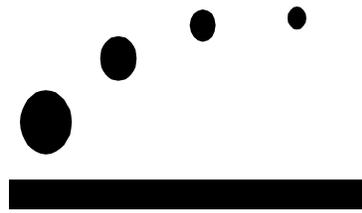


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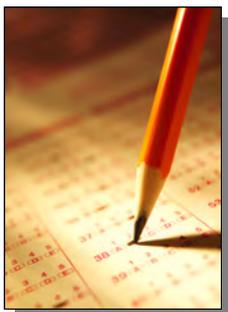


Assessment Tools In the Workplace



A partnership project of
Kingston Literacy and
Literacy Link Eastern Ontario





Assessment Tools In The Workplace

This report discusses assessment tools in the workplace, how tests are being used, a description of the most common tests and a comparison of job task and tests. Also included are strategies that instructors can use to make students more comfortable and prepared for pre-employment tests.

Topics covered include:

1. Trends in pre-employment testing practices

2. Test Analysis

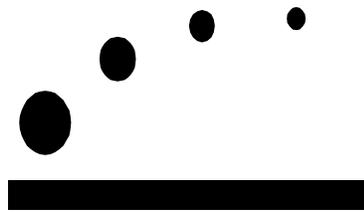
- Company A Aptitude Test
- Company B Pre-screening Test
- Canadian Adult Achievement Test (CAAT)
- General Aptitude Test Battery (GATB)
- QWIZ® Call Center Assessments
- The Test of Workplace Essential Skills (TOWES)

3. Test and Job Task Comparison

4. Applications in the Classroom

Workplace Literacy Special Initiative

Assessment Tools in the Workplace



*A Report on Pre-employment
Testing Practices
Part I*

**This report is part of a larger project
developed in cooperation with
Literacy Link Eastern Ontario**

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Carynne Arnold *Kingston Literacy*

Doug Noyes *Literacy Link of Eastern Ontario*

Jennifer Wilson *Ontario March of Dimes*

Research: Carla Douglas

Project Coordinator: Cheryl Robinson

Desktop Publishing: Darren MacDonald

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Introduction

This research project is the result of a growing trend in the employment world: the increasing use of pre-employment tests as part of the hiring process. It is a trend that affects job searchers, employment service providers, literacy practitioners and students. The most pressing question for literacy practitioners is: How do we prepare our students for this important step in finding employment? The question is not easily answered, as pre-employment testing practices in many workplaces remains somewhat mysterious. What kinds of assessment tools are employers using? What kinds of skills do they test for? How are the skills they test for linked to the nine Essential Skills used on the job?

Finally, we wanted to know how this trend affects people who are applying for entry-level jobs. Candidates for entry-level positions frequently report that while they have the experience and Essential Skills to perform a particular job, they are being screened out of the hiring process because they aren't able to pass the pre-employment tests.

The report explores these questions by analyzing the occupation-specific pre-employment tests shared with us by local employers and also by investigating the link between the skills tested for and the nine Essential Skills identified by Human Resources Development Canada. The IALS literacy scale and the Essential Skills complexity scales have been used throughout to assess literacy levels. To make our research as accessible as possible, we've included summaries of each section of the report. To get an overview of the project scope and research findings, please read the sections with the grey band along the right side of the page.

As part of our working partnership with employers, we agreed not to identify the companies by name. We appreciate their assistance with the project and hope this research will help other literacy practitioners and their students better understand the world of pre-employment testing.

Project Overview – Part I

Introduction

The term pre-employment test describes any assessment an employer administers to a job applicant during the hiring process. It may consist of a few questions designed in-house and administered by pencil and paper to a full battery of cognitive, personality, skills, knowledge and abilities inventories and simulations administered in real time, online, by professional test developers. Within this broad descriptive range, pre-employment tests have in common the utility of gathering information about job candidates.

Issues surrounding the practice of administering pre-employment tests include legal and ethical considerations about collecting personal data as well as the cost and administrative difficulty of deciding what to test for and which tests can best deliver this information. Finally, there is the question of whether evidence shows that a given test can fairly and accurately assess what it is meant to.

While the debate over their validity, reliability and general usefulness continues, pre-employment tests have become commonplace. Employers use test results in a variety of ways. At one end, tests may be administered to verify that an applicant has specific job-related skills, such as computer use or typing speed. Tests such as these are often given after an interview, just before a job offer is made. Other employers may use tests to get an overview of an applicant's skills, abilities and personality traits, and test results are weighted alongside other criteria such as experience and qualifications listed on a resume. At the other end, tests are sometimes used as an initial screening tool. These are essentially high-stakes tests, where those applicants whose scores fall below a benchmark are eliminated from the hiring process before it has begun.

With these factors in mind, Part I of this study analyzes five pre-employment tests to determine the skill levels required to complete them successfully. The study is particularly interested in determining how the tests' structure and content may fit with the literacy skills of an entry-level candidate (Essential Skills defines an entry-level job as any position one can enter with a high school diploma or less). In addition, the study examines the links between the assessment tools and the nine Essential Skills identified by Human Resources Development Canada (HRDC). The Essential Skills identify and define the skills that are required to perform successfully in almost any occupation. They also provide complexity rating scales that rank tasks according to their frequency and level of difficulty.

Investigation

A review of recent literature was conducted to identify current trends, practices and issues in the field of pre-employment testing across Canada and the United States. It is included in this report. To identify and obtain the tests needed for this investigation, information was gathered from two sources: a pre-employment testing survey of local employers, conducted by the Employment Resource Centre (Kingston) in 2003, and a more detailed follow-up survey done as part of this project in 2004. Of those employers who identified the tests they used, two agreed to provide Kingston Literacy with a copy for analysis. The remaining three tests are commercially available and were identified as being currently in use by survey respondents.

Test Review

Five tests are reviewed in this investigation. They include two in-house tests, the General Aptitude Test Battery (GATB), the Canadian Adult Achievement Test (CAAT), and a series of call centre assessments developed by the Qwiz[®] Corporation. Test analysis focuses on assessing the literacy skill levels required to complete the tests. Tools used to evaluate literacy levels include the Essential Skills complexity ratings and the International Adult Literacy Survey (IALS) literacy complexity scale. Additionally, Flesch-Kincaid and Fry readability scores are assigned to prose passages. The tests are also evaluated for features that fall outside the scope of these scales, such as visual presentation and the adequacy and clarity of instructions. As a second point of focus, the tests are examined for their assessment of the nine Essential Skills. The test review includes a discussion of each test as well as a summary of findings.

Conclusions

Finally, the findings are discussed in terms of their relevance and fairness to employers, entry-level candidates, and literacy practitioners.

Literature Review Summary

The literature identifies four key participants in the testing field: test developers and publishers, the research community, and the human resources departments who administer pre-employment tests. Governments play a role as well, by providing guidelines for good practice. A few items stand out. First, pre-employment testing is on the rise, largely as a result of developments in computer software and the Internet. All of the participants mentioned above emphasize that testing should never be used as a single determining factor in the hiring process. If used, it should be one of many selection tools, such as work history, an interview and references, etc. There is general agreement, as well, that a good test will have undergone a strenuous development process that includes, first and foremost, an assessment of the job profiles in question. The literature also suggests that use of pre-employment testing increases during poor economic conditions and decreases in a good economy when the demand for workers rises.

One of the most striking items found in the literature is the unanimous endorsement of pre-employment tests by human resources professionals. Indeed, pre-employment tests are praised for their efficiency in streamlining the hiring process, reducing the number of bad hires and for their general cost-effectiveness. Almost as striking is the view of researchers and test publishers that evidence of this claim is tenuous at best. Many tests currently in use are the subject of continued research. As well, future trends forecasters in the test publishing industry suggest that a new generation of employment tests is on the horizon; these will be used to test employees at regular intervals after they are hired to determine if the results of the original pre-employment tests were accurate and valid.

Finally, it is the view of members of the Test Publishers Association that the testing industry is market driven. That is, business and government sectors, in their thrust for accountability, are demanding more (and more efficient) ways to screen potential employees. Human resources departments are the front line of the industry, implementing practices before research has fully assessed their merits. It appears, then, that there is a central conflict between the efficiency and financial returns that pre-employment testing offers and the evidence that would support its practice.

Literature Review

Introduction

A search of the literature that deals with pre-employment screening, testing and assessment yields documents that can be grouped into several categories, including

- Resource guidelines and standards reports
- Human resources professional publications (magazines, newsletters, journals) intended for people working in the human resources/personnel field
- Academic research journals in Applied Psychology, Industrial Psychology and Personnel Psychology (academic studies)
- Association of Test Publishers publications (papers, articles and newsletters)

Each category of documents provides a different perspective on the subject of pre-employment testing. Resource guidelines and standards reports broadly outline acceptable practice in pre-employment testing. The professional publications present the best picture of what is happening in the field, while the academic literature focuses more on assessment tools than on general practice. Nevertheless, the various categories of literature do overlap. For instance, test designers and publishers produce articles in the professional magazines, and journalists discuss some of the legal implications regarding pre-employment testing. Generally, the professional publications intended for people working in the field of human resources and personnel management cover the topic of pre-employment assessment most broadly. They point to current issues and trends, and introduce material that is covered elsewhere in the literature. Collectively, the literature presents a picture of current practices and opinions about its value, how testing fits into the hiring process, and guidelines about how it should be used. As well, the literature reveals areas of debate surrounding the use of pre-employment testing and indicates the direction it is likely to take in the future.

Summary of Findings

A. Guides, Manuals and Reports

Pre-employment testing information in this category consists of general resource guides for human resources professionals, standards reports for academic and workplace testing, and reports that focus on workplace literacy testing and its associated assessment tools.

A key document in this category is the U.S. Department of Labor's (1999) *Testing and Assessment: an Employer's Guide to Good Practice*. This comprehensive resource provides information to human resources managers and professionals about how to select and administer assessment tools, how to interpret their results and how to interpret and understand the legal and professional standards regarding pre-employment assessment. It also includes a glossary of assessment terms. The information provided here is extensive: in 80 pages it answers questions about practical and theoretical issues surrounding testing, and serves as a standard for those who may be implementing a testing program.

Similarly, the Bureau of National Affairs' Human Resources Guide (n.d.) is a valuable source of information on human resources policy, guidelines and practices in the United States. It includes a comprehensive section on pre-employment testing, with a full discussion about how, when and why it is used, and its ethical and legal considerations. It also contains contact information for the major pre-employment testing companies in the U.S.

The guide also includes some statistics of interest to this study, citing results from a 2000 American Management Association survey on job skills and psychological testing:

- Job skills' testing of applicants is conducted by 57 percent of 1,627 employers responding to the survey.
- In 2000, 60 percent of 2,133 respondents tested applicants' skills. (As defined by the survey, job skills' testing focuses on "[the] skills and competencies necessary to perform specific job tasks.")
- Roughly half of the employers (49.7 percent, down from 52.8 percent in 2000) test applicants in specific job categories and 7.6 percent (up from 7.2 percent in 2000) assess all prospective employees.
- More than half of the respondents in each industry sector included in the survey engage in applicant skills testing.
- Manufacturers are the most likely to test employees' skills.
- Of five categories of psychological measurements of applicants, the most common are cognitive ability tests, or tests of spatial, verbal, and math skills (used by 17.7 percent of the respondents), and managerial assessments (11.9 percent). Personality tests, at 11.3 percent (down from 14.6 percent in 2000), run a close third. Physical simulations of job tasks (8.9 percent) and interest inventories to determine career paths (5.6 percent) are not so common.

In the field of workplace literacy testing, Maurice Taylor (n.d.) evaluates three existing assessment instruments (including the CAAT), and notes that research in this area is sketchy. As well, Taylor describes the process by which workplace literacy skills have been identified, and reviews the literature associated with this research. In a second paper, Taylor (1997) discusses issues surrounding the question of testing as it applies to workplace literacy programs. A technical analysis of seven commonly-used assessment tools is provided, along with a discussion of the Essential Skills, the nature of testing and test development, and an explanation of some of its technical term.

Conclusion

Collectively, these documents provide a framework and context for considering the topic of pre-employment testing. As Taylor (n.d.) notes, the language and terminology associated with testing is complex. These documents explain its terms and outline existing standards, and thus serve as a useful point of reference from which to compare additional literature in the field of pre-employment testing.

B. Human Resources Professional Magazines

The articles reviewed from professional publications present a broad and consistent picture of current pre-employment testing practices. Literature in this category includes publications and magazines from human resources, management, and other professional associations, as well as general interest newspaper articles. The authors of these articles are senior human resources consultants, test publishers and journalists. As such, they express opinions based on their experience and observations. The intended audience for these kinds of publications is the human resources professional, and accordingly, the articles are meant to inform, explain and communicate new information in order to keep those working in the field abreast of current practices. Generally, these articles present a current snapshot of what is happening in businesses and organizations. They cover such basics as what kinds of pre-employment tests are available, what they test for, and what they can do for a business or organization. Some statistics are included. As well, they contain information about what constitutes a good pre-employment test, along with a caution that tests must be carefully assessed.

Finally, the authors show nearly unanimous agreement that pre-employment testing is beneficial to organizations. Schinnerer (2003) says that over the last 50 years thousands of studies have investigated the benefits of testing. The consensus is that pre-hire assessments, when properly designed and implemented, can significantly impact the bottom line for a company through increased performance and lower turnover, among other things. Goffin (2003), too, says that accumulated research shows that a well-developed and valid test will substantially increase the chances of a good hire. Tyler (2000) suggests that good testing can help to standardize a subjective process; Rhodes (2002), Agard (2003), Johnson & Kleiner (2000) and Stanley (2004) make similar claims.

Issues and Trends: Recent developments in pre-employment testing

The general opinion expressed in the literature is that pre-employment testing (and the number of tests available) is on the rise. McKibbin-Brown (2003) notes that even ten years ago there were relatively few tests available to businesses, but that the recent onslaught of Web-based tools has made it much more convenient for businesses to access pre-employment tests. Software development and the Internet have revolutionized the fields of job search, placement and screening (Schinnerer, 2003). A multitude of products are readily available to any business seeking to improve their hiring process. Indeed, a Google[®] search of pre-employment testing generates over 17,000 hits, many of which lead to test-publisher sites. Goffin (2003) and Hudy (2001) point out that the sheer number and range of such products make it difficult for human resources personnel to sort out what is and isn't useful. Shinnerer adds that employers have been slow to adopt online assessments because they are unaware of their benefits.

It appears as well that along with the number of tests commercially available, there is a corresponding increase in the kinds of assessments employers may choose from. Prager (2000) refers to a new generation of tests that actually screen the test-taker's ability to fake answers during the testing process; Latham (2003) reports on a test that assesses practical intelligence, or how an individual is likely to respond under a variety of

circumstances. Tyler (2000) notes that traditionally tests were used to screen out inappropriate applicants. Now, however, they can be used to screen in applicants who show the potential for future development in the organization. For example, someone who tests well for customer service skills but is weak in math may be chosen as a good candidate for future training and development. In other words, new developments in testing techniques can evaluate a candidate's potential for success.

Such developments in testing reveal an interest in using tests to find out more about a candidate's character, values and personality. Buchanan (1999) also refers to these developments, and notes that industry is increasingly aware that interpersonal skills are just as important as job-related technical skills. This may account for an increase in tests that assess personality traits such as teamwork, leadership and trustworthiness, to name a few. Finally, as a cautionary note, Flynn (1999) warns that general aptitude and skills testing are usually defensible from a legal point of view; personality testing, however, moves into a grey area and may be open to challenges.

Statistics

The literature presents only a few numbers that help to reveal current pre-employment testing practices. McKibbin-Brown (2003) says that 70 percent of the top 500 companies in Canada use some type of pre-employment testing. Tyler (2000) quotes a similar number for U.S. companies, stating that 62 percent test applicants for specific job skills, and 34 percent test for reading and math literacy, adding that pre-employment testing is most common in the retail, manufacturing and transportation sectors. The cost of testing for entry-level applicants ranges from five to forty dollars (Tyler). Buchanan (1999) estimates that over half of all larger U.S. companies (over 300 employees) use pre-employment testing. Interestingly, a *Security* article (Anonymous, 2002) suggests that the frequency of pre-employment testing declines in a tight labour market, when many positions need to be filled.

Additional data quoted in the literature supports the apparent need for pre-employment testing, especially in the areas of literacy and math skills. A 1998 survey by the American Management Association found that 36 percent of tested applicants lacked sufficient reading and math skills to do the jobs they sought (Tyler, 2000). Hays (1999a) declares that as much as 20 percent of the U.S. workforce is functionally illiterate. In a similar vein, Rhodes (2002) quotes the National Adult Literacy Survey which estimates that 23 – 25 percent of adults aren't sufficiently literate for the workplace, where reading levels of grades 9 to 12 are typically required. These data have important implications for workplace safety. *Vocational Training News* (Anonymous, 2002) puts this figure much higher, stating that almost half of American adults have low literacy skills which inhibit safety and productivity.

Finally, Schinnerer (2003) presents some examples that promote the financial benefits of pre-employment testing:

- UPS found it could reduce turnover 33 percent in the package handler position, thereby saving \$400,000 annually.

- Sherwin-Williams reports that use of assessments reduced the number of interviews conducted each year by over 5,000.
- LensCrafters reports a 50 percent decrease in turnover among hourly associates after implementing assessments and drug screens.

Tests available to human resources (HR) personnel

As Schinnerer (2003) and McKibbin-Brown (2003) have noted, HR personnel are moving toward software and Web-based assessments for pre-employment screening. Sunoo (1998) supports this observation, quoting a 1997 survey of HR professionals which found that selecting candidates and developing pre-employment assessments were the two most important uses of information technology in their jobs.

The literature in this category is less concerned with the format of pre-employment tests than it is with the content. Most of the authors make reference to the kinds of skills and attributes that testing can measure. It is a long list that includes ethics, personality traits, knowledge, intelligence, technical skills, problem solving, sales potential, mechanical aptitude, teamwork, leadership, integrity, reliability, basic literacy, safety, drug use, math ability, theft, verbal ability, job-related knowledge, attitude toward technology, ability to learn and flexibility of thought (Schinnerer, 2003); biographical data (most useful for entry-level hires in the absence of a work history); practical intelligence, personality traits (Latham, 2003); intelligence, ability to acquire further knowledge, customer service and other job skills, personality (McKibbin-Brown, 2003).

Hurwitz and Ippel (1999) note four categories of tests that these attributes fall into: Ability tests that measure stable abilities such as perceptual judgement; aptitude tests that assess how much a candidate will benefit from additional training; knowledge and skills tests that measure how much a candidate has already learned in a specific area; and attitude tests that measure motivation and other personality factors. Flynn (2002) describes three categories (criterion, content and psychological), and Stanley (2004) at least six, including job knowledge, psychological, psychomotor, proficiency, cognitive abilities and interest.

Components of a good test and advice/cautions to HR professionals

The range of categories and kinds of tests described above supports Shinnerer's (2003) and McKibbin-Brown's (2003) assertions that human resources professionals face a multitude of choices when selecting pre-employment assessment tools. With few exceptions, the literature in this category is devoted to explaining the components of a good test and how to assess its potential usefulness.

A good deal of space is given to defining some of the technical terms associated with testing and explaining how they function in a well-developed test. Stanley (2004), Hudy (2001) and Latham (2003) note that a test must be able to prove its statistical reliability (consistency), its statistical validity (whether it accurately measures what it says it will) and that it is norm-referenced (the scores are in a context that is defined by a larger

group's performance). Others, such as Johnson (2000), Goffin (2003), Tyler (2000), Flynn (2002) and Rhodes (2002) note that the test publisher's research must be sound and that they need to be able to demonstrate that it is sound in the documents that accompany the test itself. Goffin points out that a good test will come with a comprehensive user's manual, and that additional technical support should be available from the testing company.

In addition to these guidelines, Shinnerer (2003) and Goffin (2003) provide steps for evaluating a test; Tyler (2000) and Hurwitz & Ippel (1999) caution that tests are just one tool in the hiring process and shouldn't replace other factors; Phan (2002) advises that personality traits such as trustworthiness are as valuable as hard skills and should be assessed more frequently; Buchanan (1999) cautions that off-the-shelf tests can lead to a "one-size-fits-all" screening process that eliminates some potentially good candidates. There is a risk, in other words, of using a test to measure attributes that may be more appropriately assessed at an interview.

By far the most outstanding feature of the literature in this category is the frequent and consistent mention of the need for accurate job profiles. Schinnerer (2003), Hudy (2001), Latham (2003), Goffin (2003), McKibbin-Brown (2003), Hurwitz & Ippel (1999), Hays (1999a), Stanley (2004), Buchanan (1999), Tyler (2000), Flynn (2002), Rhodes (2002) and Johnson (2000) all advise: Be certain that you know what you want the test to measure and that the test measures what it says it will. Conduct a thorough job analysis to determine the core competencies for the job before selecting an assessment tool.

Conclusions

The literature reflects little disagreement and considerable consensus in its support for pre-employment testing. It assumes that testing is an integral part of well-developed hiring practices, and further, that it is present in a majority of larger organizations. Among other things, a well-developed test can improve a business' bottom line and help to standardize what is otherwise a subjective process. As well, the literature presents consistent information about how to assess pre-employment tests responsibly and provides clear guidelines about how they fit into the hiring process.

It should be noted, however, that the literature, while supported by some research data, reflects the opinion of the authors, many of whom are test developers. As such, increasingly widespread use of pre-employment testing is accepted as a given in the field of human resources, and the authors here present ways for human resources professionals to work within this reality. Shinnerer and others suggest that a battery of tests will present a more comprehensive profile of a job candidate. Little information is available, however, about what specific skills and attributes (or combination of these) are most often being measured in today's workplace, or which specific tests are being used to assess them.

C. Academic Literature

Literature in this category includes formal research studies investigating the statistical validity and usefulness of specific measures used in developing (mostly cognitive)

employment and pre-employment tests. The studies look at isolated groups of candidates for particular jobs, or at measuring instruments that are currently being used in the field of testing. As well, the literature presents some theoretical considerations about pre-employment testing. As a whole, this research reflects the areas of scientific interest that may require continued attention, and suggests that while a number of testing practices are currently in use, they may still be open to debate.

Research Studies

Mooney (2002) describes the experience of a large employer (Riverside County, CA), as it shifted its pre-employment testing from a written test to an online battery of tests, and concludes that there were obvious and real benefits to the employer in terms of time, cost, and the number of candidates it could draw from. As well, online recruitment and testing benefited candidates who could be screened from anywhere at any time. Sproule (2001) also studied the pre-employment testing practices of a single employer (Commonwealth of Pennsylvania) over 20 years and found that the assessment procedures currently in use in Pennsylvania for entry-level corrections officers are supported by a variety of validity evidence, are fair by gender and race, and are cost effective. In a lengthy study, Dierdorff (2003) examines the quality and validity of job analysis data, concluding with recommendations about the time and cost involved in conducting such endeavors, as well as the need for additional research. Donovan, Drasgow and Probst (2000) used statistical measures to compare a pencil-and-paper test to a computerized version and found the scores to be the same; Hausknecht, Farr and Trevor (2002) report on a field study of the effects of practice on test scores (practicing improves a candidate's scores); and Colom, Contrera, Shih and Santacreu (2003) report that cognitive-spatial abilities tests (such as those used to screen air traffic controllers) are valid, and are good predictors of job performance. Cortina, Goldstein, Payne, Davison and Gilliland (2000) cite recent research stating that scores on measures of cognitive ability, conscientiousness and interview scores are positively correlated to job performance, and investigate whether interviews alone could predict the same level of performance. Mueller-Hanson, Heggstad and Thornton (2003) present evidence that tests of selected personality traits correlate at least modestly with performance measures, but cautions that faked answers by a candidate will distort the test results. Ceci (2000) acknowledges that intelligence testing may produce an accurate assessment of intelligence, but warns that many questions remain about the validity of these tests. There are so many variables in a test, for instance, that it is difficult to assess their usefulness. In the same vein, Chan, Drasgow and Sawin (1999) reports that certain cognitive abilities test scores become invalid with the passage of time.

Theoretical Discussions

In a lengthy discussion of workplace literacy and job analysis, Burnaby (2001) suggests that current job analysis may not accurately reflect the literacy skills needed for a given job, that more in-depth analysis is needed to determine exactly what a worker is required to do. Like Dierdorff et al. (2003), Burnaby notes that effectively auditing workplace requirements is slow, expensive (and possibly conflictual), and she suggests ways to improve this process.

Murphy, Cronin and Tam (2003) report on a survey of 703 industrial and organizational psychology professionals regarding the use of cognitive ability testing. The survey found a consensus that the tests are valid and fair and that they provide good but incomplete measures. An extensive body of evidence shows that these tests can predict school and job performance and a mastery of other tasks. Murphy notes also, however, that cognitive ability testing is one of the most controversial topics in applied psychology. One survey item around which opinion was most polarized was the question of whether cognitive ability tests should be as highly-regarded as they are in the workplace. Opinion generally held that if they are used in the workplace, cognitive ability tests should be only a part of the selection process.

Similarly, in a review of research about the use of cognitive ability testing and ethnic diversity, Sackett, Schmitt, Kabin and Ellingston (2001) acknowledge that cognitive ability testing for entry-level candidates is valid, and that scores can be useful predictors of future performance. They suggest further, however, that in order to assess the whole candidate, other criteria need to be used in addition to test scores. As well, candidates should be given full opportunity to demonstrate their abilities (in work history, life experience) and that they should also have the opportunity to prepare for testing with adequate practice.

Conclusions

The outcomes discussed in the scientific research provide evidence that the tests and measures under investigation are valid and sound. Moreover, they support the more general assertion that test results are a useful predictor of performance. Perhaps more noteworthy, however, these studies highlight the importance of the validation process. It should also be noted that while some of these tests and measures have made their way into the marketplace, their validity and usefulness are still being debated in the academic sphere.

This point is driven home by Burnaby (2001), Murphy, et al. (2003) and Sackett, et al. (2001) in their more theoretical approaches to the question of pre-employment testing. Their studies and discussions point to a discrepancy between testing theory and testing practice, and suggest that continued research is required in this field.

D. Association of Test Publishers Publications

The Association of Test Publishers is a non-profit organization that represents the providers of tests and assessment tools, and is committed to promoting the integrity of assessment services and products. Their journal, papers and newsletters (www.testpublishers.org) provide guidelines and background information and discuss current issues and trends in the field of assessment. A review of some of these documents lends a perspective that is unavailable in other literature on the subject.

On the subject of testing in general, DePascale (2003) argues that the predominance of the large scale assessment has its roots in the early 1980s when the thrust for

"accountability" was co-opted as a political tool. DePascale's discussion centres on educational assessment, but these principles extend to the workplace. Educational reform resulted in pressure by governments to produce faster and more in-depth test results. Similarly, Harris (1999a) describes the demands that the knowledge-based economy is placing on the testing industry. He argues that workers are expected to possess the necessary skills to acquire, deliver and process information. Accordingly, businesses and governments are demanding more sophisticated tools to assess these skills. Harris also (1999b) points to a "net-centric" economy, where technology leads the way; it presents many opportunities for test developers, he adds, cautioning that there is a danger of moving too fast. Research, guidelines and self-regulation must remain at the forefront of test development. To this end, Plake (2002) provides a detailed account of how test sponsors, developers, administrators, and test-takers each play a role in ensuring that responsible test practices are followed.

Of particular interest to this study is Jones and Higgins' (2001) discussion of recent and future trends in employment testing. Referring to the American Management Association 2000 survey (also cited in the Human Resources Guide) they note:

- Sixty-nine percent of surveyed organizations conduct job-specific skills testing (similar to earlier results from 1998 and 1999).
- Forty-three percent test applicants for basic literacy and math skills.
- Manufacturers are more likely than service providers to conduct testing.
- There is a shift away from general personality inventories and towards more job-specific traits such as integrity, honesty and customer service aptitudes.
- Development of voluntary professional certification has been growing steadily over the past 30 years.
- Computer and Web-based testing have been growing since the 1980s and are now common practice.

Jones and Higgins (2001) also observe that trends such as these aren't found in the research literature. Workplace practices become established long before they are examined academically, and as well, there is often a lengthy publication lag-time for academic research. As to the future of pre-employment testing, Jones and Higgins see the following trends emerging:

- The continued growth of virtual career centres (Monster[®], etc.) which have become electronic job marketplaces and have evolved without the direct involvement of industrial/organizational psychologists who need to investigate their impact
- Fully integrated, Web-based personnel assessment and processes
- Increasing concerns about Internet-age access and fairness
- Increasing privacy and ethical concerns over the storage of information (profiles, test scores) in databases
- Continued increases in professional certification testing programs.
- A new generation of testing constructs created by organizational psychologists to identify loyal and productive employee types and to screen out those who aren't
- Increasing use of HR assessments that evaluate an employee from recruitment through retirement.

- Continued development of multimedia tests and recognition of the need to make tests shorter (requiring fewer responses), and to lower test reading levels while retaining the validity of the test scores.
- Increasing recognition of the need for and use of impact testing which moves beyond a test's validity or usefulness. Research in this area has just begun, and will require post-testing that asks the questions: What is the impact of testing? Does it generate more revenue, retain more employees, etc.? Is testing improving the bottom line of industries and organizations? Are tests doing what we want them to do?

In addition to the body of information the Test Publishers Association articles provide, they are notable for articulating where the test publisher fits within the larger context of pre-employment assessment. It sees the test publisher/developer responding to political and market demands and not, as might have been expected, as the engine that drives the testing industry.

Discussion

As most of the literature indicates, the practice of administering pre-employment tests to job applicants is increasing. Computer and Web-based assessments are driving the transformation of businesses and the test publishing industry. Few statistics, however, are available to create a clear picture of assessment practice. Recent surveys in Canada and the United States estimate that between 60 and 70 percent of larger organizations administer some type of pre-employment testing, and that the manufacturing sector is most likely to do so. Additionally, figures show that between 34 and 43 percent of organizations test for basic literacy and math skills. Finally, anecdotal reports show that attributes such as integrity and honesty are increasingly being assessed.

All categories of the literature emphasize the importance of responsible testing practices. This includes creating job profiles in order to choose the most appropriate test and then administering that test fairly. A single test or a battery of tests should not be the sole basis upon which hiring decisions are made.

Unfortunately, the literature revealed no information about the names of specific tests currently used in the workplace. Taylor refers to a number of assessment tools used in workplace literacy programs (including CAAT, TABE), but it is not clear if or where these assessments cross over into use by employers. The scarcity of information about specific tests may be due in part to the tremendous number of tests on the market. It may also be that organizations are reluctant to release information about how they assess applicants.

Collectively, the four categories of literature help to create a picture of pre-employment testing (and its associated assessment tools) both as an industry and as a complex system of participants that function more or less independently. Human resources standards and guidelines provide the structure within which testing ought to occur. These guidelines, however, are often shaped by past or existing practices. Professional publications for human resources personnel present the most current picture of what is happening at the front line in pre-employment assessment. Although the advice in these publications is for

organizations to proceed with assessments cautiously, the evidence suggests that advances in technology and the demand for financial returns are having an important influence on decision-making. It is interesting, for instance, that the human resources professional publications voice nearly unanimous enthusiasm for the benefits of testing, provided that a test is carefully chosen to do what it is meant to do. In striking contrast, however, Jones' and Higgins' (2001) lengthy discussion of future trends asserts that little is really known about whether pre-employment assessments actually provide the financial returns and employee retention they are intended to. In short, it appears that the marketplace is driving the increased use and development of assessment tools. Finally, the academic literature reveals that what is happening on the ground in businesses and organizations is still open to debate, and that the tools and measures used in assessment may require further research to confirm their actual benefits.

Essential Skills

The Human Resources Development Canada (HRDC) Essential Skills Inventory is a list of nine skills a worker needs to perform adequately in almost any job.¹ These do not include specific technical skills, knowledge or other abilities that may be required for a particular job. The Essential Skills are those needed by anyone to perform in almost any occupation successfully. The Essential Skills are "enabling skills" that

- help people perform the tasks required by their occupation and in daily life
- provide a foundation for learning other skills
- enhance people's ability to adapt to change

The nine Essential Skills identified by HRDC are:

Reading Text
Writing
Document Use

Numeracy
Thinking Skills
Working with Others

Computer Use
Continuous Learning
Oral Communication

Development

Prior to 1994, work by researchers in Canada, the US, Great Britain and Australia had identified a set of skills that were needed in virtually any occupation. These are called the Essential Skills. In 1994, Human Resources Development Canada launched a study called the Essential Skills Research Project (ESRP). The ESRP sought to determine how these skills were used, or what they looked like, in a variety of jobs. The ESRP interviewed 3,000 workers in approximately 180 occupations to find out how specific skills, like reading, writing and numeracy, were applied in a given occupation.

Although Essential Skills had been identified previously, the HRDC Essential Skills inventory distinguishes itself by its focus on workplace authenticity. That is, the HRDC definitions are based on research in the workplace and on interviews with people using the skills to perform their jobs. The Essential Skills in this report refer specifically to those defined by HRDC.

Key Features

HRDC has examined the nine Essential Skills to determine what they mean in a range of occupations. Writing, for instance, has different requirements and therefore a different meaning for a food server than it does for a data entry clerk. With this in mind, HRDC further defines the Essential Skills according to their complexity over a number of

¹ Adapted from the HRDC Essential Skills Web site at:
<http://www15.hrdc-drhc.gc.ca/english/general/es.asp>, Retrieved Feb 22 - Feb 25, 2004.

dimensions. Additionally, HRDC provides occupational profiles that describe the Essential Skills in a job-specific context.

Complexity Ratings

Although the same Essential Skills are needed to perform any job, they are used in ways that range from easy to difficult. Complexity ratings describe how a single skill, such as writing, varies across different occupations. Complexity ratings correspond with those in the International Adult Literacy Survey.

Dimensions

A dimension is a sub-category within the complexity scale for some of the Essential Skills. A dimension refers to a specific feature of a single skill. For example, writing is further broken down to account for length, style and structure, and the content of the writing.

Profiles

The Essential Skills Profiles describe how each Essential Skill is used by workers in a job category or occupational group. They contain complexity ratings for typical tasks related to that skill with examples of how the skill is actually used on the job. The profiles also provide a standardized description of how the skill is used — this feature makes it easier to compare how skills are used across a range of different occupations.

Definitions

The nine Essential Skills are defined by HRDC as follows:

Essential Skill	Definition
Reading Text	Reading documents that are organized in sentences or paragraphs e.g. notes, memos, specifications, manuals, regulations, books, reports, journals Forms, labels and text in tables and charts if they include at least one paragraph Print and non-print (e.g. computer screen) media Takes into account: Purpose for reading and types of texts 5 levels of complexity
Writing	Writing texts and writing in documents (e.g. filling in forms) Electronic writing (e.g. computer) 5 levels of complexity over 3 dimensions

Essential Skill	Definition
Document Use	Tasks that involve a variety of information displays including words, numbers, icons and other visual characteristics (color, line, shape) have meaning according to their spatial arrangement e.g. graphs, charts, tables, blueprints, drawings, signs, labels Print and non-print media (computer, flags, clocks, gauges) Documents with a paragraph of text are also included in Reading Text Documents requiring entry of information are also included in Writing Often requires two uses simultaneously e.g. reading/interpreting or writing/completing/producing 5 levels of complexity over 3 dimensions
Numeracy	Use of numbers and ability to think in quantitative terms Distinguishes between a worker's use of numbers and the level of understanding of the underlying concepts 5 levels of complexity over 2 dimensions in 4 application settings
Thinking Skills	Differentiates between five different (but interconnected) cognitive functions 5 Thinking Skills: Problem Solving, Decision Making, Job Task Planning and Organizing, Significant Use of Memory and Finding Information 4 levels of complexity over varying number of dimensions for each component (above)
Working with Others	Extent to which employees work with others to complete required tasks Examines four work contexts: alone; independently; with a partner; as part of a team No complexity ratings
Computer Use	Variety and complexity of computer use within occupational group 5 levels of complexity
Continuous Learning	Knowing how to learn Understanding own learning style Knowing how and where to find materials, resources and learning opportunities No complexity ratings
Oral Communication	Use of speech to exchange ideas and information with co-workers 4 levels of complexity over 4 dimensions

Note that some skills, like Reading Text, do not include dimensions in their complexity ratings. Additionally, Working with Others and Continuous Learning do not (as yet) have complexity ratings. For a full description of the Essential Skills Complexity Ratings, see Appendix A.

Test Review Summary

Introduction

The five tests under review present tasks requiring a range of literacy abilities. While some tests are brief and job-specific, others are lengthy assessments of aptitudes, knowledge and academic achievement. Nevertheless, each of the tests has features that influence the literacy levels needed to complete it successfully, and each may be used at some time to screen for entry-level positions. Accordingly, these features have an important influence on a job seeker's chances of success. And, while there is no specific pattern to the challenges presented in these five assessments, the difficulties they may present to an entry-level candidate have some characteristics in common.

Literacy Levels

As noted earlier, Essential Skills defines an entry-level job as any occupation one can enter with a high school diploma or less. Essential Skills complexity ratings for literacy tasks (Reading Text, Document Use and Writing) for these job categories typically fall between levels one and three. Similarly, the International Adult Literacy Survey (IALS) concludes that roughly 75 percent of the Canadian population has literacy ability levels between one and three (note that the two scales are comparable). According to these descriptions, then, level three is a reasonable level of complexity for a test that screens for entry-level jobs.

Results

Of the five tests reviewed, three fall into the level three category: the Company B Pre-screening Test, the General Aptitude Test Battery (GATB) and the Qwiz[®] Call Center assessments. The formats of these tests vary widely. The Company B test is designed in-house, is administered by pencil and paper and answers are recorded on the test sheet itself; the GATB is a long-established aptitude test consisting of 12 tests, administered by pencil and paper with answers recorded on a separate sheet; and Qwiz[®] assessments are professionally-developed workplace simulations, administered and scored online. What they have in common are clear instructions and fairly concrete tasks, in which the answer can be reached with little inference or background knowledge.² Sentences and paragraphs also tend to be short and use a vocabulary readily understood by an entry-level candidate.

Finally, instruction length does not seem to influence literacy levels. The Qwiz[®] simulations and the GATB include lengthy step-by-step descriptions of how to proceed. [Qwiz[®] and GATB also include visual features such as detailed graphics (Qwiz[®]) and

² Inference refers to the ability to reach conclusions with partial information or to "read between the lines." Background knowledge is the cumulative total of facts known by the reader, including specialized knowledge (Evetts & Gauthier, 2003).

boldface print (GATB) to further reduce the possibility of misunderstanding.] The Company B test, on the other hand, has very few instructions, and those it does have are incorporated into the task itself. In all three assessments, however, there is no area of doubt about what the task is asking the candidate to do or to demonstrate.

The Company A Aptitude Test and the Canadian Adult Achievement Test (CAAT) require literacy abilities beyond level three, and are thus considerably more challenging for an entry-level candidate. The difficulties they pose are considered separately.

The Company A test was designed in-house and takes about 30 minutes to complete. It is a pencil-and-paper test with answers recorded on the test sheet. Most of the literacy complexity scores for this assessment are within the 1 – 3 range. The word problems, however, receive a 3+ rating because missing or absent information and ambiguous language leave the tasks open to interpretation. As a result, the candidate may need to infer both what the question is asking and what the missing information consists of. In some cases, the candidate may have to fill in the blanks with background knowledge of how such word problems are constructed and solved. It is unclear whether the ambiguity of these problems is intentionally designed to test the candidate's thinking and reasoning skills or whether it results simply from unclear expression. The effect, however, is the same: an incomplete question, coupled with insufficient information to answer it, leaves the candidate at a distinct disadvantage.

The CAAT is a lengthy and comprehensive measure of an adult's educational achievement in various subject areas. It is administered by pencil and paper with responses recorded on a separate sheet. Levels B, C and D of the CAAT were examined for literacy features. Level B literacy complexity scores fall mostly in the 1 – 3 range, which reflect the test's mostly concrete tasks. CAAT Level C and D scores, however, range from 2 to 4+. With the exception of one set of ambiguous instructions in Level C, the CAAT instructions are clearly explained. Briefly, these higher scores are due in part to the rigour of the tasks (for example, multiple, undefined operations in word problems), and in part to the sophisticated level of background knowledge the tasks demand. It is worthwhile noting again that the CAAT is a measure of academic achievement. As such, it is designed to assess knowledge gained through education. As an educational assessment the CAAT is considered fair and accurate. The question remains, however, of how educational achievement translates into job performance, especially at the entry level.

All three CAAT levels place a heavy emphasis on academic knowledge (particularly in the Language, Vocabulary and Mathematics subsections), and because of this emphasis the literacy complexity ratings are difficult to approximate. Essential Skills and IALS complexity levels refer to authentic text samples, whereas the CAAT is a construct designed to assess specific skills and knowledge. As a result, the literacy complexity scores do not always reflect the relative ease or difficulty of a task. For example, the structure of a task and the information provided to complete it may combine to produce a low complexity score. However, if it requests specific knowledge, as in the Vocabulary section of all three levels, then the task may remain quite difficult regardless of its low complexity. Finally, completing these knowledge-specific tasks requires considerable background knowledge and inference, but it is not entirely clear what distinguishes background knowledge from more general knowledge, or careful reading from inference.

It is clear, however, that it is the need for these particular skills that may present the biggest barrier to success for entry-level candidates.

Essential Skills

The test review also focused on the question of whether the tests assess a candidate for the nine Essential Skills, and to what extent. To summarize, all of the tests measure some of the Essential Skills, some in limited ways and some in greater detail. How well they assess the Essential Skills seems to depend on the test's design and purpose.

For instance, the CAAT assesses five of the Essential Skills: Reading Text, Document Use, Continuous Learning, Numeracy and three of the five Thinking Skills. Given that it is by far the longest test under review, it might have been expected that the CAAT would assess more than these. Again, this is due to the CAAT being primarily a test of acquired academic knowledge, while the Essential Skills Inventory focuses on skills used in a workplace setting, using authentic workplace documents.

The GATB is a lengthy assessment as well, and assesses the same Essential Skills (but different subcategories and dimensions) as the CAAT. These include Reading Text, Document Use, Continuous Learning, Numeracy and three of the five Thinking Skills (Problem solving, Significant use of memory and Finding information). A considerably shorter test, the Company A assessment can be linked to four of the Essential Skills: Reading Text, Document Use, Numeracy, and one of the five Thinking Skills (Problem Solving). For a test this brief, it compares reasonably well to the CAAT and the GATB.

By contrast, the Company B test (similar in length to that of Company A), assesses six of the Essential Skills across more dimensions than the tests listed above. These include Reading Text, Writing, Oral Communication, Numeracy, Working with Others and four categories of Thinking Skills (Problem solving, Job task planning, Decision making and Significant use of memory). Finally, seven of the nine Essential Skills are assessed in the Qwiz[®] simulations: Reading Text, Document Use, Numeracy, Computer Use, Oral Communication, Working with Others and all five categories of Thinking Skills (Problem solving, Decision making, Job task planning, Significant use of memory, and Finding information).

What sets the Company B and Qwiz[®] assessments apart from the others is their workplace context. The Company B test includes a situational component in which candidates must judge how they would respond in a variety of on-the-job scenarios. Working with Others, Oral Communication and a broad range of Thinking Skills are among the Essential Skills required for these tasks. The Qwiz[®] assessments consist entirely of workplace simulations. Each assessment is a virtual workplace and its onscreen documents are authentic to that workplace. By approximating or creating a workplace context, then, these assessments focus on "doing" rather than "knowing," and therefore correspond more closely to the Essential Skills. The following table shows which Essential Skills are assessed by each of the tests reviewed.

Essential Skill	Company A	Company B	CAAT	GATB	Qwiz [®]
Reading Text	*	*	*	*	*
Writing		*			
Document Use	*		*	*	*
Numeracy	*	*	*	*	*
Thinking Skills	*	*	*	*	*
Working with Others		*			*
Computer Use					*
Continuous Learning			*	*	
Oral Communication		*			*

Conclusions

Any of the features (or combination of features) identified in the analysis can influence the literacy levels required to complete the assessments successfully. Visual features can help to reduce complexity, while ambiguous language can increase it. Likewise, any task that calls for higher-level inferences or specialized background knowledge may increase complexity beyond the level of the majority of candidates. In other words, the more concrete a task is, the more likely it is to be within the range of most people's ability.

It is reasonable to conclude, then, that for some kinds of assessments, adjusting these features could reduce the required literacy levels while leaving the content intact. For instance, on a test that requires a candidate to demonstrate his or her ability to solve word problems, reducing literacy complexity would make the test more accessible while still assessing the quantitative task. On the other hand, reducing complexity would not significantly improve accessibility on tests that require specific background knowledge.

Adjusting literacy levels offers a partial solution to improving the match between entry-level candidates and the tests that are used to assess their job-related abilities. Defining and assessing these abilities requires careful thought about what is the most reliable indication of future job performance: the candidate's knowledge gained through academic achievement; whether he or she can perform specific tasks with accuracy; whether the candidate can demonstrate how he or she would respond to various situations on the job; or a combination of all of these. Above all is the question of how to design a fair and accurate test with these assessment goals in mind.

On one hand, it would seem that a test that assesses the broadest range of Essential Skills would be optimal, especially if the test is used as an initial screening tool. Tests with an emphasis on workplace situations appear to do this best. On the other hand, if the test is just one of many criteria used in the hiring process, then the Essential Skills may be

assessed elsewhere, such as through an interview or demonstration of work. The accessibility and fairness of the pre-employment test depends on a balanced consideration of all of these factors.

Test Review

Introduction

The test review examines five locally administered pre-employment tests. Three of these are commercial products developed by professional test publishers and include the General Aptitude Test Battery (GATB) the Canadian Adult Achievement Test (CAAT), and the call centre assessments produced by the Qwiz[®] Corporation. The remaining two assessments were designed in-house by the employer. Examination of the tests focuses on the literacy skills needed to complete them successfully, and whether specific test features, such as language level and use, and visual presentation, are reasonably consistent with the skill levels required for an entry-level position. In addition to literacy features, the test review includes a summary of which of the nine Essential Skills the tests assess. The review concludes with a short summary of the Test of Workplace Essential Skills (TOWES), a test designed specifically to assess Essential Skills used in the workplace, with attention paid to the skills and skill level requirements for entry-level jobs.

Essential Skills literature describes an entry-level position as any occupation that can be entered with a high school diploma or less. The National Occupational Classification (NOC) profiles 150 of these occupational groups, which are included in skill levels C (Secondary school and/or occupation-specific training) and D (short demonstration of work or on-the-job training) of the NOC.³ These jobs have been cross-referenced with Essential Skills to create Essential Skills Profiles, which provide a full description of the most important Essential Skills for a specific job as well as the level of complexity required to perform them successfully.⁴ Examples of occupations in this category include manufacturing operators, assemblers and labourers, office equipment operators, food and beverage service workers, material handlers and shipping/receiving clerks.

Review Format

Description

Each of the tests is described in terms of its position in the testing marketplace (whether it is developed in-house or by a test publisher), what it is intended to assess, its content and format, how it is administered and scored, and whether it is norm-referenced.

Language and Literacy Features

Three general questions underpin the content analysis of the tests:

³ Detailed information on these occupational classifications is found at the NOC Web site at: <http://www23.hrdc-drhc.gc.ca/2001/e/generic/welcome.shtml>

⁴ Essential Skills Profiles are found at: http://www15.hrdc-drhc.gc.ca/English/general/all_profiles.asp

- What do the test questions require the job candidate to do or to demonstrate?
- Are these expectations communicated clearly?
- Are the expectations reasonable for an entry-level candidate?

Test content, including written instructions, is examined for language and literacy features that may not be easily understood or interpreted by a job candidate. Unclear instructions are open to misunderstanding. Lack of clarity may result from awkward or vague sentence structure or the use of sophisticated vocabulary where a simpler word would do. In other cases the question may be stated clearly, but it assumes the candidate's ability to call upon background knowledge or make inferences in ways that aren't obvious. In short, a question may contain a subtext that the candidate must understand and navigate in order to answer it correctly. The test analysis employs a range of methods which together create a profile of the literacy features of each test.

1. Readability of text

To put the test language into an age and grade-level context, it is analyzed using two readability tools — the Fry Readability⁵ program, which calculates the age level at which text can be read and understood, and the Flesch-Kincaid Grade Level program, which rates text on a U.S. grade school level. Both Fry and Flesch-Kincaid analyze text according to the number of syllables per word and the number of words per sentence. They are useful in that they help to describe the text in ways that are familiar to most people, and as such are used as an initial measure. Their accuracy is limited, however, in that they do not address what a reader is required to do with the text. As well, consistent results using these tools generally require a text sample of about 100 words, or a short paragraph. The question and answer formats of some tests do not provide a prose sample this size. Additionally, content may be arranged graphically in tables, charts or diagrams, and cannot be scanned by conventional readability programs.

2. Reading levels

To link the readability analysis to adult literacy levels, sections of each test is also analyzed using the Essential Skills and International Adult Literacy Survey (IALS) literacy complexity levels. Typically, Essential Skills complexity levels for Reading Text, Document Use and Writing fall in the 1 – 3 range for entry-level jobs. Occasionally a Level 4 or 5 is assigned for specific tasks. The International Adult Literacy Survey results show that over seventy-five percent of the Canadian population has literacy proficiency levels that range from Levels 1 – 3, and that over forty percent are at Levels 1 and 2.⁶ Accordingly, pre-employment tests (which may be used to screen for entry-level positions) and which require literacy proficiency beyond Level 3, are of particular interest to this study.

⁵ Fry and Flesch-Kincaid are widely available tools that assign age and grade scores to text passages.

⁶ *Assessing the Complexity of Literacy Tasks* © National Literacy Secretariat, 2003 is a comprehensive guide intended to help information designers understand the ability levels of the Canadian population in the areas of prose, document and quantitative literacy. The guide provides a model for assessing the complexity of literacy tasks and includes an explanation of its terms. This test review uses some of these terms and methods for analysis.

The IALS and Essential Skills scales are compatible. The Essential Skills complexity ratings for Reading Text refer to prose passages, and a separate complexity scale is provided for Document Use. The IALS literacy complexity levels refer to Prose, Document and Quantitative Literacy on a single scale. The scales provide similar information, but because of their different structures, they sometimes generate slightly different scores for the same text sample. Finally, it must be noted that the assigned levels are approximations based on the criteria in the rating scales and the format and content of the test itself. Where significant discrepancies in assigning levels arise, they are discussed in the test review. For a full description of the Essential Skills and IALS Complexity Levels, see Appendices A and B.

3. Discussion of complexity

A discussion of the complexity of the literacy tasks explains how some of the higher literacy levels assigned to test content were determined. As Evetts and Gauthier (2003) have shown, assessing literacy complexity levels requires a text (passage or document to be read) and instructions about what to do with the text (literacy task or test question). Two kinds of text appear most frequently in the assessments under review. Kinds of text and associated literacy tasks are described in the table that follows:

Kind of text	Features	Kind of task
Prose	Continuous passages of text organized in sentences and paragraphs	<ul style="list-style-type: none"> • Locate, understand and use information from texts such as news and magazine articles, instructions, manuals, regulations • Perform a quantitative task such as finding the information needed to calculate the answer to a word problem, where numbers are embedded in prose text
Documents	Text organized into structures such as lists and tables or arranged spatially on maps and drawings	<ul style="list-style-type: none"> • Locate and use information from texts (documents) such as forms, schedules, maps, tables, graphs • Perform a quantitative task such as balancing a checkbook, calculating times according to a schedule, or calculating an amount, where numbers are embedded in document structures

Quantitative literacy tasks (numbers embedded in text) are included in a separate category on the IALS literacy complexity scale. A description of the kinds of text found in each of the five assessments is included in the reviews.

Conditions that influence higher complexity ratings include the degree to which the test question is clear and direct, the adequacy of the information needed to answer it, whether

inference and background knowledge are required, and whether there is distracting information (either in the question or the text) that may produce a wrong answer.

Rating the complexity of some tasks is particularly imprecise, especially where inference and background knowledge are required. There is no clear line between what is considered general background knowledge, to which most people have access, and specialized knowledge. For instance, in a multiple choice vocabulary test, a candidate may be asked simply to "choose the best answer." The question is clear and all of the necessary information is provided, suggesting that the task has a relatively low degree of complexity. However, to successfully complete this task the candidate needs a fairly sophisticated vocabulary to draw upon. Similarly, inference, which is sometimes described as "reading between the lines," is a cognitive skill critical for proficient reading (Evetts & Gauthier). But degrees of inference can be difficult to assess, as at higher levels they become increasingly abstract.

In other instances, such as rating the complexity of test instructions, the literacy task is only implied. Isolated instructions, like those found in the Qwiz[®] assessments, have no task attached to them. Rather, it is implied that candidates are to read and understand the contents of these passages in order to proceed through the simulations that follow. It should be noted that the Essential Skills and IALS complexity rating scales refer to the skills needed to navigate authentic documents, such as pamphlets and brochures, application forms or other informational reading materials. Tests, on the other hand, are constructions which do not always fit with this model.

Essential Skills

Finally, the test review links the assessments to the Essential Skills. With the exception of TOWES, none of the tests under review has been specifically designed to assess the Essential Skills used in a workplace setting. All of the tests, however, assess Reading Text and Numeracy, and most assess Document Use. The test analysis examines the extent to which they assess these and the other Essential Skills, and at what level.

Test Profiles

Assessment	Format	Visual Features	Instructions	Emphasis
Company A	Question and answer Pencil and paper	n/a	Unclear for word problems Questions allowed during test for support	Problem solving
Company B	Question and answer Pencil and paper	n/a	Few instructions but tasks are clear	Decision making and judgement
CAAT	Question and answer Pencil and paper Separate answer sheet	Large blocks of text in reading comprehension No section headings to assist reader	Adequate, with one exception	Academic knowledge
GATB	Question and answer Pencil and paper Separate answer sheet	Use of boldface print clearly identifies questions Visual/perceptual sections with no text	Lengthy instructions Instructions read aloud by test administrator Questions allowed during test for support	Aptitudes and abilities
Qwiz[®]	Online	Onscreen documents clearly divided according to content Instructions include graphics of simulation documents	Lengthy instructions not supported by audio Cannot refer back to instructions during simulation	Multiple tasks under pressure

Although TOWES is not formally reviewed, its emphasis is on the Essential Skills.

Company A Aptitude Test

The aptitude test used by this company was designed in-house and was last revised in 2002.

Description

The test is administered by pencil and paper before an interview. It is used to assess a range of job-related skills, including literacy, numeracy, thinking/reasoning skills and common sense.

The test consists of 75 items for a possible score of 50 points. Test questions include:

- 7 simple calculations (add, subtract, multiply, divide)
- 7 word problems
- a multiple choice spelling assessment (2, 3 and 4-syllable work-related words)
- 50 data-accuracy (clerical) items (25 strings of letters and 25 strings of numbers) in which applicants are asked which pairs of letter/number sets are the same

Writing skills are not assessed by the test. Single word and short answer replies are required. Applicants have 30 minutes (more if needed) to complete the test without the use of a calculator. They may ask questions and have instructions explained verbally if needed. The test is not norm or criterion-referenced, and has not been assessed for reliability or validity. A score of 80 percent (10 or fewer wrong answers) is considered the acceptable cut-off for applicants.

Readability

Kinds of text found in Company A assessment

Prose	Document
Instructions	Data matching form
Word problems	(numbers)
Cloze passages	Data matching form
	(names)
	Word lists

Flesch-Kincaid and Fry readability scores for test instructions and word problems are shown in the table that follows. Average scores appear in the top row and the range, in parenthesis, in the bottom row.

Flesch-Kincaid and Fry Readability scores for Company A assessment

Text	Flesch-Kincaid (Grade)	Fry (Age)
Instructions	10.4* (0 - 12)	15 (12 - 20)
Word Problems	7.7 (5.5 - 12)	12 (7 - 15)

* Note that Flesch-Kincaid analysis may be inconsistent because of the small sample size. The instructions have been grouped to create a passage of prose text. Individually, the instructions range from 0 (sample too small to rate) to 12.4.

Literacy Complexity Levels

Essential Skills and IALS complexity ratings have been assigned to similar text samples, and are as follows:

Essential Skills complexity levels for Company A assessment

Text	Reading	Document Use (3 dimensions)		
		Document complexity	Finding / entering information	Using information
Word Problems	1, 2, 3, 3+			
Spelling	2	1	1	1
Data matching		1	1	1

IALS Literacy Complexity levels for Company A assessment

Text	Prose	Document	Quantitative
Word Problems			3, 3+
Spelling	1	2	
Data Matching		1	

Level 3+ complexity ratings result from the ambiguous wording of the text, not the tasks themselves

Discussion

The low to medium age, grade and complexity levels shown in the tables help to describe the Company A assessment as a straightforward series of tasks in which most of the necessary information is readily available. The arithmetic, spelling and clerical sections are similar to job-related activities.

However, the readability scores and complexity scales do not fully describe some areas where unclear communication could present problems to a job candidate. These problems can be described as gaps between what the assessment requires the candidate to do and what is actually communicated in the assessment language. In some cases higher level inferences are required to understand the task, and in others inadequate or missing information can mislead or cause confusion.

A description of these areas of difficulty follows. It should be noted as well that the reason they are not reflected in the Essential Skills and IALS complexity scales is likely because these scales refer most often to authentic documents that a candidate may encounter. An assessment, on the other hand, is a construction, sometimes designed to test a candidate's thinking and reasoning skills in ways that authentic text usually does not.

The first difficulty a candidate may encounter in the Company A assessment applies to all seven of the word problems, and has to do with word meaning. Preceding the word problems are seven arithmetic problems in which candidates are asked to "calculate" answers. Instructions for the word problems, on the other hand, direct the candidate to "answer" the questions. A candidate might reasonably assume that "calculate" and "answer" mean roughly the same thing. He or she might also assume that the term "word problem" refers to a quantitative task that requires a numeric calculation. Some of the word problems, however, do not require numeric calculations. They might be more accurately described as lateral thinking puzzles, since the answers can be reasoned without a calculation. Moreover, some of the questions contain numbers or quantities that distract from what the question is really asking.

Individual word problems require a candidate to make similar inferences where the given information is insufficient or ambiguous. In most cases, not quite enough information is provided to make the task concrete. The result is that the candidate must supply this information through inference or through the confidence of background knowledge of how the question "works." Sometimes a candidate is required to simply make a guess, because the given information could logically lead to more than one correct answer.

Essential Skills

The Essential Skills assessed by the Company A test are shown in the tables that follow.

Essential Skill	Dimension	Level
Reading Text	No dimensions for this category	1, 2 and 3+*

Essential Skill	Dimension	Level
Document Use	Complexity of	
	• document	1
	• finding/entering information	1
	• information use	1

Essential Skill	Dimension	Level	
Numeracy (1) Numerical calculation	• Money math	Operations required	1, 2
		Translation	1, 2
	• Data analysis	Operations required	1, 2
		Translation	1, 2

Essential Skill	Dimension	Level	
Thinking Skills	• Problem solving	Complexity of	
		• problem	1, 2, 3*
		• identifying problem	1, 2 and 3
		• identifying solution steps	1, 2 and 3

*Level 3 complexity ratings result from the ambiguous wording of the text, not the tasks themselves.

Comments

Four Essential Skills are assessed by this test: Reading Text, Document Use, Numeracy and Thinking Skills. Note that for Numeracy and Thinking Skills, only some of the dimensions are identified by the test.

Except for the word problems, the test uses a vocabulary similar to what might be used in the workplace. As well, spelling, arithmetic and clerical exercises are either similar to job-related activities or assess abilities necessary for the job. However, since there is no workplace context, links to the Essential Skills are approximate, and the levels of complexity are estimates.

Company B Pre-screening Test

This assessment was designed in-house and has been in use for about one and a half years.

Description

The test is administered by pencil and paper before an interview. It is used to identify people who are best suited to the job, and assesses a number of job-related skills including literacy, numeracy and thinking/reasoning skills.

It consists of 20 multiple-choice questions:

- 5 word problems
- 5 vocabulary questions
- 5 spelling questions
- 5 situational judgement questions

There is also a written component. Candidates are asked to write a short (100 words or less) paragraph describing what three specific job attributes mean to them and what additional attributes they would bring to the job if successful.

The test has a possible score 20 points. The writing component is not scored. It is used to assess whether the candidate can communicate clearly in writing with reasonably good sentence structure and spelling. An overall score of 70 percent on this pre-screening test is considered an acceptable cut-off for candidates. Candidates are given 20 minutes to complete it, and may ask for clarification if needed.

Readability

Text in the Company B test consists entirely of prose, including the following:

- Instructions
- Word problems
- Cloze passages
- Short paragraphs (workplace scenarios)

Flesch-Kincaid and Fry readability scores for this test are shown in the table that follows. Average scores are shown in the top row and the range, in parenthesis, in the row below. Instructions refer only to the writing task. The word problems have no heading or instructions; the situations have instructions incorporated into them.

Flesch-Kincaid and Fry Readability scores for Company B assessment

Text	Flesch-Kincaid (Grade)	Fry (Age)
Instructions	9.8	14
Word problems	9.0 (6.7 - 12.0)	14 (11 - 18)
Workplace scenarios	8.2 (6.8 - 8.8)	13 (11 - 13)

Essential Skills and IALS complexity scores are shown in the following tables. Numbers in boldface indicate more frequent scores.

Essential Skills reading complexity levels for Company B assessment

Text	Level
Word problems	2, 3
Vocabulary	2
Spelling	2
Situations	3

Essential Skills Writing Complexity levels for Company B assessment

Dimension	Level
Length and purpose of writing	2
Style and structure	2
Content of writing	3

IALS Literacy Complexity levels for Company B assessment

Text	Prose	Quantitative
Word problems		2, 3
Vocabulary	2	
Spelling	2	
Situations	3	

Discussion

A couple of features distinguish this assessment from the others under review. First, the text is entirely prose. Second, it is the only assessment to include a writing component. The content of the writing task is assigned a level 3 complexity rating because it is non-routine (Essential Skills writing complexity scale).

Also notable in this assessment are either the absence of instructions or their integration into the text. Nevertheless, reading complexity levels remain in the 2 – 3 range, since little inference is needed to determine what the tasks are requesting. The word problems are largely self-explanatory, as the question is stated clearly at the end of each of these. Similarly, each situation asks the candidate directly how he or she would respond. Spelling and vocabulary include brief instructions, and the writing assignment is explained in a short paragraph. There are no literacy features that would present difficulty to a job candidate.

Essential Skills

The Essential Skills assessed by the Company B test are shown in the tables that follow.

Essential Skill	Dimension	Level
Reading Text	No dimensions	2, 3

Essential Skill	Dimension	Level
Writing	Length and purpose of writing	2
	Style and structure	2
	Content of writing	3

Essential Skill	Dimension	Level	
Numeracy (1) Numerical calculation	• Money math	Operations required	2
		Translation	1
	• Scheduling or budgeting and accounting math	Operations required	2
		Translation	2
	• Measurement and calculation math	Operations required	2
		Translation	2

Essential Skill	Dimension	Level	
Oral communication	Range and complexity of	• communication functions	2
		• information	2
		• communication context	2
		• risk levels in failing communication intent	3

Essential Skill	Dimension	Level
Thinking Skills (1) Problem solving (2) Decision making (3) Job task planning and organizing (4) Significant use of memory	Complexity of	
	• problem	3
	• identifying problem	2
	• identifying solution steps	2
	Consequence of error	3, 4
	Reversibility of decision	2, 3
	Adequacy of information available	2
	Set procedure	2
	Body of similar decisions	1
	Judgement required	3
	Variety in work activities	3
	Whether task sequence is provided or determined by worker	2
	Whether priorities are provided	2
Extent to which work plan is disrupted	3	
Extent to which work plan is integrated	2	
3 types:		
Purposeful memorization of procedures (through repetition)	Yes	
Remembering for brief periods	Yes	
Learning occurs through one exposure	Yes	

Essential Skill	Dimension	Level
Working With Others • Types of work contexts	No dimensions or complexity	
	Work alone	Yes
	Work independently	Yes

Comments

The levels assigned to the Essential Skills are approximations. As noted elsewhere, the structure and content of a test cannot fully replicate the workplace environment on which the Essential Skills are based. However, in this brief pre-screening assessment, six of the Essential Skills are assessed: Reading Text, Writing, Numeracy, Oral Communication, Working with Others and four of the five Thinking Skills. This is due largely to the Situations section of the test, in which candidates are asked to use judgement and make

decisions in a number of workplace scenarios. Other sections of the test have a workplace context as well. Vocabulary and spelling words, for instance, are work-related, and the word problems are tasks a candidate might perform on the job.

Canadian Adult Achievement Test (CAAT)

The Psychological Corporation, Harcourt Brace and Company, 1988

Description

The Canadian Adult Achievement Test (CAAT) is designed to measure an adult's level of educational achievement in mathematics, reading and language. The CAAT has four levels:⁷

- Level A is for adults who have had one to three years of formal education
- Level B is for adults who have had four to six years of formal education
- Level C is for adults who have had at least seven to ten years of formal education and may or may not have completed high school
- Level D is for adults who have had eleven to twelve or more years of formal education and have probably completed high school

This review focuses on levels B, C and D. The CAAT includes subtests in vocabulary, reading comprehension, spelling, number operations, problem solving, mechanical reasoning, language, science and study skills (see table). Not all CAAT levels include each of these subtests. Level D was developed with higher-performing adult students in mind, and has a more academically-oriented focus. Although the test measures educational achievement, it is considered to be a usable workplace literacy assessment, given that some items in reading, comprehension, problem solving and mechanical reasoning correspond to work-related topics.⁸

Subtests in each of the CAAT levels

CAAT Subtests	Level B	Level C	Level D
Vocabulary	*	*	
Reading Comprehension	*	**	
Spelling	*	**	
Number Operations	*	*	
Problem Solving	*	*	
Mechanical Reasoning	*	*	
Language		*	
Science		*	*
Reading Vocabulary			*
Mathematics			*
English			*
Study Skills			*

⁷ The description of the CAAT is adapted from two papers by Maurice Taylor: Test Review: Workplace Assessment Tools, National Literacy Secretariat (no date) and Workplace Literacy Assessment Tools (1997).

⁸ Taylor, Workplace Literacy Assessment Tools.

The CAAT has a multiple choice format and is administered by pencil and paper. Candidates record their answers by shading the correct circle on a separate answer sheet. It can be hand or machine scored. Level C takes approximately 4.5 hours to complete; Levels B and D about 3.5 hours. Two kinds of scores can be obtained from the CAAT: content referenced (average scores for the test objectives have been determined) and norm referenced (candidate scores are compared to those of a reference group). The CAAT is considered valid and reliable.

CAAT scores produce grade equivalencies that range from K.0 to 12.9. Scores beyond 12.9 are considered post-secondary. The CAAT also yields scaled scores that can be compared across the four levels.

Readability

The following table shows the considerable range in the kinds of text found in the CAAT levels.

Kinds of text found in the CAAT

	Level B	Level C	Level D
Prose	Instructions Cloze passages Information paragraphs Job advertisement Persuasive letter Clothing label Questions Word problems	Instructions Cloze passages Information paragraphs Advertisement Thank you letter Warranty Questions Word problems Statements	Instructions Cloze passages Information paragraphs Event notice Opinion/humour piece Questions Word problems Statements Short fiction (used in sample exercise)
Document	Test answer sheet Schedule/timetable Pie graph Announcement	Test answer sheet Bus schedule Pie graph Sale price list (table) 2-item table 6-item table Bar graph Announcement	Test answer sheet Food label Research paper outline Table of contents Telephone book segment Newspaper index Line graph 2-item table Coupon Back of a cereal box Word lists (spelling) Dictionary entries Pronunciation guide Card catalogue entry Book index Advertisement Newspaper segments
Other	Poem	Poem	Long poem (ballad)

Samples of prose text have been analyzed for Flesch-Kincaid and Fry readability. The samples are prose passages common to all three levels. These include all the written directions in the test booklets and the text for Reading Comprehension and Problem Solving. Results are shown in the table that follows. The average Flesch-Kincaid grade-level and Fry age-level scores are shown in the top row. The range is shown in parenthesis in the bottom row.

Flesch-Kincaid and Fry Readability Scores

Text	CAAT Level B		CAAT Level C		CAAT Level D	
	Flesch (Grade)	Fry (Age)	Flesch (Grade)	Fry (Age)	Flesch (Grade)	Fry (Age)
Instructions	5.5 (3.6 - 5.6)	10 (8 - 11)	6.2 (3.7 - 11.7)	11 (8 - 20)	5.4 (2.5 - 5.9)	10 (6 - 11)
Reading Comprehension	7.1 (5.4 - 9.0)	12 (11 - 15)	10.7 (9.4 - 12)	18 (15 - 20)	12.0 (9.5 - 12)	17 (16 - 19)
Problem Solving	8.7 (4.1 - 11.7)	12 (8 - 13)	9.5 (3.6 - 12)	15 (8 - 20)	8.0 (2.6 - 12)	13 (7 - 20)

The reading grade and age-levels for these text samples correspond fairly closely with each other (grade is appropriate to age) and with the number of years of education each CAAT level is intended for. However, a couple of exceptions stand out. First, readability scores for test instructions are highest for CAAT Level C, and scores for Levels B and D are roughly the same. Lower scores for Level B reflect a simpler vocabulary for test instructions. The lower score for Level D, on the other hand, may be due to fewer and shorter instructions with less text, which require the candidate to have background knowledge of how to navigate test instructions generally. Second, reading comprehension scores for Level C are somewhat higher than the education level the test is intended for (7 - 10 years). These scores are also higher than those for Level D. Lengthy, dense text that uses 4 and 5-syllable words may account for these higher scores.

Literacy Complexity Levels

Text samples from subsections of each of the CAAT levels have been rated for Essential Skills and IALS reading complexity levels. They are shown in the tables that follow. Each of the subsections has from 15 to more than 50 questions, depending on the level. The scores shown in the tables indicate the complexity levels of the questions found in the subsection. Numbers appearing in boldface print indicate the most frequently-assigned level for that section of the test.

Essential Skills Complexity Levels for CAAT Levels B, C and D

CAAT	Reading	Document Use: 3 Dimensions		
		Complexity of Document	Finding Information	Using Information
Level B				
Vocabulary	2			
Reading Comprehension	1, 2, 3	2	2	2
Problem Solving	2, 3	1	1	1
Mechanical Reasoning	1			
Level C				
Vocabulary	3			
Reading Comprehension	2, 3, 4	2	2	2
Problem Solving	2, 3, 4	1, 2, 3	2	1
Language (4 subsections)				
a) Using reference books	2, 3, 4			
b) Sentence structure	4			
c) Punctuation & grammar	4			
d) Paragraph structure	4			
Mechanical Reasoning	1, 2			
Science	2	3	2	1
Level D				
Reading Vocabulary (3 subsections)				
a) Word meaning	3			
b) Inferring meaning from context	3, 3+, 4			
c) Usage	4			
Reading Comprehension	2, 3, 3+, 4, 4+	2, 3	3, 4	2, 3
Mathematics (Word problems)	2, 3, 4			
Spelling	4			
English (3 subsections)				
a) Punctuation & grammar	4			
b) Written expression	4			
c) Sentence structure	4	2, 3	2, 3	2, 3
Study Skills (Knowledge and use of reference materials; research planning)	3, 3+, 4	2, 3	2	
Science	3, 4			

IALS Literacy Complexity Levels for CAAT Levels B, C and D

CAAT	Prose	Document	Quantitative
Level B			
Vocabulary	2		
Reading Comprehension	3	2	
Problem Solving	1	1	2, 3, 4
Mechanical Reasoning	1		
Level C			
Vocabulary	3		
Reading Comprehension	1, 2, 3, 3+, 4, 4+	2	
Problem Solving		2, 3	2, 3, 4, 4+
Language (4 subsections)			
a) Using reference books	2, 3, 4		
b) Sentence structure	4		
c) Punctuation & grammar	4		
d) Paragraph structure	4		
Mechanical Reasoning	2		
Science	2	2	3
Level D			
Reading Vocabulary (3 subsections)			
a) Word meaning	3		
b) Inferring meaning from context	3+, 4		
c) Usage	4		
Reading Comprehension	3, 3+, 4	2, 3	4
Mathematics (Word problems)			3, 4
Spelling	4		
English (3 subsections)			
a) Punctuation & grammar	4		
b) Written expression	4		
c) Sentence structure	4		
Study Skills (Knowledge and use of reference materials; research planning)	3, 4	3, 4	
Science	3	3	3

Discussion

1. Level B

The IALS and Essential Skills Reading and Document Use complexity scores for this level fall mostly in the Level 2 – 3 range and correspond to the literacy levels of most of the population according to the IALS survey. Tasks in Level B are generally concrete, where requested information and given information match directly to each other. As well, instructions are clear and use simple vocabulary. In reading comprehension, for instance, candidates must read a short text and locate specific factual items. Most of these items are direct matches.

It is important to note, however, that the CAAT Level B is intended for adults with 4 - 6 years of formal education, and that some tasks requiring Levels 3 and 4 may pose considerable difficulty. Some of the problem-solving tasks, for example, require the candidate to identify relevant information, translate it into a numeric question, and then perform more than one operation to arrive at an answer. These tasks require the use of inference and may also rely on background knowledge of how such word problems are constructed. The use of multiple, undefined operations, as explained in the IALS description of Quantitative Literacy, accounts for the Level 4 score on the IALS complexity scale. On the Essential Skills scale the word problems are rated Level 3. As noted in the Introduction, the IALS and Essential Skills complexity scales provide different specific details about reading complexity.

These complexity scores are approximations. As noted already, the Essential Skills and IALS complexity scales refer to authentic texts, found either in the workplace or in general use to provide information and services. Texts for these purposes are often instructional or expository, and the tasks attached to them are mostly concrete, such as following a procedure or finding specific information on a topic. The more abstract a task becomes, or if it asks for the candidate to demonstrate specific knowledge, the more difficult it is to assess using these complexity scales.

For example, the vocabulary subtest in the CAAT Level B is given a complexity rating of Level 2 because it asks for one or more pieces of information in the presence of some distracting information. It may also require low-level inference (IALS and ES complexity scales). A correct answer, however, depends upon the candidate's knowledge of word meanings — in this case, 2, 3, 4, 5 and even 6-syllable words. Without a reliable vocabulary tool that rates words according to their difficulty, assessing these tasks remains a matter of judgement about what distinguishes background knowledge from general knowledge and what degree of inference is considered high or low. So, although the vocabulary tasks are rated fairly low on the complexity scale, they remain difficult, especially given the years of education the candidate has achieved and the broad reading and knowledge of language that are associated with a large vocabulary.

2. Level C

The vocabulary tasks in CAAT Level C present similar assessment difficulties as Level B. Instructions and format in this level are the same as those in CAAT Level B. However, the tasks in this subsection receive a Level 3 complexity rating because of the vocabulary words themselves. Again, assessing the difficulty of a vocabulary word is subjective. Comparatively, the Level B words are things and descriptions of things one might encounter in everyday life; Level C words, on the other hand, are more abstract, more about concepts and ideas and more likely to call upon specialized background knowledge.

Reading comprehension scores are most often Level 3. The tasks ask the candidate to match information given directly in the text, with some inference and use of background knowledge. Some tasks, however, require a high level of inference in order to identify the answer in the text. Others require the application of knowledge of literary forms (poetry, for example) in order to understand what the question is asking. Many of the reading comprehension questions are stated indirectly. Questions beginning with the words "what is likely" or "what is probably" are cues that no direct answer will be found in the text. The candidate must first infer what is being asked, and then apply background knowledge to formulate an answer.

Some of the instructions in Level C are confusing. In the Language section candidates are required to evaluate passages of underlined text for errors in grammar, punctuation or capitalization. The instructions read:

Some underlined parts have no error, but there is never more than one type of error in any underlined part.

Logically, this means that an underlined section may have more than one error but not more than one of the same type. In fact each underlined section has only one error, but the instructions fail to make this clear.

Finally, the Language subsection receives an overall complexity rating of Level 4. These tasks require a well-grounded background in sentence and paragraph structure, punctuation and other conventions of writing. Further, some tasks require a candidate to evaluate the quality of the text, and this requirement puts the tasks at Level 4 on both the Essential Skills and IALS scales.

3. Level D

As the complexity scores show, the CAAT Level D is a rigorous test of knowledge and skills. The considerations discussed in Levels B and C, above, apply as well to Level D. In the first two levels, inference and background knowledge are required occasionally and at varying levels. In CAAT Level D, however, they must be applied generally and at consistently higher levels. Evaluating text and inferring meaning from context, for

instance, require a sophisticated knowledge of the conventions of writing and how language works.

Conclusions

Each CAAT level is more demanding of a candidate than the last, and is consistent with its intended use as a measure of the knowledge and skills for given levels of academic achievement. Accordingly, the literacy skills needed to complete the CAAT successfully become progressively more sophisticated. In particular, the move from Level B to Level C is the most pronounced, as Level C requires considerably more specific knowledge and use of inference. By contrast, Level D is much like an extension of Level C.

The design and scoring of the CAAT takes these differences into account, so that a candidate is not penalized for writing one level over another. The difficulties outlined above are essentially the same but become more pronounced with each CAAT level. Similarly, difficulties applying literacy complexity ratings increase with each CAAT level. In the abstract and knowledge-based tasks it is not always clear where the line is drawn between specialized knowledge and general knowledge or common sense, or where careful reading leaves off and inference begins.

Instructions at all three levels are adequate (Level C Language excepted) but not comprehensive. For example, sample questions are provided at the beginning of each subtest, but sample answers aren't. As well, candidates are instructed to "mark the space" on the answer sheet, but no sample answer sheet or explanation of its format is provided. As well, the CAAT presents some challenges visually. It is dense with blocks of text, and even at Level B the reading comprehension selections are five and six paragraphs long.

Finally, the length of the CAAT and time taken to complete it, coupled with the progressively more challenging questions, suggest that some degree of success on the CAAT is related to a candidate's experience with test questions and test-taking in general.

Essential Skills

The following table shows which Essential Skills are assessed by the CAAT. Note that the complexity ratings are approximations only. Note as well that the tasks in each subtest of each CAAT level, combined with completing the answer sheet, could be scored as Level 1 in Document Use on the Essential Skills complexity scale.

Essential Skill	Dimension	Complexity/ CAAT Level		
		B	C	D
Reading Text	No dimensions	2, 3	3	3+

Essential Skill	Dimension	Complexity/ CAAT Level		
		B	C	D
Document Use	Complexity of			
	• document	1, 2	2	2, 3
	• finding/entering information	2	2	2 – 4
	• information use	2	2	2, 3

Essential Skill	Dimension	Complexity/ CAAT Level		
		B	C	D
Continuous Learning	No dimensions or complexity (Yes/No)			
	• Knowing how to gain access to a variety of materials, resources and learning opportunities		Yes	Yes

Essential Skill	Dimension	Complexity/ CAAT Level			
		B	C	D	
Thinking Skills (1) Problem solving	Complexity of				
	• problem	2, 3	2, 3	3, 3+	
	• identifying problem	1	1	3	
	• identifying solution steps	1	1	2	
	• assessing solution*	n/a	n/a	n/a	
	(2) Decision making	Consequence of error*	n/a	n/a	n/a
		Reversibility of decision*	n/a	n/a	n/a
		Adequacy of information available	1	1	1
		Whether there is a set procedure	2	2	2
		Judgement required	2	2	2
(5) Finding information	Complexity of				
	• locating information	n/a	2	3	
	• extracting/processing information	n/a	3	3	

*Levels could be assigned to these dimensions, but since the context is a test and not a workplace, they don't really apply. For instance, the consequence of error is obviously high, considering errors will lower the test score. Similarly, the degree of precision required is as much as the candidate is capable of and/or as much as the task requires.

Essential Skill	Dimension	Complexity/ CAAT Level		
		B	C	D
Numeracy (1) Numerical Calculation <ul style="list-style-type: none"> • Money math • Scheduling or budgeting and accounting math • Measurement and calculation • Data analysis (2) Numerical Estimation	Operations required	2	3	3
	Translation	2	2	3
	Operations required	2	3	3
	Translation	2	3	3
	Operations required	2	4	4
	Translation	2	4	4
	Operations required	3	4	5
	Translation	3	4	5
	Whether there is a set procedure	3	3	3
	Number of factors comprising item being estimated	2	2	3
	Amount of information available	1	2	3
	Consequence of error*	n/a	n/a	n/a
	Degree of precision required*	n/a	n/a	n/a

Comments

The CAAT assesses Reading Text and Document Use quite thoroughly, and it assesses some aspects of Continuous Learning, Thinking Skills and Numeracy. It is also worthwhile noting again that CAAT Levels C and D require an understanding of the conventions of writing. However, since no writing itself is required to complete the test, it is not included in these tables.

The CAAT assesses a broad range of knowledge that might be required for a variety of jobs. With the exception of some of the word problems, however, the tasks are not placed in a workplace context where a range of procedures, processes and choices exist. This reflects the CAAT's primary purpose as a measure of academic achievement, with an emphasis on knowing rather than doing. As a result, it is difficult to compare many of the CAAT assessment tasks to those outlined in the Essential Skills complexity scales.

General Aptitude Test Battery (GATB)

Form A, Published in 1983 (Booklet 1) and 1986 (Booklet 2) by Nelson Canada

Description

The General Aptitude Test Battery (GATB) was initially developed in 1947 by the United States Employment Service as an employment counselling assessment tool. Its development responded to a need for a tool that could quickly and accurately identify a candidate's ability to perform successfully in a variety of occupations.⁹ It has since undergone numerous revisions and modifications, and it continues to be the subject of extensive research.

The current version of the GATB assesses nine aptitudes using 12 tests. Eight of these tests are administered by pencil-and-paper; four are performance tests. Tests one through seven are presented in two booklets; Mark Making requires a separate sheet. Aptitudes and corresponding tests are shown in the table that follows. Those marked (P) are performance tests. This review focuses on pencil-and-paper tests one through seven.

Aptitudes assessed by the GATB

Aptitude	Test
General learning ability (Intelligence)	<ul style="list-style-type: none">• Three-dimensional space• Vocabulary• Arithmetic reasoning
Verbal	<ul style="list-style-type: none">• Vocabulary
Numerical	<ul style="list-style-type: none">• Arithmetic reasoning• Computation
Spatial	<ul style="list-style-type: none">• Three-dimensional space
Form perception	<ul style="list-style-type: none">• Tool matching• Form matching
Clerical perception	<ul style="list-style-type: none">• Name comparison
Motor coordination	<ul style="list-style-type: none">• Mark making
Finger dexterity	<ul style="list-style-type: none">• Assemble (P)• Disassemble (P)
Manual dexterity	<ul style="list-style-type: none">• Place (P)• Turn (P)

A comprehensive administration and scoring manual accompanies test packages. Test administrators are directed to read the instructions aloud to test candidates. As well, instructions to test candidates encourage them to ask questions to ensure that they understand what they are supposed to do. The GATB instructions are lengthy and comprehensive. Sample exercises, including correct responses and how to record them,

⁹ Summary information about the GATB is adapted from Kirman & Geisinger, 1986.

provide the test candidate with step-by-step guidance. These samples are provided for each of the seven pencil-and-paper subtests.

The tests can be hand or machine scored, and scoring stencils are provided for hand-scoring. As well, instructions alert those who are hand-scoring tests to watch for particularly low scores. An accidentally skipped question will cause inaccuracy on the remainder of the scoring sheet, and administrators are instructed to move the stencil down a space to account for this possibility. No such provisions are discussed for computer-scored answer sheets.

Candidates' test scores across the nine aptitudes are norm-referenced against established scores for 66 Occupation Aptitude Patterns (OAPs). OAPs are families of (non-supervisory) occupations, grouped according to the common aptitudes needed to perform them successfully. For each of the 66 OAPs a candidate receives an overall rating, as follows:

- H (High) – candidate score meets or exceeds scores for all aptitudes associated with that OAP
- M (Medium) – candidate score is similar to scores obtained by workers judged satisfactory in job performance
- L (Low) – candidate score is below satisfactory level and probability of satisfactory job performance is low

Finally, the administration manual also includes a detailed list of 2500 occupations (a subset of a list of 10,000) and their OAP categories.

The GATB has been used in Canada since 1964.¹⁰ It is used primarily in educational and employment counselling settings, although it is used as an employment selection tool as well. It is well-regarded by users, who report medium to high satisfaction with the clarity of the manual and test directions, ease of administration and precision of results. As well, the GATB is supported with documentation from Canadian occupation classifications.

Readability

The kinds of text a GATB candidate is required to read, and Flesch-Kincaid and Fry readability scores for prose text are shown in the tables that follow. The range is shown in parenthesis. Note that these are the only prose passages found in the GATB.

Kinds of text found in the GATB

Prose	Document
Instructions	Test answer sheet
Word problems (Arithmetic reasoning)	Vocabulary word lists Name comparison lists

¹⁰ Information about the GATB in Canada is from Pettersen & Turcotte (1996).

Flesch-Kincaid and Fry readability scores

Text	Flesch-Kincaid (Grade)	Fry (Age)
Instructions	6.1 (4.7 - 7.2)	11 (8 - 12)
Word Problems	7.7 (4.2 - 12)	13 (8 - 17)

Literacy Complexity Levels

Text samples and tasks have been rated for Essential Skills and IALS reading complexity levels. Note that the tasks in each of the seven tests under review could be assigned a Level 1 rating in the Document category on both scales. The task instructions, their associated visual symbols and the use of the answer sheet combine to make these exercises document-like. By Essential Skills and IALS definitions, however, they are not really reading or document activities, as there is no text attached to the task. Numbers in boldface indicate more frequent scores.

Essential Skills Complexity Levels for the GATB

GATB subtest	Reading	Document Use (3 dimensions)		
		Document complexity	Finding / entering information	Using information
Name Comparison		1	1	1
Vocabulary		1	3	3
Arithmetic Reasoning (Word Problems)	2, 3			

IALS Reading Complexity Levels for the GATB

GATB subtest	Prose	Document	Quantitative
Name Comparison		1	
Vocabulary		3	
Arithmetic Reasoning (Word Problems)			2, 3

Discussion

As the ratings in the tables indicate, literacy, reading and document complexity scores in the GATB fall in the 1 – 3 range. By the IALS survey definition, then, the GATB falls within the range of literacy ability for about 75 percent of the population. Level 3 scores for vocabulary and word problems result from the inference and background knowledge required for these tasks.

A number of literacy features stand out in the GATB. First, it contains very little text. The word problems and instructions contain the only prose passages, and the instructions are the most lengthy of these. Second, the instructions provide detailed examples of test questions and answers, and how to mark the answer sheet (but no visual sample of the test answer sheet is provided). As well, instructions are read aloud by the test administrator, providing additional support. Finally, on the Arithmetic Reasoning test, the word problems are simplified by the use of visual features. In these tasks, the question portion of the word problem — the sentence the candidate must translate into a numeric question — is presented in boldface print. As a result, less inference is required to understand what the question is asking, and thus the complexity levels for reading and numeracy (Essential Skills) are lower (provided the candidate understands the purpose of this visual feature).

As noted above, the GATB is not a heavily text-based assessment. Three of the seven tests (Three Dimensional Space, Tool Matching and Form Matching) rely almost entirely on perceptual abilities. Aside from the answer choices A, B, C or D, no text appears on the test question sheets. Because there is no text, these tasks do not meet the Essential Skills or IALS definitions of literacy tasks. Nevertheless, they may still be considered to have a literacy component, since applying an understanding of the written instructions to the visual/perceptual content is essential.

Essential Skills

Essential Skills identified in the GATB are shown in the tables that follow. Note that this review refers to the seven tests found in booklets one and two of the GATB. Mark Making and the performance tests may assess Essential Skills not identified here.

Essential Skill	Dimension	Level
Reading Text	No Dimensions	3

Essential Skill	Dimension	Level
Document Use	Complexity of	
	• document	1
	• finding/entering information	3
	• information use	3

Essential Skill	Dimension	Level
Continuous Learning	See discussion of this item in comments that follow this table	Yes

Essential Skill	Dimension	Level
Thinking Skills (1) Problem Solving	Complexity of <ul style="list-style-type: none"> • problem • identifying problem • identifying solution steps • assessing solution* 	1 1 1 n/a
(4) Significant use of Memory	Learning occurs from one exposure	Yes
(5) Finding Information	Complexity of <ul style="list-style-type: none"> • locating information • extracting/processing information 	1 2

Essential Skill	Dimension	Level
Numeracy (1) Numerical Calculation		
• Money math	Operations required Translation	3 3
• Scheduling and budgeting or accounting math	Operations required Translation	2 2
• Measurement and calculation	Operations required Translation	2 2
• Data analysis	Operations required Translation	2 2

Comments

The Essential Skills literature includes a description of what is meant by Continuous Learning, but no guidelines on how it is assessed. For the purposes of this review, if an assessment task matches or is similar to the Essential Skills description, then it is included. In the case of the GATB, no specific tasks meet the description of learning or

how learning occurs as outlined in the Essential Skills literature. However, Continuous Learning has been included here because the GATB is designed to assess the general learning ability associated with doing well in school.

The other Essential Skills the GATB assesses with some accuracy include Reading Text, Document Use, Thinking Skills and Numeracy. Some dimensions of the Essential Skills do not correspond closely to the structure or conditions of a test environment. For example, Problem Solving in the Essential Skills literature refers to workplace problems; complexity scores for this category in the table above refer to the complexity of solving word problems on the Arithmetic Reasoning test. The two activities are similar enough that the Essential Skill can be included here, but the complexity scores are approximate.

QWIZ[®] Call Center Assessments

Qwiz[®] Inc., Roswell, Georgia, est. 1986

Description

Qwiz[®] Call Center assessments are designed to measure how well a candidate will function in a call centre environment. They assess specific job skills such as listening, data entry speed and accuracy, spelling and computer navigation. Some tests are also designed to identify an applicant's ability to solve problems, provide customer service, handle anger and build relationships.

Qwiz[®] assessments are delivered online. Individual segments can be emailed to an applicant at home, or they can be administered in the workplace. The format is a workplace simulation, where a candidate follows a set of procedures similar to the tasks he or she would perform on the job by responding to a series of audio prompts.

The tests are scored immediately online, and a report is delivered to the test administrator. Scoring information includes the candidate's raw score and the raw score as a percentage, time taken to complete the test, number of times the candidate asked for prompts to be repeated, number of errors and what the specific errors were. The report also includes company and system-wide averages, and high/ low scores against which the administrator can compare the candidate's performance. Some test results also include the candidate's system-wide percentile rank. A comprehensive user manual and online or telephone technical support accompany the Qwiz[®] assessments.

Call centre assessments comprise four kinds of tests:

1. **Spelling**
Candidates listen to Standard English general terms or US place names and enter the correctly-spelled word in the space provided onscreen.
2. **Basic Simulation**
In a simulated telephone call, candidates listen to caller contact information and enter data into an onscreen form. The information the candidate hears is presented sequentially according to the layout of the onscreen form. In other words, a candidate proceeds through the form from left to right and top to bottom, and is not required to search the form for the correct row or column in order to enter data.
3. **Expanded Simulation**
Candidates navigate from a Call Waiting screen and respond to calls by either taking an order or by entering information into the appropriate onscreen form. After choosing which form is needed to complete the call, candidates proceed through it sequentially.

4. Contact Center Scenario

Candidates respond to a variety of customer requests through a series of simulated calls that require them to select verbal responses and enter information as necessary. The onscreen form is divided into three sections: a data entry area where information is added and the call is processed; written prompts indicating what the candidate should do next, with an option to hear the caller again; and a list of (written) verbal responses the candidate may select while talking to the caller. Clicking on a verbal response allows a candidate to hear it before it is selected.

Written instructions precede each test segment, and a candidate may take unlimited time to read and understand these. As well, there are two or three practice questions before the scored test begins. Some tests are timed and others aren't, but the time taken to complete a simulation is recorded regardless. Training sessions are available to test administrators, but they are not a formal part of the testing process.

Readability

Kinds of text found in Qwiz[®] assessments

Prose	Document
Instructions (short prose passages and multiple paragraphs)	Onscreen documents and forms

Test content for Qwiz[®] assessments consists entirely of interactive simulations where candidates enter data into onscreen documents. The test instructions are passages of prose text (with graphics) that explain how to proceed through the test. Average Flesch-Kincaid and Fry readability scores for the test instructions are listed in the table that follows.

Flesch-Kincaid and Fry readability scores for Qwiz[®] assessments

Qwiz[®] Instructions	Flesch-Kincaid (Grade)	Fry (Age)
Spelling	6	11
Basic Simulation	8	13
Expanded Simulation	8	13
Contact Center Scenario	9.4	15

Literacy Complexity Levels

Essential Skills complexity levels for Reading and Document Use are shown in the table that follows. Reading levels apply to the test instructions (prose text) and Document Use levels to the workplace simulation.

Essential Skills Reading and Document Use complexity levels

Assessment	Reading	Document Use (3 dimensions)		
		Document complexity	Finding information	Using information
Spelling	1	1	1	2
Basic Simulation	2	2	1	2
Expanded Simulation	2+	3	2	2
Contact Center Scenario	3	3	3	3

The following table shows the IALS reading levels for the same assessments. Again, as the test content (simulation) consists of onscreen forms, the Prose Literacy category applies to the written instructions for the assessment.

IALS literacy complexity levels for Qwiz[®] assessments

Assessment	Prose	Document	Quantitative
Spelling	1	2	
Basic Simulation	2	2	
Expanded Simulation	2+	3	
Contact Center Scenario	3	3 3	

Discussion

Reading age levels for the Qwiz[®] assessments range from 11 – 15 and grade levels from six to 9.4. Required reading proficiency falls into Levels 1, 2 and 3. These levels reflect their concrete, direct instructions and relatively simple tasks that require only low levels of background knowledge or inference. Some background knowledge is required of these tasks, such as the spelling of general terms and place names, and knowledge of state abbreviations.

The higher reading complexity levels, at Level 3, arise from the need for a candidate to read, understand and remember the multiple steps for the exercises that will follow. The candidate doesn't have access to the instructions once the simulation has begun, and therefore can't refer back to these for support. It should be noted as well that no literacy task is attached to the instructions, and that the implied task is to read, understand and remember how to navigate through the simulations. In the case of the Call Center Scenarios, text and audio prompts are provided to help guide the candidate to the next step. The Call Center Scenarios also require some quantitative literacy tasks. These

involve calculating times and scheduling appointments. The tasks do not specify which operations need to be performed (and not all tasks require an operation), but they do require an ability to think in quantitative terms and to make some calculations as needed.

Finally, the sound quality on the spelling assessment is poor. Word endings are muffled and it is sometimes difficult to tell one word from another. For example, shiny/shining and occur/occurrence are hard to distinguish. Candidates may ask for words to be repeated, but it this lowers their score.

Essential Skills

Essential Skills assessed by the Qwiz[®] Call Center assessments are listed in the tables that follow.

Essential Skill	Dimension	Level
Reading Text	No dimensions	2, 3

Essential Skill	Dimension	Level
Document Use	Complexity of <ul style="list-style-type: none"> • document • finding/entering information • using information 	1, 2, 3 1, 2, 3 2, 3

Essential Skill	Dimension	Level
Numeracy		
(1) Numerical Calculation	Operations required	1
• Money math	Translation	1
• Scheduling or budgeting and accounting math	Operations required	1
	Translation	1
• Data analysis	Operations required	1
	Translation	1
(2) Numerical Estimation	Whether there is a set procedure	1
	Number of factors comprising item begin estimated	2
	Amount of information available	1
	Consequences of error	2
	Degree of precision required	2

Essential Skill	Dimension	Level
Computer Use	No dimensions	2

Essential Skill	Dimension	Level
Oral Communication	Range and complexity of <ul style="list-style-type: none"> • communication functions • information • communication context Risk levels if intended communication fails	3 2 2+ 2

Essential Skill	Dimension	Level
Thinking Skills	Complexity of	
• Problem Solving	<ul style="list-style-type: none"> • problem • identifying problem • identifying solution • assessing solution 	1 2 2 2
• Decision Making	Consequence of error Reversibility of decision Adequacy of available information Set procedures in place Existing body of similar past decisions Judgement required	2 1 1 1 1 2
• Job Task Planning	Variety in work activities Task sequence provided Priorities provided Whether work plan can be disrupted Whether work plan needs to be integrated Number of sources for work assignments	2 1 1 1 1 1
• Significant Use of Memory (3 Types)	No dimensions or complexity ratings <ul style="list-style-type: none"> • Type 1 – memorization through repetition • Type 2 – remembering for brief periods • Type 3 – learning occurs through single exposure 	Yes Yes Yes
• Finding Information	Complexity of locating information Complexity of extracting/processing information	1 1

Essential Skill	Dimension	Level
Working With Others	No dimensions or complexity	
<ul style="list-style-type: none"> Types of work contexts 	Work alone Work independently	Yes Yes

Comments

Notably, seven of the nine Essential Skills are assessed in the Qwiz[®] simulations: Reading Text, Document Use, Numeracy, Computer Use, Oral Communication, Thinking Skills and Working with Others. In the simulated workplace format, candidates can demonstrate skills that fall outside the scope of many tests. The skills are integrated, so that by performing the simulation a candidate uses a variety of skills simultaneously. For instance, Computer and Document Use serve as a foundation for a variety of activities, including listening, selecting verbal responses, making decisions and calculations, and exercising judgement. Further, since the simulation replicates a workplace, the onscreen documents are authentic (to this workplace), and thus provide a realistic setting in which to evaluate the Essential Skills.

The Test of Workplace Essential Skills (TOWES)

Currently there is one assessment tool available to employers, employees, and workplace educators that is designed specifically to test Essential Skills used in the workplace.

The Test of Workplace Essential Skills (TOWES) is an assessment tool consisting of a collection of tests, which together can assess a candidate's skills across three of the Essential Skills categories:¹¹

Reading Text	The ability to understand and use information contained in prose passages
Document Use	The skills and knowledge needed to understand and use information from documents such as tables, catalogs, maps and scale drawings
Numeracy	The ability to understand and use numerical information embedded in print

Just as the Essential Skills Inventory describes and rates the skill content of jobs in a uniform way, TOWES is designed to complement this methodology by *testing* the Essential Skills in a uniform way. TOWES results are compatible with both the IALS and HRDC Essential Skills complexity ratings. Results can therefore be consistent from one workplace to another, and are designed to fit with the development of national standards and performance-based assessments.

Two aspects of the TOWES are of specific interest to this project. One is that TOWES claims to give employers a way to fairly set and assess the skills and skill level requirements for entry-level jobs. TOWES developers note that this kind of an assessment would provide a more reasonable and valid benchmark for assessing suitability for a particular job than using benchmarks such as years in school. Developers also note that instructors and tutors in the literacy field can use TOWES results to help design programs to meet individual educational needs, and help students work towards attaining the skills needed for their job goal.

Currently, TOWES is being used only on a limited basis with demonstration partners and authorized assessment centres.

¹¹ Information about The Test of Workplace Essential Skills is adapted from www.towes.com.

Conclusions

This report was precipitated by the increasing use of pre-employment tests in the workplace, and by a perception that qualified entry-level job candidates may be getting screened out of the hiring process because they do not have the literacy skills needed to pass the tests. This is of special interest to literacy practitioners who help adult students prepare for future employment, including the task of passing pre-employment tests.

In the preceding study we were particularly interested in how well the tests assessed Essential Skills, and whether they demanded a demonstration of Essential Skills generally considered beyond the abilities of an entry-level candidate. The test analyses identify what features could cause difficulties for entry-level candidates, and the findings have relevance for employers, literacy practitioners, and job candidates alike.

Among the many issues and trends identified in the literature is the caution to employers that pre-employment tests should be used with care, as one of a number of selection tools. Further, job analysis should be a central part of test development to ensure that the test matches the skills required for that specific job. The perception of some job candidates, however, has been that the tests they have taken have not adequately assessed the Essential Skills required for the job, but instead tended to test for skills that would not be required for the type of work they were applying for.

Both the preliminary survey and the test analyses show that the type of test a candidate may have to complete, and its relevance to workplace Essential Skills, depends entirely on the test chosen by each individual employer. The findings provide evidence that some pre-employment tests, especially at the entry level, are perhaps not as accurate or consistent as HR personnel would suggest. As well, the ability of pre-employment tests to assess the Essential Skills is uneven. Some tests have features such as ambiguous language or unclear instructions, which may confuse a candidate. Other tests include highly complex tasks, including the ability to use inference, which require literacy levels generally beyond the ability of the majority of people applying for entry-level positions. Still other tests assess candidates for specialized background knowledge gained through academic achievement, and appear to have little connection to the kinds of skills used in a workplace setting.

In comparison, there are tests that lead candidates through a series of questions, or simulated situations, which closely mimic the Essential Skills needed for the actual job. The simulation replicates a workplace, so the documents used in the test are authentic. Situational assessments such as these provide employers with a testing tool that will most closely assess the Essential Skills used on the job.

Some tests assess a broad range of the Essential Skills while staying within a reasonable (Level 3) literacy complexity range.

Viewing pre-employment tests with these considerations in mind raises questions: Are the ability to use inference and apply (specialized) background knowledge necessary job skills at the entry level? If there are hidden or unintentional features that make the tasks unnecessarily complex, can the test be relied on to accurately predict job performance? The answers to these questions depend to a certain extent on how the tests are used — at what point in the hiring process they are administered and how their results are weighted against other factors.

Regardless of when and how they're used, however, if a test does contain features that screen out otherwise qualified candidates, then employers are not getting accurate results from their tests and they are narrowing their pool of potential employees.

It is important for literacy practitioners to know that pre-employment testing is on the rise. In preparing students for specific employment goals, instructors must consider not only the Essential Skills required to perform the job well, but additional skills that may be required to pass the pre-employment test. As the test analysis shows, this includes the experience and skill involved in test-taking itself — understanding the structure of different tests, correctly interpreting what test questions are asking, and knowing how to make the most of the time allotted under the particular test circumstances. As the research indicates, job candidates who may otherwise be qualified for an entry-level position could find this initial step in the hiring process to be the most difficult step they take.

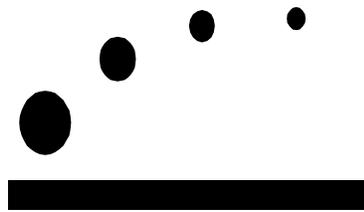
At the same time, instructors and students must keep in mind that for some employers, skills testing and setting education requirements are part of a broader hiring process. As part of our initial survey, employers were asked if all applicants are required to have a Grade 12 diploma. Out of the 22 employers who responded, nine answered yes and 13 answered no. This indicates that in some cases, while testing and screening for education requirements could be an initial hurdle for students, employers may place greater emphasis on discovering an applicant's experience and soft skills. In addition to preparing students for testing, practitioners should also refer students to employment service agencies for additional job search coaching.

Future research

The links between pre-employment assessment tools and the Essential Skills required for entry-level positions will be further examined in Part II of this project. There, Essential Skills used in particular jobs are compared with the Essential Skills tested for in the hiring process.

Workplace Literacy Special Initiative

Assessment Tools in the Workplace



*A Report on Pre-employment
Testing Practices
Part II*

**This report is part of a larger project
developed in cooperation with
Literacy Link Eastern Ontario**

Project Overview: Part II

This second phase of research follows the earlier investigation of the growing use of pre-employment testing in the workplace. *Assessment Tools in the Workplace: Part I* identified five locally administered pre-employment tests and assessed them to determine whether or not they were reasonably fair and consistent with the Essential Skills levels needed for entry-level jobs. More specifically, the study looked at the Essential Skills levels a candidate would need to successfully complete the test. It also noted additional Essential Skills the pre-employment tests assessed.

In Part I we found that the use of pre-employment testing is a growing trend; that Essential Skills and IALS literacy levels required to complete these tests vary widely; and that a candidate may need skills as high as Level 4 and beyond in order to succeed on some tests. And, given that some tests are used as initial screening tools, the higher Essential Skills levels required effectively block entry-level candidates from jobs they may well be qualified to do. For a full discussion of findings, see the conclusion section of Part I of this study.

The literature review conducted for Part I reveals unanimous agreement among human resources professionals, test publishers and academic researchers that a pre-employment test must accurately assess the skills needed for the job in order to be of value. Where Part I asks if the pre-employment tests in use are reasonably fair and consistent with the skills of an entry-level job candidate, Part II asks to what extent the tests reflect the specific skills needed for the job: Which Essential Skills do employees use on the job, and at what levels? What kinds of text do they read and write? Which additional Essential Skills do they use? Do employees use skills that fall outside the Essential Skills descriptions? Do questions on the pre-employment tests match these skills and levels?

For this phase of research we again sought the participation of local employers who had previously provided either the names of their tests or copies of the tests themselves. In Part II, employers or workers in three entry-level jobs provided detailed information about the kinds of numeracy and computer activities performed on the job, what kinds of texts they read and work with, what kind of writing they do, and to what extent they are able to make use of ongoing learning opportunities on the job. As well, interviewees were asked to identify job skills that fall outside the Essential Skills definitions. Data gathered from the interviews was rated according to the Essential Skills complexity scale. Essential Skills were scored and charted to produce job activity profiles like those generated for the test analysis in Part I. Finally, the two profiles are compared to show the relationship between job and test activities.

Executive Summary

Introduction

The second part of this study investigates the relationship between pre-employment tests and the job tasks entry-level workers perform. Three entry-level jobs are examined in detail: Outbound Selector at a distribution warehouse, Security Patrol Officer, and Customer Care Representative at an inbound call centre. The pre-employment tests used to screen candidates for these jobs were analyzed in Part I. Part II compares this data to information about job tasks gathered in workplace interviews. The following six Essential Skills are investigated:

Reading Text	Computer Use
Document Use	Numeracy
Writing	Continuous Learning

Job activities are categorized according to the Essential Skills used to perform them, and are assigned corresponding Essential Skills complexity levels. The resulting tables provide a basis on which to compare specific test and job task features.

Workplace Interviews

The employees interviewed were asked to describe the following:

- Five main job activities
- Three most important job skills
- What kinds of texts and documents they read and write on the job
- Details about length and purpose of specific literacy tasks
- Level of difficulty performing these tasks
- Math and computer tasks and skills needed to perform them
- What kind of job training occurs and how it is delivered
- Activities associated with ongoing learning

In each of the workplace interviews, employee descriptions of job tasks match those listed in the NOC profiles for these entry-level jobs. Essential Skills needed for the jobs also correspond to those listed in the Essential Skills profiles.

Test and Job Task Comparison

The job task information and corresponding Essential Skills levels analysis provide a basis for evaluating whether the pre-employment test is a reasonable assessment. A task-by-task comparison of test items and job activities shows where they are either similar or

require similar skills. Comparing the Essential Skills complexity levels needed to complete the test and job tasks shows where they are similar as well. The pre-employment tests vary in the degree to which test items and job tasks are similar, although all three use relevant test items. For Essential Skills complexity levels, all three tests show a close and sometimes identical match between test and job tasks. Tables comparing these items are found in the Test and Job Task Comparison.

Conclusions

The test and job task comparison show the degree to which the two correspond. Where test items and job tasks match both in kind and in required skill levels then the pre-employment test is seen as a fair assessment of the entry-level candidate's abilities. Based on these comparisons, the pre-employment tests in this second part of the study are fair and reasonable assessments for entry-level candidates applying for these jobs. The test items are relevant to the jobs, and the Essential Skills levels are comparable.

The job activities described in the interviews provide other important information about the pace and culture of the workplace and how skills are applied on the job. For example, skills are often integrated while performing a single task and an isolated skill, such as writing, may be applied within a complex structure that also includes planning, memory and judgement. In other words, the job activities described in the interviews help to illustrate the complexity of routine tasks, and it follows that complex job tasks are more difficult to assess on a pre-employment test. Findings from this study also show that workers may face additional Essential Skills challenges in the workplace. Please see the Conclusions section of this report for a full discussion of these findings.

Test and Job Task Comparison

Company A: Distribution Warehouse

Job Title: Warehouse Worker – Outbound Selector
NOC Job Title: Material Handler (7452)

Workplace and Job Description

The workplace is a food services warehouse and distribution centre. The entry-level job chosen for this study is Outbound Selector. Briefly, this warehouse worker prepares delivery orders by selecting products from warehouse bins and stacking them onto a small forklift. The National Occupations Classifications (NOC) lists some secondary school education and physical strength as requirements for this position.¹² The site's human resources manager gave the workplace interview for this position. He lists accuracy (attention to detail), efficiency, and physical dexterity as the three most important skills used on the job.

Reading Text, Document Use and Writing

The employee reads and writes the following kinds of text on the job:

Prose	Documents	Writing
Training materials, manuals, procedure and safety documents and books	Labels, including codes of letter or number strings and words	None listed
Cleaning schedules	Computer-generated data sheets	
	Onscreen data forms	
	Shortage reports	

Job tasks and corresponding Essential Skills levels are shown in the tables that follow.

¹² The work described in the interview corresponds closely to the NOC description. NOC information for this and other jobs in the study is taken from the NOC Web site at: <http://www23.hrdc-drhc.gc.ca/2001/e/groups/1424.shtml>, retrieved December 6, 2004.

Reading Text

Task	Level
Read training materials and manuals to understand policies, procedures and safety information	3
Read cleaning schedule and follow instructions	1

Document Use

Task	Level
Read number or letter string codes on pick sheet and match codes to product bins and products	1
Enter numbers onto paper short sheet when enough product isn't available to fill order	1

Writing

This position requires no formal writing tasks. To complete a shortage report, a worker typically enters numbers onto a form and signs it. Activities like these are included in Document Use.

Discussion

Note that the workplace requires and provides a significant amount of training both before formal work begins and on an ongoing basis. While some of this consists of hands-on learning, the new employee must also be able to demonstrate an understanding of company policies, procedures, and especially safety regulations. Much of this kind of training is text-based (manuals, text books), and reading levels needed to understand it (Level 3) are considerably higher than the Reading and Document Use skills needed to perform job duties.

Other Essential Skills

Numeracy, Computer Use and Continuous Learning skills used in this position are shown in the tables that follow. Note that Thinking Skills, Working with Others and Oral Communication were not a focus for this study.

Numeracy

Task	Level
Money Math Calculate total pay based on rate/hour and overtime	2
Scheduling/Budgeting/Accounting Plan shift activities according to orders listed on pick sheet and location of products in warehouse, taking into account how much time will be required	2
Count product and reconcile to order form	1
Numerical Estimation Estimate time needed to fill an order	1
Estimate weight and volume of order	1
Measurement and Calculation Calculate product shortages	1

Computer Use

Task	Level
Enter data into terminal to receive shift work orders	1

Continuous Learning

Task	Level
Ongoing learning occurs <ul style="list-style-type: none"> • as part of regular work activity • through co-workers • through formal training offered in the workplace • as needed or if requested by worker 	No complexity levels

This workplace provides comprehensive job training before formal work begins. Most of this is related to occupational health and safety, and employees must pass additional tests on this material. Ongoing safety training is also required at regular intervals.

Discussion

The tables show that the Essential Skill levels for this position consistently fall in the Level 1 – 2 range. The single exception is for reading and understanding training manuals, company policies and safety procedures.¹³ The required skill levels are also consistent with those of an entry-level job, defined in Part I of this study as a job that can be performed with secondary school education or less. Additionally, the levels fall within the ability range of approximately 40 percent of Canadian adults, who are estimated to perform at IALS and Essential Skills Levels 1 – 2.¹⁴ Note that none of the job activities described in the interview fall outside the Essential Skills descriptions.

Pre-employment Test and Job Task Comparison

The company uses a pencil-and-paper test designed in-house to assess job applicants. The test is given before an interview and consists of 75 items for a possible score of 50 points. A full discussion of the Company A Aptitude Test is found in Part I of this study.

The following table compares test items to the job tasks described in the workplace interview.

Tasks on pre-employment test	Description of job tasks
7 arithmetic questions – add, subtract, multiply and divide	Fill delivery orders by selecting products from warehouse bins and stacking them onto skids
7 word problems (not job related)	Match product codes on pick sheet to codes on warehouse aisles, bin numbers and product
11 spelling questions – choose correctly-spelled word from a list of four to complete the sentence (job-related vocabulary)	Methodically "build" a skid so that product is stacked for efficient delivery
25 data matching items – company names	Count product and confirm quantities on pick sheet
25 data matching items – number strings	Report product shortages

Some test items correspond directly to the kinds of activities an employee must perform on the job. For instance, to fill an order correctly the employee must match product codes

¹³ Note also that the levels derived from the workplace interview correspond closely to the Essential Skills profile for Material Handlers (7452). Essential Skills profile for this job was retrieved November 24, 2004, from: <http://www.15.hrdcdrhc.gc.ca/English/profiles/95.asp>.

¹⁴ *Assessing the Complexity of Literacy Tasks* ©, National Literacy Secretariat, 2003.

quickly and accurately. Data matching accounts for 50 of the 75 items on the test. Similarly, the employee regularly uses simple arithmetic to fill orders and to calculate and report shortages. These skills are tested in the arithmetic section.

The word problems and spelling questions on the aptitude test show less direct correspondence to the described job tasks. However, spelling work-related words and using skills like logic and reasoning to answer word problems are relevant to the job tasks. Matching product labels and reading and understanding work procedures are activities where spelling may be important. The worker also needs to "build" a skid efficiently, which means knowing the layout of the warehouse and the location of products and then planning the order of selection to ensure that trucks are loaded according to their delivery schedules. The word problems on the test may assess these sometimes complex thinking skills. The word problems present some difficulties, however, which are discussed at the end of this section.

The next table compares Essential Skills levels required to complete items on the test to the levels needed to perform the job.

Essential Skill	Assessed on test	Used in workplace
Reading Text	1, 2, 3+*	1, 3
Document Use	1	1
Writing	Not assessed	Not used on the job
Numeracy	1, 2	1, 2
Computer Use	Not assessed	1
Ongoing learning	Not assessed	Used formally in safety training and informally as needed

*Complexity level of 3+ due to the lack of clarity in the way the questions are worded (Word Problems).

The table shows that Essential Skills levels for test items correspond closely to job tasks, suggesting that the test accurately measures the skill levels required for the job. Levels for Document Use and Numeracy are identical, and levels for Reading Text fall within a similar range. Lack of clarity in the word problems sufficiently increases the complexity of Reading Text by requiring significant use of background knowledge and inference.

Comments

The above comparison shows that the pre-employment test is reasonably well-tailored to the tasks required for the job. Test tasks are generally relevant, and the Essential Skills levels are a close match. The complexity of the word problems are the exception. As discussed above, the need to use background knowledge and inference place Essential Skills levels for Reading Text beyond Level 3, and may present considerable difficulties for the entry-level candidate.

Another significant difference between test and job tasks is in the kind of reading required for each. Word problems on the test are the only text that falls into the Reading Text category, where text is arranged in sentences and paragraphs. As part of job training, employees need to read and understand a variety of written materials, such as policy and procedure manuals and safety regulations. The word problems on the test present what IALS describes as quantitative literacy tasks, where numbers are embedded in text and the purpose for reading usually involves finding a numeric solution. While job-related reading may include some tasks such as these, its main purpose is to understand information in order to follow instructions and maintain a safe workplace.

With the exception of the word problems section, the test is reasonably fair in its assessment of entry-level candidates. Especially for specific job skills, like doing simple arithmetic and accurately matching product codes, it succeeds in matching test items to job tasks. This may be due to the relatively low complexity of the skills the company needs to assess. For instance, if the company needs to know if candidates can add and subtract and whether they can demonstrate sufficient attention to detail to perform the job, a test such as this provides a concrete and accurate assessment.

In other areas, especially where skill levels become more complex, the test is less successful at isolating specific skills. Reading selections on the test appear to target thinking skills over the ability to read and understand information, but the word problems are sometimes so unclear that they are confusing and may not meaningfully assess anything. Essential Skills levels for Reading Text for the test (3+) and for the job tasks (3) are moderate to high for an entry-level job. They appear particularly high for this position, where routine, work-related reading isn't a regular activity. But given that considerable reading is required for job training, this level is appropriate.

The issue of job training raises additional questions about the relationship between the pre-employment test and the actual job tasks. In the workplace interview at this company, job training was described as extensive and comprehensive and involving a variety of teaching media, such as texts, manuals, hands-on activities and video and audio tapes. Much of the training is about workplace health and safety, and new employees are required to pass additional tests demonstrating their understanding of these regulations. It is difficult to assess how much of this learning is text-based, and what kind of support is available to an employee who has difficulty with literacy tasks. If the training material consists mostly of written information, then it may be fair to assess reading at a higher level on the pre-employment test. However, if training information can be delivered successfully by other methods, then the reading level on the test may needlessly screen out otherwise qualified candidates.

Company B: Security Services

Job Title: Security Patrol Officer
NOC Job Title: Security Guard (6651)

Workplace and Job Description

The workplace is a security services company contracted to perform a variety of security and patrol functions to a wide range of customers. The entry-level job chosen for this study is Security Patrol Officer, whose main duties include performing mobile security patrols and alarm response, writing reports and participating in ongoing training. The National Occupations Classifications (NOC) lists some secondary school education and a driver's license as requirements for this position. Job training is usually provided by the employer. The employee interviewed for the study lists memory and time management, writing and people skills as the three most important skills used on the job.

Reading Text, Document Use and Writing

The employee reads and writes the following kinds of text on the job:

Prose	Documents	Writing
Company handbook and guidelines	General alarm response form used by company	Detailed shift notes recorded in a book that is passed on to officer on next shift
Site descriptions	Specific alarm response form for some clients	
Instructions and procedures	Signs, labels, hazard warnings and symbols	Detailed notes for personal shift record
Industrial safety regulations	Time sheets and schedules	Incident and occurrence reports
Notes and memos	Officer evaluation forms	
Text messages	Daily officer report	
	Equipment log	
	Activity log	
	Parking tickets	
	Maps, blueprints, floor plans	

Job tasks and corresponding Essential Skills levels are shown in the tables that follow.

Reading Text

Task	Level
Read new client site briefings to understand instructions and procedures	3
Read company handbook to understand policies and procedures	3
Read hazard warnings and industrial safety information	2
Read memos and activity reports from supervisors and co-workers	3
Read text messages from co-workers	2

Document Use

Task	Level
Select correct alarm response form from a number of similar documents and enter multiple pieces of information	3
Read and enter information into timesheets and schedules and other similarly structured forms	2
Read signs, labels and hazard symbols	2
Enter information into equipment and activity logs	2
Enter information into officer reports and evaluations	3

Writing

Task	Level
Write detailed shift information in log book passed on to co-workers	2
Write lengthy notes to self about shift activity, including information from patrol slips (integrate information)	3
Write detailed information into incident and occurrence reports	2
Write memos and text messages to co-workers	2

Discussion

Information in the tables illustrates how this position relies on effective literacy skills. The employee reads a variety of texts at Essential Skills Levels 2 and 3, and writes extensively at Level 2. As well, Level 3 writing, with an emphasis on accuracy and clear communication, is required for integrating information from a variety of records and slips.

Other Essential Skills

Numeracy

The employee states that he uses few math skills on the job, noting that if a situation is complex enough to require taking measurements and making other calculations, then usually the police are called. He does, however, use money math skills for calculating pay. He also makes extensive use of math skills associated with time management and scheduling. These are found in the table that follows.

Task	Level
Money Math Calculate total pay based on rate/hr and overtime	2
Scheduling/Budgeting/Accounting Plan shift activities according to location, expected length of call, number of calls per shift, possibility of unexpected delay	3
Reschedule shift duties when necessary	2
Numerical Estimation Estimate time needed for a call, number of calls per hour and per shift	2
Measurement and Calculation Calculate parking or seating capacity	2

Computer Use

The employee states that he doesn't use the computer at all in his work. Computer-generated reports and information are prepared exclusively by supervisors.

Continuous Learning

Task	Level
Ongoing learning occurs <ul style="list-style-type: none">• as part of regular work activity• through co-workers• through formal training offered in the workplace• as needed or if requested by worker• through reading or other forms of self-study• through off-site training	No complexity levels

The ability to make use of ongoing learning opportunities is essential to this position. Note that the employee listed ongoing training as one of the most important skills needed on the job. Job training occurs before formal work begins and is supplemented on an ongoing basis at regular intervals. As well, employees receive training for specific jobs and clients in order to become familiar with their locations, safety regulations and policies. Finally, employees make use of self-directed learning either through self-study or formal college training.

Discussion

Essential Skills levels for this position consistently fall within the Level 2 – 3 range, and are consistent with the ability range of approximately 75 percent of the adult population.¹⁵ This position requires effective skills in Reading Text, Document Use and Writing for the variety of tasks and the volume of text-based work it involves. Proficiency levels for these tasks, however, are within a range that can be considered reasonable for an entry-level employee.¹⁶

None of the job tasks described by the employee fall outside the Essential Skills descriptions. It is interesting to note, however, that use of the Essential Skills are integrated on the job, and in some cases rely on each other. For instance, the employee interviewed estimates that he fills between 10 and 12 pages of a small (7.5cm x 12.5cm) notebook per shift, in addition to recording entries in the notebook that is passed on to colleagues and completing other reports. While the content, purpose and style are routine, the accuracy of information depends on recalling information from memory. Effective completion of the writing tasks, then, is linked closely with Significant use of Memory.

¹⁵ *Assessing the Complexity of Literacy Tasks* ©, National Literacy Secretariat, 2003.

¹⁶ Note also that the levels derived from the workplace interview correspond closely to the Essential Skills profile for Security Guards (6651). Essential Skills profile for this job was retrieved November 24, 2004, from: <http://www.15.hrhc-drhc.gc.ca/English/profiles/95.asp>.

Pre-employment Test and Job Task Comparison

The company uses a pencil-and-paper test designed in-house to assess job applicants. It is administered before a job interview and consists of 20 multiple-choice questions and a writing sample, which is not scored. A full description of this pre-screening test is found in Part I of this study.

The following table compares tasks on the pre-employment test to the five main job tasks described by the employee.

Tasks on pre-employment test	Description of job tasks
5 word problems with work-related content, such as calculating parking capacity and pay with overtime	Conduct mobile security patrols for multiple clients
5 vocabulary and word usage questions with work-related content	Respond to alarm calls
5 spelling work-related terms	Perform bylaw enforcement
5 workplace scenarios where candidate chooses how to respond in a variety of job situations	Perform contract security services at multiple locations
100-word paragraph describing attributes candidate would bring to the job	Write reports, complete activity and equipment logs, time sheets and schedules

Notably, each of the five sections on the test has work-related content, placing the candidate in a workplace context. The word problems are tasks an employee would need to perform on the job and the scenarios are typical situations an officer may have to respond to. Three of the five sections — spelling, vocabulary and writing — assess reading and writing skills. This is a reasonable focus for the test, given the volume and variety of reports and documents an employee is required to complete on a shift.

The writing assessment on the test is not scored, but is submitted by the candidate as a sample only. In the initial interview for Part I of this study, the district manager of this company explained that the purpose of the written paragraph was to assess whether or not a candidate could communicate reasonably well in writing. Forms and reports need to be legible, and occurrences need to be reported accurately and in a way that others will understand.

The next table compares Essential Skills levels required to complete items on the test to the levels needed to perform the job.

Essential Skill	Assessed on test	Used in workplace
Reading Text	2, 3	2, 3
Document Use	Not assessed	2, 3
Writing	2, 3	2, 3
Numeracy	1, 2	2, 3
Computer Use	Not assessed	Not used on the job
Ongoing learning	Not assessed	Used extensively on the job

Essential Skills levels for test and job tasks correspond closely, though there are a few differences. The test doesn't assess Document Use, which is used extensively on the job. Numeracy tasks on the test are at levels 1 and 2, whereas on-the-job Numeracy tasks are slightly more complex, at levels 2 and 3. During the workplace interview, the employee described situations in which a large number of variables needed to be assessed when planning shift activity, and this information accounts for the slight difference.

Comments

Test items assess the ability to perform actual job functions fairly directly, and are presented in a workplace context. The match between the test and job tasks is most evident for concrete activities, such as making specific calculations. These test items also yield concrete "yes" or "no" answers about whether a candidate can perform these job functions.

Writing is more difficult to assess in this way, yet the test succeeds by asking for a writing sample that will not be scored. It asks, "Can the candidate communicate reasonably well in writing?" and based on his own experience and knowledge of the job, the manager who reads the sample can answer either "yes" or "no."

For other job skills, such as decision making, judgement and working with people, the workplace scenarios attempt to get a picture of how the candidate would respond on the job. Again, the test seems to be asking, "Will the candidate make the right decision, yes or no?" Questions like these may also be designed to assess character and personality traits. While they are not unfair, they rely on a candidate's honest response, and in this may not always be accurate.

Overall, this pre-screening test is a fair assessment for entry level candidates, as indicated by the similarities between test items, job tasks and Essential Skills levels. Features of this job that stood out in the workplace interview were the volume and variety of writing and the thinking skills needed to make effective decisions and plan activities that include multiple variables. As noted earlier, much on-the-job writing relies on recalling events and details from memory. Similarly, performing some math-related job tasks, such as scheduling, requires using a variety of thinking skills. It is important to note, then, that although a job task like writing may be routinely performed at level 2, the task may be made more complex by its reliance on other Essential Skills.

Company C: Call Centre

Job Title: Customer Care Representative
NOC Job Title: Customer Service Attendant (1424)

Workplace and Job Description

The workplace is an incoming call centre that handles customer accounts for wireless telephone services. The entry-level position chosen for this study is Customer Care Representative. The National Occupation Classification (NOC) lists the employment requirements for this job as completion of secondary school and on-the-job training, which is usually provided.¹⁷ The employee lists computer use, customer service and navigating onscreen forms as the three most important skills for this position. He also notes that reading, writing, and math are skills he uses repeatedly, but that the tasks are straightforward and are performed without difficulty.

Reading Text, Document Use and Writing

The employee reads and writes the following kinds of text on the job:

Prose	Documents	Writing
Company manuals and guidelines	Tables and schedules	Notes and memos
Text book	Onscreen documents	Customer account activity
Policies and regulations	Signs and labels	Event tracking log
Email		
Memos and notes		
Company intranet		

Job tasks and corresponding Essential Skills levels are shown in the tables that follow.

¹⁷ The work the employee describes corresponds closely to the NOC description. NOC information for this and other jobs in the study is taken from the NOC Web site at:
<http://www23.hrdc-drhc.gc.ca/2001/e/groups/1424.shtml>, retrieved December 6, 2004.

Reading Text

Task	Level
Read company manuals and guidelines to learn and understand job procedures	3
Read textbook to learn specifics about job, to locate specific information for tests, and to scan for information (training period only)	3
Read and understand policies and regulations	3
Read onscreen forms to locate information	2
Read memos and email from supervisors	2

Document Use

Task	Level
Read customer account screens to locate and update information	2
Read tables and schedules for product availability	2
Fill in onscreen forms to record events during shift	2
Choose from multiple documents for required task, and enter information onscreen	3

Writing

Task	Level
Record activity on customer account screens	2
Complete event-tracking log for next customer care representative	2
Jot down hand-written notes during customer call	1

Essential Skills levels fall in the 1 – 3 range and are consistent with the skill levels required for an entry-level job. Note that the level 3 ratings assigned to Reading Text are for tasks completed during on-the-job training, before formal work begins. Although

levels for most other literacy tasks fall in levels 1 and 2, reading, writing and document entry tasks make up a significant portion of the worker's duties on a shift.

Other Essential Skills

Numeracy

The employee states that very little math is required on the job. Calculations needed to update customer account information, such as recording payments or changes in service, are done automatically in the onscreen forms. However, some tasks do require the ability to think in quantitative terms. They are as follows:

Task	Level
Money Math	
Receive payments and enter amount on customer account screen	1
Scheduling/Budgeting/Accounting	
Schedule changes in services or products	1
Determine which service package best meets customer needs	2
Numerical Estimation	
Calculate rough estimate of how much a new feature will cost	1
Data Analysis	
Compare costs of different services	1
Calculate average savings/cost of new feature	1

Computer Use

The employee identifies computer use as one of the most important skill for this job. He is referring to the ability to keyboard quickly and accurately, to know his way around the keyboard (different function keys), and to be able to navigate between numerous information screens. He estimates he uses at least seven computer programs on a regular basis. Aside from time spent on breaks, the employee spends his entire shift at the computer.

Task	Level
Select software/screen that corresponds to caller request; move between screens as needed	2
Key in data while talking to customer	2
Use company intranet	2
Send and receive email	2

Continuous Learning

Task	Level
Ongoing learning occurs <ul style="list-style-type: none"> • as part of regular work activity • through co-workers • through formal training offered in the workplace • as needed or if requested by worker 	No complexity levels

Workers at this call centre receive extensive (four – six weeks) job training before formal work begins. The employee interviewed notes that training focuses on policies, procedures, and how to perform specific job tasks effectively, with little emphasis on occupational health and safety. He notes as well that he believes the skills he has learned on the job, such as customer service, oral communication and computer use, are readily transferable to other occupations.

Pre-employment Test and Job Task Comparison

Qwiz[®] Call Center assessments are used to screen candidates for Customer Care Representative positions. The tests are administered online, before an interview, and are designed to simulate the workplace. Candidates perform a variety of tasks in the Qwiz[®] simulations. They are listed in the left-hand column of the table that follows. The column on the right shows the employee's description of his main job tasks.

Tasks on pre-employment test	Description of job tasks
Listen to Standard English general terms or US place names and enter correctly-spelled word into onscreen form	Answer incoming calls from customers regarding their wireless telephone accounts
Listen to caller contact information and enter data into onscreen form	Listen to customer requests and advise about products and services available to match their requirements
Navigate from a call waiting screen and choose the correct onscreen form for data entry	Provide information about account status, billing, pricing, and other account details; schedule new services
Respond to customer requests through a series of simulated calls	Enter all information into onscreen documents
Enter order information or provide requested information by completing an onscreen form	Handle customer complaints and resolve billing or service disputes as necessary
"Talk" to caller and resolve disputes by selecting from a list of written prompts	Write a record of customer account activity for use by co-workers
Enter data quickly and accurately	

Tasks on the pre-employment test correspond closely to the actual job tasks described by the employee. Providing customer service, receiving verbal information and recording it quickly and accurately into onscreen forms makes up the balance of activity in both sets of tasks. A comparison of Essential Skills levels shows the two sets of tasks to be similar as well.

Essential Skill	Assessed on test	Used in workplace
Reading Text	2, 3	2, 3
Document Use	1, 2, 3	2, 3
Writing	Not assessed	1, 2
Numeracy	1, 2	1, 2
Computer Use	2	2
Ongoing learning	Not assessed	Formal job training and ongoing training as needed

*Essential Skills levels for Qwiz[®] assessments are taken from *Assessment Tools in the Workplace: Part I*.

Complexity levels for test and job tasks are nearly the same, suggesting that the test is a fair assessment of job skills. Job training, as described in the workplace interview, requires reading and understanding and then following the instructions in training

manuals and textbooks. User instructions for the Qwiz® assessments involve similar literacy tasks. However, there is no writing component in the Qwiz® assessments, yet it is a regular activity on the job. A candidate who passes the pre-employment test may be unprepared for this job requirement.

Keyboarding is not identified in the Essential Skills descriptions for Computer Use.¹⁸ It may fall into the category of job-specific knowledge, like knowing how to operate other kinds of equipment. Nevertheless, the employee identifies proficiency at the keyboard as the basis of computer use for this job.

Comments

Overall, the Qwiz® assessments compare favourably to the tasks performed by the worker in this call centre, as test items and complexity levels closely resemble job tasks. One exception is writing, which is a regular job activity not assessed in the Qwiz® simulations. Features of the Qwiz® assessments simulate a workplace in a number of ways:

- **Content.** Tasks on the assessments replicate calls a worker would handle on the job. Essential Skills used to perform these tasks are integrated. For example, a single call may require a candidate to use Reading, Computer and Document Use, Numeracy and Oral Communication simultaneously.
- **Delivery.** The assessments are performed online in real time, much like an actual call, so that candidates have little time to consider their responses.
- **Scoring.** A variety of data is collected, including total number of calls per session, number of errors, number of keystrokes per minute, and the candidate's percentile rank for the assessment. Similar information is often collected in the workplace, where workers may be encouraged to meet call and sales quotas.

Given their similarities in kinds of tasks and levels of complexity, these workplace simulations present a fair assessment for the entry-level candidate. It is worth noting, however, that factors other than ability may hinder a candidate's performance. For example, the sound quality was poor on the spelling tests analyzed for Part I of this study, making it difficult to identify some words and spell them correctly. For this and other Qwiz® assessments, keyboarding skills (keystrokes per minute) are assessed and scored. A candidate with weak keyboarding skills is unlikely to do well on these assessments. Finally, the pressure of the timed environment may cause errors (although timing the test allows administrators to see how a candidate will perform under pressure).

¹⁸ A full description of the Essential Skills is found in Appendix A.

Conclusions

The workplace interviews conducted for Part II of this study yielded valuable information about Essential Skills used on the job. They also revealed additional factors that may influence how the job is performed. From the data collected in the interviews we have been able to ascertain the Essential Skills used and their corresponding complexity levels.

With a few exceptions, which are noted in the text of the Test and Job Task Comparison, the pre-employment test items match job tasks quite closely, both in the kinds of tasks performed and in the Essential Skills levels required for each. From the perspective of fairness, then, the tests are reasonable and correspond to the Essential Skills required for entry-level jobs.

The results of the test and job task comparison, however, raise additional questions about the role of Essential Skills in entry-level jobs. The Essential Skills level for Reading Text is Level 3 for each of the tests and jobs. For the most part, this level is required to read and understand training materials, such as safety regulations and company policies and procedures. After completing training, however, the worker does not routinely read at this level.

The emphasis on training was noted in each of the three interviews and helps to explain, at least in part, why entry-level jobs have become more complex. The demands of the marketplace and its thrust for increased productivity, coupled with quotas and government-regulated occupational health and safety requirements, combine to create unique pressures in the workplace. Add to this the issues of insurance and liability, and we get a picture of the workplace as a charged environment stressed by competing demands. As a result, there may be an increasing onus on workers to know and understand safety information and company policies in order to protect both themselves and the employer. Moreover, much of this information is text-based, so that even if higher Essential Skills levels aren't needed to perform a job, they are required to complete job training.

As well, the emphasis on training (especially health and safety) points out the importance of text-related skills in the ongoing learning process. All three workplaces require and provide training at regular intervals. In addition to these programs, the Security Patrol Officer regularly seeks additional learning opportunities on his own. Training may also be considered in terms of whether it is workplace-specific, as at the call centre, or whether it helps to develop skills that may be transferable to another job or another occupation. Company A provides occupational health and safety certification as well as training. The certification becomes a credential workers can carry to other employers. Call centre training, on the other hand, is very job-specific in its aim to increase the number of calls per hour and how to handle customers. Yet this training may also improve generic customer service and computer skills that may be transferred to another job.

While the participating employers have generously provided their time for workplace interviews, due to security and confidentiality concerns they have been reluctant to share samples of their documents. As a result, we cannot fully assess the complexity of routine forms and schedules or the content of training materials. We don't know, for instance, how well- or poorly-designed these reading materials are and whether they present additional challenges because of this. (The Company A aptitude test, examined in Part I of this study, is sufficiently confusing in its language to increase the complexity level significantly.) Similarly, we don't know how much literacy support may be available to a worker during the training period or how the training is delivered. Company A uses a variety of media, including video and hands-on exercises, but some portion is also text-based. Knowing the content of workplace documents and training materials would allow for a better estimation of the fairness of the literacy levels required for the pre-employment test.

It is interesting to note that the three tests succeed fairly equally in matching test items to job tasks, given that two are traditional pencil-and-paper tests and the third is delivered online as a simulation. The Company B test assesses more Essential Skills than the Company A test by adding workplace scenarios that assess judgement and other thinking skills. The Qwiz® assessments, however, assess and integrate the largest number of Essential Skills. As noted previously, this method of assessment may influence how a candidate experiences the test. For example, if judgement, setting priorities, oral communication and arithmetic are assessed simultaneously, a candidate may focus on one at the expense of another.

Tests like Qwiz® are often used as large-scale screening-out tools. Candidate scores are compared to a variety of sub-groups, such as people who have taken the test within the same demographic. Locally developed and administered tests, on the other hand, are more often used to identify who can perform specific tasks. These tests are scored locally, and, in the case of Company A and B, questions and additional time are permitted during the test. In short, it is more likely that a candidate with a borderline test score may be accepted on the basis of other strengths, such as a resume, experience or personal presentation.

Literature on the subject of pre-employment testing indicates that additional research is required to determine how successfully tests can both identify and retain the best candidates. The tests examined in Part II of this study are reasonable and fair in assessing the skills of entry-level candidates. We have no information, however, about employee retention, nor are we (or the participating companies) able to directly link high test scores with high performance. Given the multitude of pre-employment tests available to employers, the onus is increasingly on the entry-level candidate to prepare for any number of possibilities. For guidelines on how to help prepare students and job seekers for these tests, please see the following section, Applications in the Classroom.

Applications in the Classroom

Workplace Pre-employment Testing: What to Expect and How to Prepare

When preparing students for employment, literacy practitioners must respond to trends in the workplace. This research shows that the use of pre-employment testing for entry-level jobs has become commonplace. It is likely that most job seekers will encounter a test at some point in their job search, and information about what to expect can help them to prepare for this stage in the hiring process.

Below is a quick guideline to help students be at their best for pre-employment testing. It is followed by brief descriptions of the types of pre-employment tests an entry-level job candidate may encounter. Typical test features, such as what the test is designed to assess, how long it may take to complete, how it is completed (online or pencil and paper), and what kinds of questions it may ask, are provided as preparation guidelines. The information is not intended as a guide to any specific pre-employment test.

Following each description is a list of Web sites where practice tests are available. Job candidates can complete tests that contain features similar to those they may encounter in the hiring process. Some sites provide scoring results and include information on how to answer specific kinds of questions.

Finally, a list of tips on how to prepare for pre-employment testing is included.

General Guidelines

1. The skills students are learning in the classroom are life-long learning skills needed for job success. While workers in entry-level positions may not do a lot of reading and writing on the job, they may be required to pass health and safety certifications, or read detailed training manuals for equipment they are working with. During the interviews conducted for this project, workers reported that Essential Skills are needed for the ongoing learning and training required for retaining their positions.

Similarly, when students complete assessments as part of their adult education program, they are gaining test-taking skills that will help prepare them for pre-employment tests and workplace assessments.

2. Many tests are given prior to a job interview. If the applicant is not able to pass the test, they may be eliminated from the hiring process at this point. For this reason, we have included a list of tips to help the applicant ascertain whether they will be required to write a test, and what kind of test will be given.

Because testing has the potential to eliminate applicants from the hiring process, it is very important that students and job seekers understand the importance of soft skills such as communication skills and customer service skills, in the job search process. While an investigation of workplace soft skills fell outside the scope of this project, it emerged as an important element for people wanting to find and maintain employment. Employers we spoke to indicated that if a job applicant lacked some Essential Skills required for the position, but demonstrated a good command of the soft skills needed for the job, the employer would be willing to train them in the Essential Skills.

Kinds of Pre-employment Tests

A. These are tests designed by a test publisher that measure things like level of education or vocational aptitudes.

Example	How long it takes to complete	How it is completed	Kinds of questions/ focus
Canadian Adult Achievement Test (CAAT)	From 3 to 4.5 (or more) hours to complete, often over 2 days	Pencil and paper, with a separate answer sheet	Sections may include: arithmetic, word problems, vocabulary (match word to definition or identify synonyms), pattern matching, spatial patterning/reasoning, mechanical reasoning, reading comprehension Some include content knowledge of language, punctuation and science
General Aptitude Test Battery (GATB)		Usually multiple choice, where answers are shown by shading in a circle	

Additional Information

- These kinds of tests are the most lengthy, comprehensive and complex.
- Candidates are likely to encounter these kinds of tests only at larger organizations (more than 300 employees) where testing policies are determined by a parent company or head office.
- They may assess advanced skills; the CAAT Level C, for example, has a challenging vocabulary subsection, and requires significant background knowledge in language, punctuation and other academic content areas.

- The GATB also contains a verbal reasoning subsection, but the remainder of the assessment relies on visual matching/reasoning or on task performance.

Web site addresses for practice tests

www.kent.ac.uk/careers/tests/mathstest.htm -- Numerical Reasoning test, timed and scored. Contains arithmetic, sequencing/patterning, word problems, graphs, area. Good practice for the CAAT.

www.kent.ac.uk/careers/tests/synonyms.htm -- Verbal Reasoning: synonyms and antonyms; timed and scored. Good vocabulary practice for both GATB and CAAT.

www.kent.ac.uk/careers/tests/verbaltest.htm -- Verbal Reasoning test, timed and scored. Good reading comprehension practice for the CAAT.

www.morrisby.com/test_takers_guide/sample_questions.asp -- This site contains nine short sample tests, including: Abstract Reasoning, General Ability Verbal (2 parts), General Ability Numerical (2 parts), General Ability Perceptual (2 parts), Shapes and Mechanical. Scores are provided, as well as an explanation of the correct answer (when wrong answers are given). All the exercises provide excellent practice for both the CAAT and the GATB.

www.ase-solutions.co.uk/support.asp?id=60 -- General Abilities Test practice. This site contains sample questions for the Verbal, Non-verbal, Spatial, Numerical and Mechanical subsection. Scoring is not provided, but correct answers are provided and (in some cases) explained. Good preparation for GATB and CAAT.

B. These are online assessments designed by a test publisher that assess a candidate's ability to do specific job tasks, like typing, using software or navigating a computer screen.

Example	How long it takes to complete	How it is completed	Kinds of questions/ focus
QWIZ® Call Center Assessments	<p>Timed or not timed simulations that take about 5 - 12 minutes</p> <p>Candidates usually have to complete a series of these short tests</p>	Online	<p>These tests assess how a candidate would perform on the job; they simulate the workplace by directing candidates through a series of onscreen prompts</p> <p>Sometimes they present a work situation where the candidate is required to respond by using judgement</p>

Additional Information

These tests can assess a broad range of Essential Skills. However, they are entirely computer-based, and require average to high-level proficiency at keyboarding and computer screen navigation.

Web site addresses for practice tests

www.proveit.com/default.htm -- Click on Demos in the toolbar; five sample online tests are available at this site. Software, typing and audio most closely resemble workplace assessments. They use onscreen prompts to direct candidates through the tests and provide practice following instructions and navigating screens in a timed test situation.

C. These tests are designed in-house by the employer.

Example	How long it takes to complete	How it is completed	Kinds of questions/ focus
Used by many smaller employers	One hour or less	Pencil and paper Space is usually provided on the test sheet for answers	Usually used to assess English, math and thinking skills Often several components, including: vocabulary, spelling, arithmetic, accuracy Workplace situations may be presented where a candidate needs to show judgement

Additional Information

- Often these tests are informal; candidates are allowed to ask questions and request clarification.
- They usually have a math and language component, and occasionally writing.
- These tests are likely to have features and components similar to a variety of professionally-developed tests, such as the GATB or the CAAT.
- Watch for unclear or absent instructions in these tests, and ask for clarification where needed. Also watch for tricks -- be clear on what the question is asking.

Web site addresses for practice tests

Any of the sites listed above will provide an opportunity to practice math, language and thinking skills. As well, the Government of Canada site at: http://jobs.gc.ca/menu/ui_examinfo_e.htm has information and tips about testing, as well as a variety of timed and scored practice tests. Use this site for additional practice and test preparation.

Tips for Job Seekers

Preparing for the test

1. Ask for the name of the test you will have to write. If they won't tell you the name of the test, ask what kind of test it is. Is it a commercial test that comes in a test booklet, or is it designed in house? You may also ask:
 - What kinds of things does the test measure? For example: literacy, numeracy skills, reasoning, thinking, vocabulary, etc.
 - What kinds of questions are on the test? Fill-in-the blanks for word usage or vocabulary, arithmetic, word problems, etc.
 - How is the test completed? For example, is it a pencil-and-paper test, or is it completed online or on a computer?
 - How long will it take to complete? How much time is given?
 - Will you be allowed to see your test results after it is scored?

The employer may not be able to answer all of these questions, but asking them will give you some more information about how to prepare for the test.

2. Whether or not you have any information about the kind of test you have to write, it is worthwhile trying some of the practice questions available online. Doing this will:
 - Help you to become familiar with the way many test questions are worded. Read the question slowly and make sure you understand what it is asking you to do.
 - Give you an idea of the wide range of question types that may appear on a pre-employment test. This may help avoid surprises on the day of the test.
 - Give you some practice reading and answering questions under pressure. This may help you to relax on test day.
 - Give you a chance to see where your strengths and weaknesses are. Many of the online tests are scored, and indicate which of your answers are incorrect.
3. If permitted, ask questions during the test. Depending on the company and the test, you may be able to ask for an explanation or clarification.

APPENDIX A

Essential Skills Complexity Ratings¹⁹

Reading Text

Reading Text refers to prose passages in the form of sentences or paragraphs (usually one paragraph or longer), such as notes, letters, memos, manuals, reports and books.

Level 1	Read relatively short texts to locate a single piece of information Follow simple written directions
Level 2	Read more complex texts to locate a single piece of information or read simpler text to locate multiple pieces of information Make low-level inferences
Level 3	Choose and integrate information from various sources or from several parts of a single text Make low-level inferences from multiple sources Identify relevant and irrelevant information
Level 4	Integrate and synthesize information from multiple sources or from complex and lengthy texts Make complex inferences and use general background knowledge Evaluate quality of text
Level 5	Interpret dense and complex texts Make high-level inferences and use specialized knowledge

¹⁹ Information in these tables is adapted from the Essential Skills Web site at: <http://www15.hrdc-drhc.gc.ca/english/general/es.asp>, retrieved Feb 22 - Feb 25, 2004. Additional information and workplace examples of these complexity ratings are available at this site.

Writing

Writing includes writing text, writing in documents and non-paper-based writing (typing).

	Dimensions		
	Length and Purpose	Style and Structure	Content
Level 1	Writing is less than a paragraph Writing is intended to organize, remind or inform	Informal writing for small familiar audience, usually co-workers Writing uses pre-set formats or format is unimportant	Concrete day-to-day matters of fairly immediate concern
Level 2	Text is a paragraph or longer and intended to serve a variety of purposes	Writing uses a more formal style with audience other than co-workers Writing sets appropriate tone Uses standard spelling and grammar Writing tasks have templates or models to follow, such as a memo or form letter	Content of writing is routine with little variation from one instance to the next
Level 3	Longer or shorter pieces of writing intended to inform, explain, request information, express opinions or give directions	Writing has established format, such as financial statement, lease, job description May require structure such as headings, table of contents, footnotes	Non-routine writing tasks May require more content but this is established from known and available sources
Level 4	Longer document presenting considerable information and may require comparison, analysis or recommendations	Consciously organized with a given purpose May require modification of a given format to fit information presented Consideration of audience may be important	May require gathering and sorting information May require specialized vocabulary May require re-writing specific information for a required audience
Level 5	Longer document requiring evaluation, critique or recommendations Tasks of any length that require originality and effectiveness	Appropriate tone may be as important as content May require complex organization to accommodate varied content	Content must be created or synthesized from multiple sources

Document Use

Document Use refers to tasks involving a variety of information displays. Words, numbers, icons, and other visual characteristics are given meaning by their spatial arrangement.

	Dimensions		
	Document Complexity	Finding/Entering Information	Information Use
Level 1	Simple document Brief text with uncomplicated structure One document and one document type e.g. signs, labels, list	Limited information search using keywords, numbers or icons Entering few pieces of information Minimal inference (entered information is identical to source) Required information is immediate and obvious	No knowledge of content required No analysis required Content is used as it is found
Level 2	Simple document with multiple pieces of information, e.g. table with no sub-parts One document or multiples of the same type	Locate one or two pieces of information using one or two search criteria or multiple searches using same one or two search criteria e.g. find phone numbers of several people Enter several pieces of information Low-level of inference; information entered is very similar to source Information is fairly evident	Limited knowledge of content required; limited analysis Information may be rearranged to make comparisons Information available may be rearranged for entry
Level 3	Document is somewhat complex Multiple pieces of information organized in sections with sub-headings or Multiple simple documents of different types (pie chart and bar graph) May be specialized document types for which specialized knowledge is required for interpretation	Locate one or more pieces of information using multiple search criteria or Using the results of one search to perform a second search Entering multiple pieces of information Moderate level of inference required – match between information found and that required may be ambiguous	Some knowledge of content is required to use information Some analysis required to select and integrate information Information found must be integrated and combined in order to be entered

Document Use/2

	Document Complexity	Finding/Entering Information	Information Use
Level 4	<p>Complex document Multiple pieces of information organized in multiple sections with one additional component, such as color coding or Multiple documents and multiple types Familiarity with specialized document types required</p>	<p>Locate multiple pieces of information using criteria the user has developed or Using the results of one search in a subsequent search Enter multiple pieces of information Considerable inference may be required – match between information found or entered and that required is ambiguous Finding and entering required information is hindered by distracters (other information?) Information needed may be mentally restructured into categories devised by user</p>	<p>Specialized knowledge of content may be required Multiple pieces of information from multiple sources must be synthesized and possibly evaluated for accuracy Information must be synthesized for entry</p>
Level 5	<p>Complex document Multiple pieces of information organized in multiple sections with two or more additional components, such as color-coding, scale, perspective or Multiple documents and multiple types Knowledge of specialized document types is required</p>	<p>Locate multiple pieces of information using multiple search criteria which may have to be developed by user or results of one search to perform a subsequent search possibly using criteria developed by user Enter multiple pieces of information High level of inference required – match between document and information required is ambiguous and hindered by multiple distracters Information needed is mentally restructured into categories devised by user</p>	<p>Specialized knowledge of document content is required Information is evaluated to make judgements of quality and to draw conclusions</p>

Numeracy

Numeracy refers to the ability to use numbers and think in quantitative terms. Essential Skills complexity ratings for numeracy include two kinds of tasks: Numerical Calculation and Numerical Estimation.

Numerical Calculation has five complexity levels and four application settings:

- Money math
- Scheduling or budgeting and accounting math
- Measurement and calculation math
- Data analysis math

The following table shows the complexity ratings for each of these settings.

Numerical Calculation

	Dimensions	
	Operations Required	Translation
Level 1	Only the simplest operations and they are clearly specified Only one type of mathematical operation is used	Only minimal translation required to turn task into mathematical operation All required information is provided
Level 2	Relatively simple operations but they may not be clearly specified Tasks involve one or two types of operations with few steps of calculation	Some translation may be required or numbers needed for solution may need to be collected from several sources May require simple formulae
Level 3	Tasks may require a combination of operations or multiple applications of a single operation Several steps of calculation required	Some translation required by problem is well-defined Combinations of formulae may be used
Level 4	Multiple steps of calculation	Considerable translation required
Level 5	Multiple steps of calculation Advanced mathematical techniques may be required	Numbers needed for calculations may need to be derived or estimated Approximations may need to be created Complex formulae, equations or functions may be used

Numeracy/2

Numerical Estimation

Numerical Estimation has four levels of complexity over five dimensions.

Dimension	Level 1	Level 2	Level 3	Level 4
If there is a set procedure	There is a formula that identifies variables and how they are combined	Formula, but doesn't incorporate all the variables	No formula, but approach has been developed, possible because task has been performed repeatedly	No formula and no established approach available
No. of factors comprising item being estimated	One factor such as estimating a dimension by eyeballing or estimating weight by lifting	Small number of factors	Many factors but routine has been established	Many factors and methodology for estimating must be developed by worker
Amount of information available	All information about factors that make up estimate and how to combine them is known Any complicating factors are known	Most information is known but some factors could throw estimate off	Information about significant factors that make up the estimate is uncertain Several complications are possible but constrained in their impact	Little or no information about significant factors that make up the estimate Factors may have to be estimated Many complications possible and not constrained in their impact
Consequence of error	Little or no consequence Errors easily rectified	Some minor consequences such as loss of time or money Rectified with minor inconvenience or cost	Significant consequences such as loss of money or time but can be rectified	Significant consequences that either cannot be rectified or only at significant cost
Degree of precision required	Little or none	Required but within a broad range of values	Required within a small range of values	High degree of precision required

Thinking Skills

Thinking Skills comprises five different but interconnected cognitive functions: Problem Solving, Decision Making, Job Task Planning and Organizing, Significant Use of Memory, and Finding Information. They are shown separately in the tables that follow.

(1) **Problem solving** refers to problems that require solutions.

Dimension	Level 1	Level 2	Level 3	Level 4
Complexity of problem	Limited number of factors	Broad range of factors, most of which are clearly defined	Broad range of factors, some of which may be vague or ambiguous	Unpredictable and contradictory factors play a role
Complexity of identifying problem	All appropriate information is available	Procedures provided for determining the nature of the problem	Solver must determine what procedures are to be used to identify the nature of the problem	Solver must create procedures to identify nature of the problem
Complexity of identifying solution steps	Procedures are given for matching solution to problem once it has been identified	Solver has to determine which of several available solutions are most appropriate	May have to modify existing procedures for solving the problems to meet new needs	Solver must create procedures for solving the problem
Complexity of assessing solution				Solver must identify or create criteria for assessing effectiveness of solution

Thinking Skills/2

(2) **Decision making** refers to making choices among options.

Dimension	Level 1	Level 2	Level 3	Level 4
Consequence of error	Little or no consequences	Errors have some minor consequences (loss of time or money) but can be rectified with little inconvenience or cost	Significant consequences (loss or time or money) but can be rectified	Significant consequences that are not rectifiable or only at significant cost
Reversibility of decision	Decision easily reversed	Reversed with some inconvenience or difficulty; options are reduced	Reversed with significant difficulty	Cannot be reversed or reversed only with major (legal, financial, health) consequences
Adequacy of information available	All information relevant to decision is known	Most relevant information is known	Information about significant elements is uncertain	Significant information relevant to decision is unknown
Whether there is a set procedure	Set procedure Exceptions clearly specified	Set procedure but also grounds for exception that require discretion or interpretation	Set procedure but it provides significant scope for discretion or interpretation	No set procedure
Whether there is a body of similar past decisions	Similar, directly-applicable decisions available	Similar decisions but analysis or extrapolation is needed to apply them	Past decisions provide limited guidance due to small number or limited comparability	No comparable past decisions
Extent to which judgement is required	Limited or no judgement needed	Need to consider several well-defined factors where consequence for error is low; may require technical knowledge	Need to consider many factors in order to make an appropriate decision Factors less well-defined and consequence of error higher than Level 2	Significant judgement required

Thinking Skills/3

(3) **Job task planning and organizing** refers to the extent to which workers plan and organize their own tasks.

Dimension	Level 1	Level 2	Level 3	Level 4
Extent of variety in work activities	Little variety; similar, repetitive tasks	Repetitive tasks but content of task can vary between repetitions	Variety but within a structure or routine	Significant variety No set structure or routine Different work plan each day
Whether task sequence is provided to worker or determined by worker	Worker has little or no authority to order tasks	Worker has some scope to order tasks within the constraints of a framework determined by superiors, a trade practice or professional standard for doing a job	Worker has wide scope to determine order of tasks within the constraints of an overall framework, a trade practice or professional standard for doing a job or a project work plan	Worker has authority to determine order of tasks
Whether priorities are provided to worker or determined by worker	Worker does not prioritize work; priorities provided to worker or performs tasks as they come	Priority to be given to various categories of tasks is provided to the worker Worker then places particular tasks into these categories to determine their priority	Work priorities set by worker but subject to confirmation by superiors	Priorities set by worker
Extent to which day's work plan is disrupted	No work plan for day or very rarely disrupted	Disruptions but worker can return to plan after No new work plan required	Disruptions after which work plan requires significant adjustment (re-sequencing tasks, rescheduling)	Day's work plan is revised on an ongoing basis due to disruptions Revision may involve reprioritizing
Extent to which workers own work plan must be integrated with others' work plan	Works independently with no integration	Some coordination of work plan with those of others (e.g. shared tools or equipment)	Work plan must be integrated to manage ongoing integration of jobs	Work plan requires making arrangements with various others to integrate work plan with theirs Integration must be created

Thinking Skills/4
Job task planning and organizing

Dimension	Level 1	Level 2	Level 3	Level 4
Number of sources for work assignments	Single source	Some limited choice over source	Several sources with possibility that there will be competing or conflicting demands on time Established criteria or procedures for deciding between assignments	Multiple sources with possibility that there will be competing or conflicting demands on time Must use judgement to decide between assignments
Extent to which the order of those tasks sequenced by the worker makes a difference to total efficiency	Not applicable Worker has no authority to order tasks	Worker may order tasks in a way that impacts productivity	Worker sequences multiple tasks for efficiency Important function but minor part of job	Worker sequences multiple tasks for efficiency Function is considered major part of job

(4) **Significant use of memory** includes any significant or unusual use of memory for workers in the occupational group. It does not include normal memory use that is a requirement for every occupation. There is no complexity rating scale. Significant use of memory includes three types:

Type 1	Purposeful memorization of procedures, codes, parts number, etc. Memorization through repetition
Type 2	Remembering information for brief periods, such as the order of items or tasks
Type 3	Unique events in which "learning" occurs from one exposure, such as remembering the solution steps to an infrequent or unusual problem

Thinking Skills/5

(5) **Finding information** involves using any of a variety of sources including text, people, databases or information systems.

Dimension	Level 1	Level 2	Level 3	Level 4
Complexity of locating information	Consulting established sources such as phone book, manual, etc. Source supplied to worker	No established source but source can be easily identified through simple inquiry	Must conduct a more complex search to locate information Research, interviews, samples may be involved	Information from several different sources must be brought together, or There is no source and it must be created
Complexity of extracting or processing information	Information usable in form in which it is obtained	Simple processing such as selecting information according to some predetermined criteria	Some analysis required Information must be understood to be acted upon	Complex analysis or synthesis Information from various sources is synthesized Information is used in process of generating a solution Information is created

Working with Others

Working with others refers to the extent to which employees work with others to carry out their job tasks. There are no complexity ratings or dimensions. Working with others describes four kinds of work contexts:

Work context	Description
Work alone	Workers work alone providing products or information on progress to others
Work independently	Workers are not physically alone but work independently, coordinating their work with that of others
Work jointly with a partner or helper	One worker coordinates and cooperates with only one other co-worker at a time
Work as a member of a team	A team is a group of workers who produce a product or accomplish a task through combined effort and organized cooperation

Computer Use

Computer use refers to the variety and complexity of computer use within an occupational group. There are five levels of complexity and no dimensions. Computer use includes the ability to manage a range of computer functions, including:

Word processing software
Graphics software
Databases
Spreadsheets

Statistical analysis software
Programming
Computer-assisted design
Communications software

Level 1	Level 2	Level 3	Level 4	Level 5
<p>Tasks require only a basic interaction with computer-controlled equipment Computer use limited to a few commands No knowledge of software needed Limited number of steps easily memorized No variation in tasks</p>	<p>Tasks require use of several familiar software features such as formatting text or one-dimensional database search Software used for limited number of functions Data entry into pre-existing structures Conversion of files from one format to another Production of letters and memos in standard formats Software set up by someone else and used with default values</p>	<p>Tasks require multiple operations with use of wide range of software features or options User may be largely responsible for setting up software, customizing interface and configuring software and hardware as needed Work may be automated by creation or use of macros, templates or scripts Tasks are more varied than level 2 and may involve experimentation and problem-solving</p>	<p>Complex tasks which may require user to select software Tasks involve multiple operations and extensive use of software functions and features Tasks require integrated use of several software packages to accomplish job Manage an existing network Add/modify user accounts and perform routine maintenance/system management Access little-used features and options of software to complete some tasks</p>	<p>Tasks involve assessment of information technology needs, selection of appropriate computing and software solutions and the evaluation of outcomes Tasks require expert knowledge of computer software and information technology systems needed to design, write and customize computer programs for specific purposes</p>

Continuous Learning

Continuous learning refers to the requirement for workers in an occupational group to participate in an ongoing process of acquiring skills and knowledge. It reflects the growing need for all workers to continue learning either in order to retain their job or to remain current in their job qualifications. From this perspective, understanding one's own learning style and knowing how to gain access to a variety of resources and learning opportunities will become Essential Skills. Continuous learning has two main sections:

Description of learning	How learning occurs
Outlines ongoing learning or skills upgrading that is required in the occupational group and may include <ul style="list-style-type: none">• training in job-related health and safety• obtaining and updating credentials• learning about new equipment, procedures, products and services	As part of regular work activity From co-workers Through training offered in the workplace Through reading or other forms of self-study Through off-site training

Oral Communication

Oral communication refers primarily to the use of speech to give and exchange thoughts and information by workers in an occupational group.

Dimension	Level 1	Level 2	Level 3	Level 4
Range and complexity of communication functions	Limited oral communication demands in basic work-related social interaction	Moderate oral communication demands	Extensive oral communication demands in complex work-related social interaction	Extensive oral communication demands in very complex work-related social interaction
Range and complexity of information	Narrow range of subject matter, familiar topic, one main issue	Moderate range of subject matter, familiar topics, usually one main issue	Significant range of subject matter, professional, organizational, theoretical, social issues	Wide range and depth of subject matter Interdisciplinary information Professional, organizational, theoretical, social issues
Range and complexity of communication content	Highly predictable context	Less predictable context	Context can be unpredictable	Variety of contexts Complex and shifting from unpredictable to highly ritualized
Risk levels in failing communication intent	Low Any particular failure is of minor significance (confusion, discomfort of speaker)	Moderate Each particular failure is significant (loss of some money or time)	Significant Failure can result in danger, significant hazard, etc.	Critical Failure can result in loss of life or injury Very serious personal consequences

APPENDIX B

Description of IALS Literacy Complexity Levels²⁰

	Prose	Document	Quantitative
Level 1	Most of the tasks at this level require the reader to locate one piece of information in the text that is identical or synonymous to the information given in the directive. If a plausible incorrect answer is present in the text, it tends not to be near the correct information.	Most of the tasks at this level require the reader to locate a piece of information based on a literal match. Distracting information, if present, is typically located away from the correct answer. Some tasks may direct the reader to enter personal information onto a form.	Although no quantitative tasks used in the IALS fall below the score value of 225, experience suggests that such tasks would require the reader to perform a single, relatively simple operation (usually addition) for which either the numbers are already entered onto the given document and the operation is stipulated, or the numbers are provided and the operation does not require the reader to borrow.
Level 2	Tasks at this level tend to require the reader to locate one or more pieces of information in the text, but several distractors may be present, or low-level inferences may be required. Tasks at this level also begin to ask readers to integrate two or more pieces of information, or to compare and contrast information.	Document tasks at this level are a bit more varied. While some still require the reader to match on a single feature, more distracting information may be present or the match may require a low-level inference. Some tasks at this level may require the reader to enter information onto a form or to cycle through information in a document.	Tasks in this level typically require readers to perform a single arithmetic operation (frequently addition or subtraction) using numbers that are easily located in the text or document. The operation to be performed may be easily inferred from the wording of the question or the format of the material (for example, a bank deposit form or an order form).
Level 3	Tasks at this level tend to direct readers to search texts to match information that require low-level inferences or that meet specified conditions. Sometimes the reader is required to identify several pieces of information that are located in different sentences or paragraphs rather than in a single sentence. Readers may also be asked to integrate or to compare and contrast information across paragraphs or sections of text.	Tasks at this level appear to be most varied. Some require the reader to make literal or synonymous matches, but usually the matches require the reader to take conditional information into account or to match on multiple features of information. Some tasks at this level require the reader to integrate information from one or more displays of information. Other tasks ask the reader to cycle through a document to provide multiple responses.	Tasks found in this level typically require the reader to perform a single operation. However, the operations become more varied — some multiplication and division tasks are found in this level. Sometimes two or more numbers are needed to solve the problem and the numbers are frequently embedded in more complex displays. While semantic relation terms such as "how many" or "calculate the difference" are often used, some of the tasks require the reader to make higher order inferences to determine the appropriate operation.
Level 4	These tasks require readers to perform multiple-feature matching or to provide several responses where the requested information must be identified through text-based inferences. Tasks at this level may also require the reader to integrate or contrast pieces of information, sometimes presented in relatively lengthy texts. Typically, these texts contain more distracting information and the information that is requested is more abstract.	Tasks at this level, like those in the previous levels, ask the reader to match on multiple features of information, to cycle through documents, and to integrate information; frequently however, these tasks require the reader to make higher order inferences to arrive at the correct answer. Sometimes, conditional information is present in the document, which must be taken into account by the reader.	With one exception, the tasks at this level require the reader to perform a single arithmetic operation where typically either the quantities or the operation are not easily determined. That is, for most of the tasks at this level, the question or directive does not provide a semantic relation term such as "how many" or "calculate the difference" to help the reader.
Level 5	Some tasks at this level require the reader to search for information in dense text that contains a number of plausible distractors. Some require readers to make high-level inferences or use specialized knowledge.	Tasks at this level require the reader to search through complex displays of information that contain multiple distractors, to make high-level inferences, process conditional information, or use specialized knowledge.	These tasks require readers to perform multiple operations sequentially, and they must disembed the features of the problem from the material provided or rely on background knowledge to determine the quantities or operations needed.

²⁰ This table was retrieved May 18, 2004 from the IALS Web site at:
<http://www.statcan.ca/english/freepub/89-588-XIE/about.htm>

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