaus, J. W. (2008). Employment self-disclosure rates and rationales of university graduates with learning disabilities.	Self-disclosure	College graduates from three universities	n=500	LD	Descriptive
*Madaus J. W., Foley, T. E., McGuire, J. M., & Ruban, L. M. (2002). Employment self-disclosure of postsecondary graduates with learning disabilities: rates and rationales.	Employment outcomes Self-disclosure	Graduates of postsecondary public institutions	n=132	LD	Descriptive
Madaus, J. W., Ruban, L., Foley, T. E., & McGuire, J. M. (2003). Attributes contributing to the employment satisfaction of university graduates with learning disabilities.	Job satisfaction	University graduates	n=89	LD	Descriptive w/ predictors
Madaus, J. W., Zhao, J., & Ruban, L. (2008). Employment satisfaction of university graduates with learning disabilities. (Same sample as Madaus, 2008)	Self- advocacy	Graduates of postsecondary institutions	n=500	LD	Descriptive

Author(s)/Study	Content	Participants	Number	Learner	Design
Mellard, D. F., & Lancaster, D. E. (2003). Incorporating adult community services in students' transition planning.	Adult community Services	Students	n=5 Community Services Reviewed	Adult Services	Meta- analysis
Murray, C., Goldstein, D. E., & Edgar, E. (1997). The Employment and engagement status of high school graduates with learning disabilities through the first decade after graduation.	Post-high-school outcomes	High school graduates	n=289	LD	Descriptive (LS 5 & 10 years)
*Murray, C., Goldstein, D. E., Nourse, S., & Edgar, E. (2000). The postsecondary school attendance and completion rates of high school graduates with learning disabilities.	Education status & earnings	Students & graduates	n=44	LD	Descriptive
Okolo, C. M., & Bouck, E. C. (2007). Research about assistive technology: 2000–2006. What have we learned?	Assistive technology	Special education	n=122; n=22 subjects with LD	LD	Meta-analysis
Price, L. A., Gerber, P. J., & Mulligan, R. (2007). Adults with learning disabilities and the underutilization of the Americans with Disabilities Act.	Use of ADA in workplace	Adults	n=25	LD	Research Synthesis
*Price, L., Gerber, P. J., & Mulligan, R. (2003). The Americans with Disabilities Act and adults with learning disabilities as employees: The realities of the workplace.	Job entry, Advancement & ADA use	Adults	n=25	LD	Qualitative Case Study
Rojewski, J. W. (1999). Occupational and educational aspirations and attainment of young adults with and without LD 2 years after high school completion.	Graduation rates & occupations	Young adults with LD & without disabilities	n=441	LD	Descriptive
Singleton, C., Horne, J., & Simmons, F. (2009). Computerized screening for dyslexia in adults.	Computer screening	Adults	n=70	SLD/D	Descriptive
Stensrud, R. (2007). Developing relationships with employers means considering the competitive business environment and the risks it produces.	Employer partnerships	Employers & HR staff	n=67	Employers	Qualitative Focus Group
Tomblin, M., & Haring, K. A. (1999). Vocational training for students with learning disabilities: A qualitative investigation.	Voc. ed. & employment outcomes	Students	n=3	LD	Qualitative Case Study
Unruh, D., & Bullis, M. (2005). Female and male juvenile offenders with disabilities: Differences in the barriers to their transition to the community.	Outcome barriers	Juvenile correction inmates	n=72 females n=276 Males	SLD; ADD/ ADHD	Descriptive
Vogel, S., & Adelman, P. B. (2000). **Adults with learning disabilities 8–15 years after college.**	Academic & employment outcomes	College able adults	n=53	LD	Descriptive LS 8-15 years

Author(s)/Study	Content	Participants	Number	Learner	Design
Witte, R. H. (2001). College graduates with disabilities and the Americans with Disabilities Act (ADA): Do they know their employment rights?	ADA	College graduates with LD	n=85	LD	Descriptive
TIER 2: TRANSITION AND GENERAL OUTCOMES Quantitative Studies (Descriptive), Meta-Analyses, Qualitative Studies, Including Case Studies					
Macdonald, S. J. (2009). Windows of reflection: Conceptualizing dyslexia using the social model of disability.	Social model	Adults	n=77	SLD/D	Qualitative Case Study
*Seo, Y., Abbott, R. D., & Hawkins, J. D. (2008). Outcome status of students with learning disabilities at ages 21 and 24.	Employment & earned income	Children to adults	n=60	LD	Descriptive LS of N=60 from 10 years at 21 & 24 years
Scanlon, D., Saxon, K., Cowell, M., Kenny, M. E., Perez-Gualdron, L., & Jernigan, M. (2008). Urban adolescents' post-school aspirations and awareness.	Post school & perceived barriers	Young urban adults	n=22 w/LD	LD	Descriptive
*Wagner, M., Newman, L., Cameto, R., & Levine, P. (2006). *The academic achievement and functional performance of youth with disabilities*. A Report from the National Longitudinal Transition Study-2 (NLTS2).	Longitudinal study	Youth with disabilities	n=2130 to 2620	LD	Descriptive LS
QUESTION 2: What is known about the experiences of people with LD in adult education—or adult education instructors and/or employers' experience, successes and needs in working with this population?					
TIER 1: ADULT EDUCATION (Includes Vocational Education, Dropouts, Literacy, Institute of Higher Education and Instructional Strategies) Peer-Reviewed Quantitative Studies Using Experimental or Quasi-experimental Designs With Comparison Groups, Random Selection of Subjects and Inferential Statistics					
No studies identified met the standards for Tier 1 empirical research.					
TIER 2: ADULT EDUCATION (Includes Vocational Education, Drop Outs, Literacy, IHE, and Instructional Strategies) Quantitative Studies (Descriptive), Meta-Analyses, Qualitative Studies, including Case Studies					
Burgstahler, S., & Moore, E. (2009) Making student services welcoming and accessible through accommodations and universal design.	UDI	Postsecondary students with disabilities & student services personnel	n=53 students n=72 SS personnel	Students with disabilities & student services personnel	Descriptive
Covington, L. E. (2004). Moving beyond the limits of learning: implications of learning disabilities for adult education.	Reading	Adult educators	n=111	LD	Meta-analysis
Dunham, M. D., Holliday, G. A., Douget, R. M., Koller, J. R., Presberry, R., & Wooderson, S. (1998). Vocational rehabilitation outcomes of African American Adults with specific learning disabilities.	Vocational education outcomes	African American clients	n=144	SLD	Descriptive

Author(s)/Study	Content	Participants	Number	Learner	Design
TIER 2: ADULT EDUCATION (Includes Vocational Education, Drop Outs, Literacy, IHE, and Instructional Strategies) Quantitative Studies (Descriptive), Meta-Analyses, Qualitative Studies, including Case Studies					
*Gregg, N. (2007). Underserved and unprepared: Postsecondary learning disabilities.	Post secondary Outcomes	Adolescents & adults with LD	n=9 academic programs	LD	Research Synthesis
Lancaster, S., & Mellard, D. (2005). Adult learning disabilities screening using an Internet-administered instrument.	Screening (eALDS)	Adult education participants	n=122	LD or SLD	Descriptive
Lesaux, N. K., Pearson, M. R., & Siegel, L. S. (2006). The effects of timed and untimed testing conditions on the reading comprehension performance of adults with reading disabilities.	Reading	Adults	n=22	SLD/O Reading Disabilities	Descriptive
Lock, R. H., & Layton, C. A. (2008). The impact of tutoring attendance on the GPAs of postsecondary students with learning disabilities.	Student support services	Postsecondary Students	n=530	LD	Descriptive
Lynda, P., & Stan, S. (2000). Adult education and learning disabilities: Why are we still seeing them as children? Using what we know about adult education to improve outcomes for adults with learning disabilities.	Adult education & outcomes	Adults	n=3	LD	Qualitative Case Study
*Mellard, D. F., & Patterson, M. B. (2008). Contrasting adult literacy learners with and without specific learning disabilities.	Reading	Adult education learners	n=311	SLD	Descriptive
Mellard, D., Patterson, M. B., & Prewett, S. (2007). Reading practices among adult education participants.	Reading	Adults	n=213	O/Low Literacy, LD Status	Descriptive
Mikulecky, L., Smith-Burke, T., & Beatty, J. (2009). Adult literacy research in 2006: Where did it appear, what methodologies were used, and what did it say?	Adult literacy	Adult literacy Learners	n=74 studies	O/Adult Literacy Learners	Research Synthesis
Pannucci, L., & Walmsley, S. A. (2007). Supporting learning-disabled adults in literacy.	Literacy	Adults	n=23	LD	Qualitative
Patterson, M. B. (2008). Learning disability prevalence and adult education program characteristics.	Adult Education	Adults in AE programs	n=31 AE Programs	LD	Descriptive
Scanlon, D., & Mellard, D. F. (2002). Academic and participation profiles of school-age dropouts with and without disabilities.	Dropouts	Young adults ages 16 to 24 at study start	n=277	LD and O/(EBD)	Descriptive
Trainor, A. A. (2007). Perceptions of adolescent girls with LD regarding self-determination and postsecondary transition planning.	Self-Determination	Adolescent females	n=7	LD	Case Study

Author(s)/Study	Content	Participants	Number	Learner	Design
Vogel, S. A., & Holt, J. K. (2003). A comparative study of adults with and without self-reported learning disabilities in six English-speaking populations: what have we learned? **NOTE: International Study, US included**	Academic & employment outcomes	Adults	n=88 SRLD	Self-reported LD (SRLD)	Descriptive

QUESTION 3: What evidence-based practices used by adult educators in the workplace can be adapted for use by non-workplace adult educators that impact work readiness and workplace skills for both young adults during transition from school to work, as well as for adults with LD preparing for entry into or already in the workplace?

TIER 1: ADULT EDUCATION IN THE WORKPLACE
Peer-Reviewed Quantitative Studies Using Experimental or Quasi-experimental Designs With Comparison Groups, Random Selection of Subjects and Inferential Statistics

No studies identified met the standards for Tier 1 in adult education in the workplace.

TIER 2: ADULT EDUCATION IN THE WORKPLACE
Quantitative Studies (Descriptive), Meta-Analyses, Qualitative Studies, Including Case Studies

No studies identified met the standards for Tier 2 in adult education in the workplace.

QUESTION 4: To what extent does the empirical research provide guidance to adult service providers working with adults with learning disabilities whose services focus on employment preparation and support?

TIER 1: ADULT SERVICE PROVIDERS AND WORK PREPARATION
Peer-Reviewed Quantitative Studies Using Experimental or Quasi-experimental Designs With Comparison Groups, Random Selection of Subjects and Inferential Statistics

No studies identified met the standards for Tier 1 in adult service providers and work preparation.

TIER 2: ADULT SERVICE PROVIDERS AND WORK PREPARATION
Quantitative Studies (Descriptive), Meta-Analyses, Qualitative Studies, Including Case Studies

Carter, E. W., Trainor, A. A., Cakiroglu, O., Cole, O., Swedeen, B., Ditchman, N., & Owens, L. (2009). Exploring school-employer partnerships to expand career development and early work experiences for youth with disabilities.	Career development early work	Chambers of commerce/ employers	n=135	Employers	Descriptive
Dipeolu, A. O. (2007). Career instruments and high school students with learning disabilities: Support for the utility of three vocational measures.	Vocational measures	High school students	n=86	LD	Descriptive
Lindstrom, L., Doren, B., Metheny, J., Johnson, P., & Zane, C. (2007). Transition to employment: Role of the family in career development.	Impact of family on employment	Young adults 21 to 27 years	n=13	LD	Qualitative Case Study
Schoen, G., Kali Mallik, L., & Stoll, B. G. (2002). Expanding Horizons: A model academic and vocational training program for out-of-school youth with disabilities.	GED, ABE, Adult education, employment	Out-of-school youth in program	n=17	LD	Descriptive

* Cited by previous authors in *Learning to Achieve, A Review of the Research Literature on Serving Adults with Learning Disabilities.*

Key Code for Subject Eligibility: LD = Learning Disability; SLD = Specific Learning Disability (D = Dyslexia, MLD = Multiple Learning Disabilities); or O = others including low literacy/reading or math, dyscalculia, and dyspraxia

Table 2.

Summary of Findings on Employment Experiences and Outcomes for Youth and Adults with LD

Study	Summary of Findings
EMPLOYMENT OUTCOMES	
Alfred, M. V., & Martin, L. G. (2007) n=69 (W2 agency staff and employers)	Services that promote economic self-sufficiency: support services, educational and learning programs, employer interventions and counseling
Alston, R. J., Bell, T. J., & Hampton, (2002) n=140 (Parents of LD students) n=323 (Teachers of LD students)	Parents think teachers do not make enough accommodations and employers are reluctant to hire persons with LD. Both groups felt students with LD were not encouraged to take science and engineering courses.
Baer, R. M., Flexer, R. W., Beck, S., Amstutz, N., Hoffman, L., Brothers, J., Stelzer, D., & Zechman, C. (2003) n=140 (Special education graduates)	Vocational education, work-study participation, attending a rural school and having a LD were the best predictors of full-time employment after graduation. Participation in regular academics and attending a suburban school were the best predictors of postsecondary education.
Benz, M. R., Lindstrom, L., & Yovanoff, P. (2000) N=432 (High school students with specific learning disabilities)	Contributing factors to better postsecondary employment and education outcomes (last two years of high school): vocational education; paid work experience; competence in functional academic, community living, personal-social, vocational and self-determination skills; transition planning; and graduation from high school
Dickinson, D. L., & Verbeek, R. L. (2002) n=97 (College graduates previously diagnosed with LD)	Lower wages and LD found to be primarily due to differences in productivity; discrimination cannot be ruled out
Edgar, E. (1995) n= 84 (Graduates with LD)	Major findings: 74 percent employed; 11 percent employed part-time; 84 percent employed full-time; males with LD were employed at almost the same rate, and in as well-paying jobs, as nondisabled males; females with LD were parenting at twice the rate of nondisabled females and many were single mothers on welfare
Fourqurean, J. M., Meisgeier, C., Swank, P. R., & Williams, R. E. (1991). n=175 (Young adults)	Statistical tests reveal that students (1) with high math ability, (2) who were employed during high school, and (3) whose parents actively participated in their education were more likely to experience employment success after high school. Overall, 86 percent of the sample was employed either full- or part-time, with the majority in entry-level, unskilled jobs. In terms of postsecondary education, 26 percent completed at least one semester of college or technical school, though at the time of follow-up only 13 percent were enrolled in school.
Gerber, P. J. (2002) n=70 (Successful people with LD)	Model for successful employment: control, internal decision, adaptability, goal orientation, reframing, persistence, goodness of fit, learned creativity, and pro-activity
*Gerber, P. J., Price, L. A., Mulligan, R., & Shessel, I. (2004) n=25 (U.S. adults with LD)	Compared employment experiences of 25 U. S. adults with LD and 24 Canadian adults with LD had nearly the same employment experiences despite marked differences in U. S. and Canadian federal disability legislation. ***NOTE: Comparison study in U.S. and Canada***
Greenan, J. P., Wu, M. Black, E. L. (2002) n=190 (Indiana employers)	Employers willing to hire people with disabilities; satisfied with their potential and performance; public support was an important incentive for employers in providing employment services

Study	Summary of Findings
Greenbaum, B., Graham S., & Scales W. (1996) n=49 (Adults, college attendees and graduates)	More than 80 percent of the participants not still in college were employed, mostly in white-collar jobs; LD disability affected most at work and non-work, typically did not disclose those disabilities when applying for jobs or once employed
*Goldstein, D. E., Murray, C., & Edgar, E. (1998) n=70 (High school graduates)	LD graduates had higher annualized earnings in the early postgraduate years and lower earnings later, a result largely explained by the greater attendance at postsecondary educational institutions of ND students
Harth, R., & Burns, C. (2004) n=100 (Attendees at two-year postsecondary program)	Vocational outcomes studied of young adults with multiple LD first 15 years after program participation indicated that large numbers of graduates were employed in both full and part-time jobs
Levine, P., & Nourse, S. W. (1998) n=13 (Major follow-up studies of youth with LD)	Notes contradictions in the findings regarding post-school outcomes, postsecondary education, and employment and identifies five methodological issues that seem to affect the conduct and interpretation of follow- up studies: (1) aggregating data across disability categories; (2) combining data on graduates who have been out of school for unequal periods of time; (3) ignoring the issue of missing data (subject attrition and incomplete data sets); (4) combining data from different informants; and (5) using nonequivalent databases to make comparisons to a population with no disabilities
Lindstrom, L. E., & Benz, M. R. (2002) n=6 (Young women with LD)	Key elements influencing career development: availability of options and opportunities; presence of positive career counseling and guidance; and ability to engage in extended career decision making process leading to occupations focusing on strengths and abilities
Logan, J. (2009) n=36 (Adults with dyslexia in US study)	Some compensatory strategies they adopt to overcome dyslexia (such as delegation of tasks) may be useful in business; may be more comfortable in a start-up or a serial entrepreneurial role so that they are able to do things in their own way. ***NOTE: Comparison study in United Kingdom (UK) and U.S.***
Madaus, J. W. (2008) n=500 (Graduates with LD from three U.S. universities)	Regarding post-school employment outcomes and experiences related to LD disclosure in employment settings; although 73 percent of the respondents reported that the LD affected their job in some way, only 55 percent reported self-disclosing, and only 12 percent reported requesting accommodations
Madaus, J. W. (2006) N=500 (Graduates with LD from three U.S. universities)	Of respondents employed, 76 percent reported receiving full employee benefits, 10 percent partial benefits and 14 percent no employee benefits. Males were more likely to be receiving full benefits than females. Males were more likely to be employed full time than females. Females were more likely to be employed part time, less than 20 hours per week. Of the 12 percent not employed, 61 percent noted that they were not currently seeking employment, caring for children (41 percent) was the most commonly selected reason for not seeking employment, followed by being in school (22 percent) and medical reasons (8 percent); 24 percent reported being laid off from a job, of this group, most indicated the cause as being a company downsizing or a reduction in budget (51 percent).
*Madaus J. W., Foley, T. E., McGuire, J. M., & Ruban, L. M. (2002) n=89 (Graduates with LD of a large, public, competitive postsecondary institution)	Results indicated that 86.5 percent of the respondents were employed full time; nearly 90 percent stated that their LD affected their work in some way, only 30.3 percent self-disclosed to their employer; Of those who had not self-disclosed, the majority reported that there was no reason or need to self-disclose; 46.1 percent reported not self-disclosing due to fear of a potentially negative impact in workplace or concern for job security.

Study	Summary of Findings
Madaus, J. W., Ruban, L., Foley, T.E., & McGuire, J. M. (2003) n=89 (University graduates with LD)	Found high levels of employment self-efficacy and satisfaction; perceptions of employment self-efficacy and use of self-regulatory strategies were found to be significant predictors of employment satisfaction
Madaus, J. W., Zhao, J., & Ruban, L. (2008) n=500 (Graduates with LD from three postsecondary institutions)	Perceptions of employment self-efficacy were found to be a more important predictor of employment satisfaction than variables such as salary and length of time on the job
Mellard, D. F., & Lancaster, D. E. (2003) n=5 (Types of community service programs reviewed)	Disparities noted in important transition services: vocational rehabilitation, rehabilitation medicine and centers for independent living
*Murray, C., Goldstein, D. E., Nourse, S., & Edgar, E. (2000) n=44 (High school graduates with LD)	Educational status had little effect on employment earnings; females with LD earned less than males with LD
Murray, C., Goldstein, D. E., & Edgar, E. (1997) n=289 (High school graduates with LD)	Significantly less likely to have attended any form of postsecondary school or to have graduated from postsecondary programs; Little relationship was found between postsecondary educational status and either employment or earnings
Okolo, C. M., & Bouck, E. C. (2007) n=122 (Articles on assistive technology)	Use of assistive technology increased self-esteem, autonomy, work experiences, social skills, independence from financial assistance, contributions to society, independence from public health care benefits, assimilation into society, life structure and income from employment
*Price, L. A., Gerber, P. J., & Mulligan, R. (2007) n=25 (Adults with LD)	Title 1 of the ADA is underutilized by individuals with LD in the workplace; self-disclosure about disability was rare; reasonable accommodations were infrequently used; none of the 25 adults used professionals, teachers, rehabilitation counselors or other related educators to get their first job
*Price, L., Gerber, P. J., & Mulligan, R. (2003) n=25 (Adults with LD)	Majority of respondents had never heard of ADA; did not understand enough about ADA to use it to get their first job, for self-advocacy, for interviewing, pre-employment testing or with job applications; no one asked for or received any accommodations under the ADA; and no one used the ADA to assist them in job promotion or advancement, despite the fact that most of them were promoted anyway.
Rojewski, J. W. (1999) n=441 (Young adults with LD)	Found that individuals with LD reported lower graduation rates, were more likely to aspire to moderate or low-prestige occupations, and were more likely to be employed rather than in postsecondary programs. Professionals must remain sensitive to the potential influence that placement decisions and general teacher expectations have on career choice, occupational preparation, and the transition process.
Singleton, C., Horne, J., & Simmons, F. (2009) n=70 (Dyslexic adults from three types of educational institutions)	Screening via computer (three tests with phonological processing, lexical access and working memory) to measure literacy is a valid and useful method of identifying dyslexia in adulthood with noted advantages of ease to administer to large numbers of adults for education and employment
Stensrud, R. (2007) n=67 (Human resources offices and direct supervisors)	Fundamental to employers' concerns were the risks they took and the nature of the labor market that contributed to those risks

Study	Summary of Findings
Tomblin, M., & Haring, K. A. (1999) n=3 (Students with LD)	Regarding employment problems; transition services need improvement; recommendations are for coordination among special and vocational instructors, counselors, and other support personnel, attention to the topic in teacher preparation programs, and responsiveness to work-place needs
Unruh, D., & Bullis, M. (2005) n=72 (Females) & n=276 (Males present-ing disabilities in a statewide transition project from juvenile correction)	Found four barrier variables less likely to be descriptive of the female juvenile offender: (1) a SLD; (2) ADD/ADHD; (3) retained a grade; and (4) inability to maintain employment. Implications for gender-specific support.
Witte, R. H. (2001) n=85 (College graduates with LD)	Half to two-thirds of respondents reported being unaware or poorly informed on all questions related to ADA. Half reported receiving ADA information and instruction during their college career.
TRANSITION AND GENERAL OUTCOMES	
Macdonald, S. J. (2009) n=77 (Adults with dyslexia)	Social-class positioning and institutional discrimination shape their adult life experiences in education and employment; Developing coping strategies to manage dyslexia is key to employment for middle-class participants; Of n=77, 24.7 percent employed, 18.2 percent unemployed, 57.1 percent student; Of n=77 reporting impact of dyslexia, 38.2 percent reported severe difficulty, and 46.1 percent reported significant difficulty
*Seo, Y., Abbott, R. D., & Hawkins, J. D. (2008) n=60 (Children with LD studied at ages 21 & 24)	Highest postsecondary school attainment was not significantly different, both rate of employment and amount of earned income were not significantly lower, but young adults with LD received significantly more public aid (such as food stamps, Supplemental Security Income and unemployment compensation)
Scanlon, D., Saxon, K., Cowell, M., Kenny, M. E., Perez-Gualdron, L., & Jernigan, M. (2008) n=22 (Young urban adults with LD)	Barriers most identified by students as limiting their chances of achieving their post-school goals relate to school, lack of money, friends and family, and self-motivation; career planning beginning at least by ninth grade may help urban youth to set and attain goals
*Wagner, M., Newman, L., Cameto, R., & Levine, P. (2006) (NLTS2) n=2130 to 2620 (Youth with disabilities)	At time of study, 63 percent of youth with LD were employed; and 77.2 percent were employed since high school on follow-up
ADULT EDUCATION (Includes Vocational Education, Drop Outs, Literacy, IHE, and Instructional Strategies)	
Burgstahler, S., & Moore, E. (2009) n=53 (students with disabilities) and n=72 (student services personnel)	Results from 14 focus groups are to increase staff comfort level of staff in working with students who have disabilities, as well as to increase staff knowledge and skills regarding disabilities (especially "invisible" disabilities that are not disclosed by service users); communication and accommodation strategies; rights and responsibilities; campus resources; and issues unique to specific offices
Covington, L. E. (2004) n=111 (Adults with LD)	Cross-sectional research suggests that a wide variety of teaching techniques is necessary for classroom success and to inform adult educators

Study	Summary of Findings
Dunham, M. D., Holliday, G. A., Douget, R. M., Koller, J. R., Presberry, R., & Wooderson, S. (1998) n=144 (African American clients with SLD in Voc. Ed.)	Four primary implications: (1) recognize cultural differences and perceptions of trust are important motivators of behavior; (2) significant proportion of those African American clients applying for vocational rehabilitation services because of a SLD will have (on average) lower average intellectual abilities (particularly verbal abilities) and significant academic deficits and training options should be evaluated for available support services (e.g., mentor) and access to accommodations; (3) secondary psychiatric disturbance is prevalent (one-third of study); and (4) college training should be scrutinized for available support services.
*Gregg, N. (2007) n=9 (Academic programs)	Adolescents and adults with LD are underserved and underprepared to meet the demands of postsecondary education; access to multiple academic options during the transition from secondary to postsecondary education is essential
Lancaster, S., & Mellard, D. (2005) n=122 (Adult education participants with reading disabilities)	Validated an Internet-administered version of Adult Learning Disabilities Screening (ALDS), e-ALDS. Implications for use by vocational rehabilitative services and ABE.
Lesaux, N. K., Pearson, M. R., & Siegel, L. S. (2006) n=64 (Adults with LD [reading disabilities])	Study suggests that extra time during testing is an appropriate accommodation to help individuals begin to compensate for reading disabilities.
Lock, R. H., & Layton, C. A. (2008) n=530 (Students with LD enrolled in a student support program)	Results linked individualized tutoring and additional supplementary support services with higher academic achievement; Relationship between grade point averages and attendance at individualized tutoring sessions (improved ability to understand and master content of particular course offerings, improved study preparation skills, and overall increase in the study session quality).
Lynda, P., & Stan, S. (2000) n=3 (Adults with LD)	LD are not just a school-based disorder but a cluster of unique strengths and challenges that require ongoing support and management from many professionals in many arenas throughout adult life.
Mellard, D. F., & Lancaster, D. E. (2003) n=5 (Community services reviewed)	Community resources contributing to significant, increased capacity and student success; vocational rehabilitation, Social Security Administration, Centers for Independent Living, adult education, and postsecondary settings; issues of institutionalization, personnel preparation, interagency collaboration, and competing agendas for school resources limit success
*Mellard, D. F., & Patterson, M. B. (2008) n=89 (Adult education participants with self-reported SLD)	Of 311 adult education learners, 29 percent self-reported having one or more SLD; SLD status significantly contributes to variance in reading level when controlling for age and intelligence; SLD status should be considered an educationally relevant variable in adult education that warrants a diagnostic or clinical teaching approach; SLD learners are four times more likely to have vision problems that may be correctable with glasses.
Mellard, D., Patterson, M. B., & Prewett, S. (2007) n=213 (Adult education participants with low literacy)	Identified differences in reading practices by age, gender, LD status and reading level that can inform educators of adults when matching curricular materials to salient learner characteristics, which could enhance the learners' persistence and success.

Study	Summary of Findings
Mikulecky, L., Smith-Burke, T., & Beatty, J. (2009) n=74 (Adult literacy studies published in 2006)	Scientifically based research may be tied to adult education. Program providers are being challenged to be flexible and tolerant in seeking ways to maintain a focus on learner goals and incorporate evidence-based practices whenever possible. Of particular concern to the adult literacy community is the limited generalizability of studies. Findings appropriate for adults pursuing the GED credential may not be at all appropriate for adults with very low literacy levels and those who have LD.
Pannucci, L., & Walmsley, S. A. (2007) n=23 (Adults with learning difficulties who did not graduate from high school)	Several learning difficulties were common (e.g., lack of organizational ability) and several showed up in the majority (e.g., modality overload). In terms of best teaching practices, connecting learning to the adults' interests and purpose for learning, as well as sufficient determination and motivation and appropriate strategies, an adult with quite severe learning difficulties can succeed.
Patterson, M. B. (2008) n=31 (Adult education programs)	After participation in adult education services, learner outcomes associated with LD prevalence are adult basic and secondary learning gains, GED outcomes and entering employment.
Scanlon, D., & Mellard, D. F. (2002) n=93 (Young adults ages 16 to 24 with LD and/or EBD)	Regarding dropping out: ensure awareness and connection to other community resources; GED or alternative high school diploma program, vocational rehabilitation, centers for independent living, literacy programs and community colleges; address attendance issues; offer support such as mentoring and peer support programs; consider graduation rates as one acceptable measure of success.
Trainor, A. A. (2007) n=7 (Adolescent females with LD)	Participants had little knowledge of job requirements or education prerequisites; comments revealed a lack of vocational education, career development and postsecondary educational opportunities; were not actively pursuing long-term goals for postsecondary careers; difficulty articulating career goals that matched individual preferences, strengths and needs; and gender may be a significant factor in career development.
Vogel, S. A., & Holt, J. K. (2003) n=88 (U.S. adults with self-reported LD)	Educational policies and legislative mandates screening, assessment and special education for those with LD/dyslexia (all countries). Screen nongraduating high school adults for possible LD/D to continue education, provide assessment, remediation and adult education; provide staff development for adult education teachers regarding LD/D and the most efficacious methods for improvement of reading, writing and math skills.
ADULT SERVICE PROVIDERS AND WORK PREPARATION	
Carter, E. W., Trainor, A. A., Cakiroglu, O., Cole, O., Swedeen, B., Ditchman, N., & Owens, L. (2009) n=135 (Chambers of commerce & employer networks)	Expand employer networks in supporting career development and early work experiences of youth
Dipeolu, A. O. (2007) n=86 (High school students with LD)	Career counseling and implications for the assessment process, and interventions instruments used for vocational or career decision-making purposes, should possess sound psychometric properties

Study	Summary of Findings
Lindstrom, L., Doren, B., Metheny, J., Johnson, P., & Zane, C. (2007) n=13 (Young adults with LD)	Increase awareness of family structure and the impact of family socioeconomic status. Students from low-socioeconomic status families may be asked to contribute to the family through paid employment or other caretaking roles. School staff members need to understand the effect of these early experiences and help students frame these as opportunities for skill building and career development. Educate parents about a variety of career options and opportunities, and build partnerships between parents and school professionals.
Schoen, G., Kali Mallik, L., & Stoll, B. G. (2002) n=17 (16 and 17 year old out –of- school youths enrolled in Horizons Program)	Services: conducted an academic assessment; assisted to improve academic skills and register for the GED; enrolled in ABE classes for three months to help pass GED with program staff monitoring and ensuring attendance; enrolled in three-month GED preparation classes; assisted in registering for the GED. Of the 15 participants seeking work, all were placed in competitive employment with an average job search time of 17 days.

* Cited previously by authors in *Learning to Achieve*.

Table 3.

Definitions Related to Learning Disabilities

Source	Definition
Legislative Definitions	
Rehabilitation Act of 1973. Pub. L. No. 93-112	"a physical or mental impairment that constitutes or results in a substantial impediment to employment; or … (B) "that substantially limits one or more major life activities." **Not LD specific**
Individuals with Disabilities Education Act (IDEA) **of 1990** Pub. L. No. 101-476, 104 Stat. 1142. Formerly the *Education for All Handicapped Children Act of 1975*	"a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations, including such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia." According to the law, learning disabilities do not include "learning problems that are primarily the result of visual, hearing, or motor disabilities; mental retardation; or environmental, cultural, or economic disadvantage. Definitions of learning disabilities also vary among states." 34 Code of Federal Regulations §300.8(c)(10)
Individuals With Disabilities Education Improvement Act (IDEIA) **of 2004** Pub. L. No. 108-446, 118 Stat. 2647	The law revised the requirements for evaluating children with **learning disabilities.**
Americans with Disabilities Act (ADA) **of 1990.** Pub. L. 101-336, 104 Stat. 327	"(1) Disability – The term 'disability' means, with respect to an individual—(A) a physical or mental impairment that substantially limits one or more major life activities of such individual; (B) a record of such an impairment; or (C) being regarded as having such an impairment." "a physical or mental impairment that substantially limits a major life activity…" … "[a]ny mental or psychological disorder, such as … and **specific learning disabilities**."
Americans with Disabilities Act Amendments Act (ADAA) of 2008 Stat. 3406	Retains definition from ADA, **specific learning disabilities,** but makes changes to the meaning of major life activities … *learning, reading, concentrating, thinking, com-municating, and working*.
National Organizations	
National Institute of Neurological Disorders and Stroke (2006)	"**Learning disabilities** are disorders that affect the ability to understand or use spoken or written language, do mathematical calculations, coordinate movements, or direct attention"
National Center for Learning Disabilities (NCLD) (2005)	"a neurological disorder that affects the brain's ability to receive, process, store and respond to information, and note that LDs can affect a person's ability in the areas of listening, speaking, reading, writing, or mathematics." Specific Learning Disability (SLD) is the term used in the federal law for any LD, and some of the SLDs include dyslexia, dyscalculia, dysgraphia, dyspraxia, auditory processing disorder, visual processing disorder, and attention deficit hyperactivity disorder (ADHD).

Source	Definition
U.S. Department of Education Office of Special Education and Rehabilitative Services Administration (RSA) (2002)	"a disorder in one or more of the central nervous system processes involved in perceiving, understanding, and / or using concepts through verbal (spoken or written) language or non-verbal means. This disorder manifests itself with a deficit in one or more of the following areas: attention, reasoning, processing, memory, communication, reading, writing, spelling, calculation, coordination, social competence, and emotional maturity."
Learning Disabilities Association (LDA) (2005)	Specific learning disabilities defined as a chronic condition of presumed neurological origin, which selectively interferes with the development, integration, and/or demonstration of verbal and nonverbal abilities. Specific learning disabilities exist as a distinct handicapping condition in the presence of average to superior intelligence, adequate sensory and motor systems, and adequate learning opportunities. The condition varies in its manifestations and in degree of severity.
U.S. Interagency Committee on Learning Disabilities (1987)	Learning disabilities is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities, *or of social skills*. These disorders are intrinsic to the individual and presumed to be due to central nervous *system* dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions (e.g., sensory impairment, mental retardation, social and emotional disturbance), *with socio*environmental influences (e.g., cultural differences, insufficient or inappropriate instruction, psychogenic factors), *and especially with attention deficit disorder, all of which may cause learning problems, a learning disability* is not the direct result of those conditions or influences. [As cited in Kavanagh, J. F., & Truss, T. J. (1988). *Learning disabilities: Proceedings of the national conference.* Parkton, MD: York. {pp. 550–551}. The Interagency Committee used underlining reproduced here as italics to indicate differences with the definition of the National Joint Committee.
National Joint Committee on Learning Disabilities (1989)	Learning disabilities is a generic term that refers to a heterogenous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although a learning disability may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional disturbance) or with extrinsic factors (such as cultural differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences. [As quoted in Myers, P. I., & Hammill, D. D. (1990). *Learning disabilities: Basic concepts, assessment practices, and instructional strategies.* Austin, TX: Pro-Ed. {p. 8}]

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Appendix 1
References

Tier 1 References

Tier One Criteria: Peer-reviewed quantitative studies using experimental or quasi-experimental designs with comparison groups, random selection of subjects and inferential statistics. Further, studies in this category were able to prove or disprove cause and effect, or point to a statistically significant reason for why an outcome occurred.

No Studies Identified Met the Standards for Tier 1 Empirical Research

Tier 2 References

Tier Two Criteria: (1) Quantitative studies that were descriptive in nature (i.e., they demonstrated statistical differences between or among comparison groups being studied or correlations between variables), (2) meta-analyses of extant quantitative research or literature reviews, and (3) qualitative studies that would include case study designs.

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