

Financial Literacy

A Conceptual Review

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Task Force on Financial Literacy



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Disclaimer

The opinions expressed in this paper do not necessarily reflect those of the Task Force. Any errors or omissions are the responsibility of the author.

For more information on the Task Force on Financial Literacy, visit
www.financialliteracyincanada.com

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Financial Literacy: A Conceptual Review

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Executive Summary

The Task Force on Financial Literacy was established to address the fact that many Canadians lack the knowledge and skills needed to make wise decisions about their finances and to manage their financial affairs.

Crafting an appropriate policy response to the “problem” of financial literacy requires an understanding of how the concept of financial literacy relates to broader and more fundamental notions of skill and how the skill levels of adults are likely to change over the coming decades.

Analyses presented in this report suggest that, in the absence of greatly increased levels of investment, the proportion of adults with low levels of skill will remain stable at about 40 per cent of the population out to 2031. This finding strengthens the argument for additional investment to reduce the negative impact that low financial literacy has on the Canadian economy and society.

Separate analyses presented in the report provide a means to understand the determinants of the difficulty of financial literacy tasks, what influences individuals acquisition and application of financial literacy skills and how financial literacy skill relates to other skills. Among other things, it suggests that financial literacy does not exist *per se* but rather involves the application of a unique constellation of underlying skills in a specific domain. Key skills include prose literacy skill, document literacy, numeracy, problem solving skill, scientific literacy and oral fluency skill. Thus, improving financial literacy levels involves being taught these underlying skills.

In the first instance, improving the financial literacy skills of adult Canadians through remedial instruction would involve improving the financial literacy skills of students leaving the secondary system. Unfortunately, there are too few students to have a marked impact on the available supply of financial literacy skill over the medium term. Thus, there is a need to consider investing in skill upgrading for adults. Such investment would necessarily have to focus on improving the oral fluency, prose literacy and numeracy skills of low-skilled adults. The evidence suggests that raising adult literacy and numeracy skill would require a significant investment but would yield an even greater economic return. The basic numbers indicate a \$30 billion one-time investment could yield roughly \$30 billion in increased labour earnings per year and significant additional savings of health expenditures. The implied return on investment is significant at a time when worker skills will play an increasing role in determining productivity growth and competitiveness in global markets. Thus, a strong case can be made for investing in the skills that underpin financial literacy proficiency.

The analyses also suggest that policy makers might chose to focus on reducing the demand for financial literacy. Much of what is produced by financial institutions is unnecessarily complex. Models of task difficulty developed to enable the assessment of adult skills provide a low-cost mechanism for systematically reducing the average difficulty of financial information destined for public consumption. Unfortunately, however, many financial literacy tasks have an intrinsic level of difficulty that places them at Level 4 or 5. Engineering these tasks down to Level 2, where most Canadians are, would be next to impossible. This suggests an on-going role for financial advisors.

Policy makers might also concentrate on improving the efficiency of the market for financial products and services by removing price and access barriers and by funding social marketing designed to alter attitudes and behaviours related to financial matters and, most importantly, to encourage individuals to seek professional advice.

Overall the research findings cited above are important for the work of the Task Force and its recommendations. It shows that:

- Raising the financial literacy levels of adults could only be achieved by raising proficiency levels in the underlying skills – most specifically, prose literacy, document literacy, numeracy and problem-solving skills, and oral fluency for adults whose mother tongue is neither English nor French.
- Raising the supply of literacy and numeracy, and, by extension, financial literacy, would require significant incremental investments. Economic theory suggests that, as the primary recipients of any associated economic benefits, individuals and their employers should pay for these investments. The case for government funding of these investments rests on arguments about the negative economic consequences associated with a slower-than-needed investment by market participants.
- Higher financial literacy levels would allow Canadians to make better financial decisions and financial institutions to reduce their transaction costs. The magnitude of these benefits would, however, pale to the estimated direct economic benefits of eliminating literacy and numeracy skill shortages that underlie weak financial literacy.

1. Introduction

This report has been written under contract to the Task Force on Financial Literacy by DataAngel Policy Research Incorporated. The report has been designed to address two questions that bear on the work of the Task Force and its recommendations.

The first question has to do with how the conception of financial literacy adopted by the Task Force relates to more established notions of skill. Canada has played a leading role in developing the theory and methods used to assess the skills of adults at the population level and to interpret what the data mean for public policy (Rychen and Salganik, 2001; Rychen and Salganik, 2003; Murray, Binkley and Clermont, 2005). The analysis presented highlights aspects of this work that can be used to focus the recommendations of the Task Force.

The second question has to do with how the financial skills of adult Canadians are likely to evolve over the medium term. The priority that is given to implementing the recommendations of the Task Force, and the urgency with which they are implemented, depend critically upon assumptions about whether average financial literacy skill levels are likely to improve over time, stay the same or decline. Even if average financial skill levels are expected to rise the possibility exists that the proportion of adults with low levels of financial literacy might not decline. The analysis presented employs projections of literacy skill profiles produced by the author on behalf of the Canadian Council on Learning (CCL, 2008). These analyses suggest that, in the absence of greatly increased levels of investment, the proportion of adults with low levels of literacy skill will remain stable at about 40 per cent of the population out to 2031. This finding implies that the “problem” of financial literacy will be with us over the medium term and strengthens the argument for additional investment.

2. Background

Canada has played a central role in the development, implementation and analysis of data on skills and their impact on economic, social, educational and health outcomes at various levels. This work, undertaken by Statistics Canada under the rubric of the International Adult Literacy Surveys (IALS), included the elaboration of a theoretical framework to inform the measurement of adult skills and the interpretation of skill measures (Statistics Canada, 2005). The program of work also involved the development of assessment frameworks for prose literacy, document literacy, numeracy, problem solving and information and communication technology literacy. The skill frameworks and associated measures have been validated through large-scale comparative assessment at the international level. More importantly in the current context the measures have been shown to influence key social and economic outcomes at several levels. Key among these is the influence of skill on employment, wage rates and incomes at the individual level. The economic effects of skill are so pronounced that differences in average adult literacy scores explain over half (55 per cent) of long-term differences in the growth rates of labour productivity and overall GDP per capita (Coulombe and Tremblay, 2004).

The IALS framework provides a context within which the Task Force's conception of financial literacy can be judged. The Task Force has defined financial literacy as the "knowledge, skills and confidence to make responsible financial decisions."¹ Analysis of IALS data suggests that the confidence to make responsible financial decisions depends to a large extent on financial knowledge and skills. Financial knowledge and skills depend on adults' attitudes and beliefs that are, in turn, conditioned by their social background and experience in school (Gal, 2005).

Conventional economics literature invokes the notions of risk aversion and time preference to explain differences in investment behaviour observed among individuals and population sub-groups (Eckel, Johnson and Montmarquette, 2004). For individuals with a low

¹ See: www.financialliteracyincanada.com/eng/about-financial-literacy/definition.php

tolerance for risk and who discount future returns at a high rate “responsible” financial decisions will involve no-risk/low-risk investments that provide immediate gratification. For individuals with a high tolerance for risk and who are more patient about realizing returns responsible financial decisions involve taking on riskier investments that offer returns over the longer term. Thought of more broadly financial knowledge, attitudes and skills also condition related behaviours that influence what is considered to be “responsible”. Most particularly these factors influence how much people work, how much they earn, how much they invest in upgrading their human capital, how much they have available to save and ultimately their savings rates.

At the risk of greatly oversimplifying, the Task Force has heard clearly that:

- Many Canadians lack the knowledge needed to make wise decisions about their finances
- Many Canadians lack the skills that they need to manage their financial decisions

If one accepts that the confidence to make responsible financial decisions depends on individuals’ attitudes and beliefs then by implication the Task Force has heard that:

- Canadian’s attitudes towards financial matters are not what they should be
- Canadian’s beliefs about financial matters interfere with their decision processes

While this framework has been useful in characterizing the nature of the financial literacy challenge in Canada it provides a weak basis for formulating a thoughtful and coherent public policy response to the issues raised. Policy makers might choose to focus their attention on improving financial knowledge, financial literacy skills, and changing attitudes towards financial matters or financial behaviours or any combination of these. It is not clear what mix of policy measures might yield the optimal return. The fundamental issue for policy makers is to understand the relationships between skills, knowledge, attitudes and behaviours and how these relationships influence the choice of policy options. The framework developed to support the comparative assessment of adult skills at the international level provides a context for exploring these relationships and dependencies and for clarifying the strengths and limitations of the available policy options.

The first important point is that financial attitudes and behaviours are conditioned by financial knowledge and skills. Adults with poor attitudes to financial matters, and those who behave badly in a financial sense, are more likely to lack the requisite knowledge and skills. By implication changing attitudes and behaviours depends to a large extent on changing financial knowledge and skill.

The second key point is that financial knowledge depends on financial literacy. Adults with low levels of skill have relatively more difficulty acquiring, understanding and applying financial knowledge. These same adults are also more likely to rely on less reliable informants for financial advice and make sub-optimal saving and investment choices as a result. By definition they lack confidence. Changing financial knowledge thus depends upon presenting financial information in simple forms, on changing who the low-skilled depend upon for advice, and on finding ways to improve the skill levels of low-skilled adults.

3. Improving the Efficiency of the Market for Financial Literacy: A Markets Model of Financial Literacy

Several of the submissions to the Task Force highlighted the fact that what Canadians know about financial matters is quite limited. In principle remedying knowledge deficits is simple – identify the key information gaps and find the means to get the missing information into the hands of those who need it to make more informed decisions. In practice, closing information gaps is significantly more complex. The economic theory that describes how markets mediate the demand for goods and services with the available supply of goods and services provides a general framework for thinking about knowledge gaps. Readers will be familiar with the most obvious market, that for consumer goods. Economists also use the same models to describe how the labour market matches the demand for labour with the available supply of workers, how education markets allocate scarce seats to the most able students and how health systems match the demand for health goods and services to the available supply. While price plays a central role in the functioning of most markets, other types of information also play a key role. Market theory identifies several sorts of information failures that impair the efficiency of markets and the ability of supply and demand to achieve their economic effects. Key information failures include the reliability of information, how long it retains its value and a variety of barriers to access. Each of these dimensions has salience in the current context.

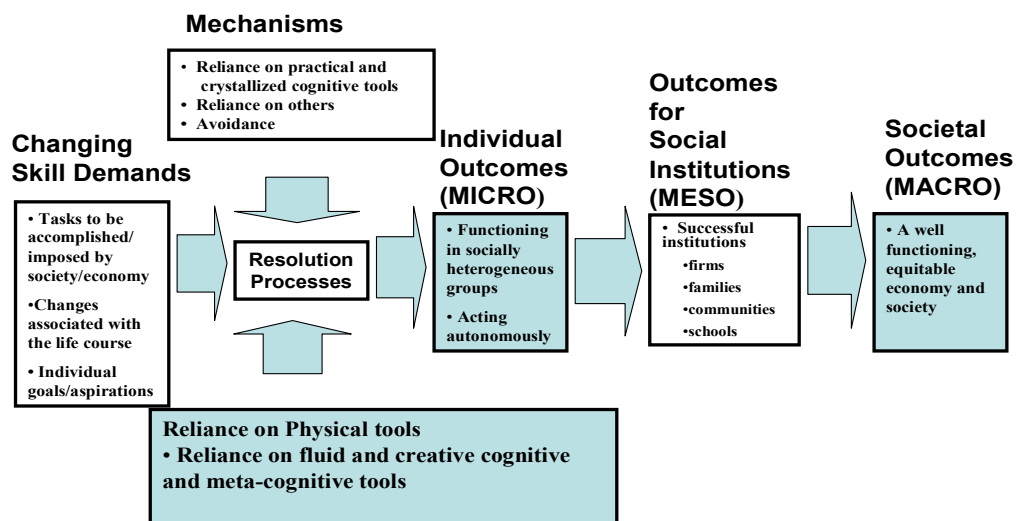
The Reliability of Information

Theoretical development undertaken in support of the assessment of adult skill provides a context within which to reflect on the efficiency of markets for financial literacy skill.

Figure 3.1 illustrates how individuals respond to changes in the demand for skill, how their level of financial literacy influences their choices of resolution processes and how their choices influence their outcomes.

Figure 3.1

A Framework for Thinking about Essential Skills at the Individual Level:



The basic story is simple. The left-most box (**Changing skill demands**) points to situations in which individuals face changes in the demand for skills. These may be traceable to external changes (in the products and services on offer, in the external economic environment, in the tax treatment of various investment alternatives, etc.) or to internal changes (changes in individual circumstances, investment objectives, etc.)

The next three boxes (**Mechanisms** and **Resolution processes**) show the range of strategies that individuals can choose in order to adapt to or resolve these changes in the demand for skill. They can ignore the changes and suffer any negative consequences that ensue. They can rely on the advice of family members, neighbours or colleagues at work. They can consult with financial professionals. Or they can rely on their own financial knowledge and skill to respond to changing demand. In reality, the majority of adults rely

on multiple sources of information in arriving at a decision of how to proceed, and they implicitly assign weights to different information sources.

The approach to these resolution processes influences outcomes. Adults who have high levels of financial literacy, or who rely on knowledgeable individuals for advice, will realize better financial outcomes than those who ignore the problem or who largely rely on unreliable sources for their advice. At its most basic the goal of the Task Force is to recommend measures that reduce the probability that low-skilled adults will ignore their financial literacy demands or will rely disproportionately on unreliable advisors.

The three right-hand boxes (**Outcomes for Individuals**, **Outcomes for Social Institutions** and **Societal Outcomes**) show how individuals respond to changing financial demands influences their own outcomes, the outcomes of the institutions with which they interact, and ultimately the welfare of Canadians.

The chart raises an interesting dilemma for the definition of financial literacy itself. The international work on skill treats skills as individual attributes that confer agency, i.e., allow an individual to act alone. A worker with low literacy skills who depends on co-workers to help deal with reading demands on the job can cope but cannot be deemed to be literate. Applying this notion to financial literacy, we should separate an individual's financial literacy skill from their financial decisions. Individuals with a very low level of financial literacy might realize good outcomes if they choose to compensate for their weak skills by relying on a professional for financial advice. Such reliance creates a level of dependence and joint responsibility that presumes that the advice given is responsible. The recent financial meltdown provides ample evidence of the inherent risks associated with this strategy and implies that it would be far better for individuals to be far more self-sufficient and critical consumers of financial advice.

The Currency of Information

Several submissions made to the Task Force suggested a need for social marketing designed to alter the financial behaviour of Canadians. While such a strategy is well justified, it is important for the Task Force to appreciate its limits. One of the defining features of financial information is that it changes over time. Change in information can be traced back to several sources, the most obvious of which is change in the relative attractiveness of different asset classes as the economy evolves. Knowledge must also be updated as the offering of products and services varies with time. Knowledge can also become stale in response to changes in the tax treatment of different investments that influence the after-tax rates of return to different asset classes. The “shelf life” of financial knowledge will limit the effectiveness of measures designed to increase Canadian’s financial literacy through social marketing.

A large proportion of adult Canadians do not possess the financial literacy skill to cope with many common financial tasks and thus to independently understand and apply new information as it becomes available. Thus, once one is past simple nostrums such as “Save for retirement” and “Don’t take on too much debt” the only durable message for individuals with low levels of financial literacy is to “Consult a financial advisor whose knowledge is current and generally reliable²”. Even low income Canadians make investment decisions that influence their economic welfare. For example their decisions about how much to save as down payments on the purchase of consumer goods and how much to finance have a significant impact on the total price they end up paying. Adults with higher levels of financial literacy will be able to weigh their options more carefully.

Barriers to Access

Economic theory that describes the functioning of markets identifies price as a significant barrier to accessing goods and services for low income Canadians. However, price-related barriers to access may manifest themselves in many ways. Costs for many investment

2 Some would argue with this latter assertion. Many financial advisors have a vested interest in the products that they promote so can be far from impartial.

goods and services offered by financial institutions are not explicitly identified. For example, banks do not charge individuals a direct fee for using the services of bank tellers so consumers are deprived of the price signals that play a central role in other markets. Thus, price cannot be considered to be a significant barrier to obtaining information in person.

A more important set of price barriers is associated with the costs of accessing financial advice on the internet. Although Canada has one of the highest levels of household internet access, adults with low levels of income, education and, by extension, financial literacy, are much less likely to report having access. The fact that free access can be arranged through public libraries, community access sites and a broad range of public service organizations suggests that price does not represent a significant barrier to access of financial information over the internet. It is also important to note that, as computer interfaces become more intuitive, the relative difficulty of ICT-based tasks will be dominated by the difficulty of the underlying cognitive tasks rather than the syntax of the interface. Thus, the cognitive skills that underpin financial literacy skill will become more important barriers than either physical access, price or the technical skills associated with using technologies.

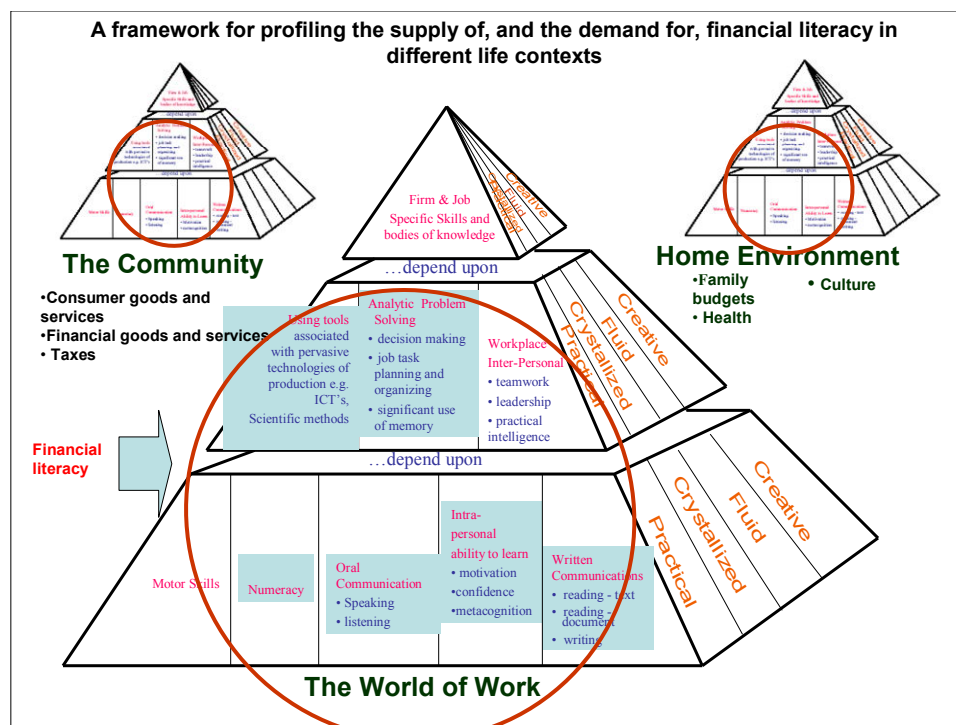
Financial Literacy as a Barrier to Coping

The key barrier keeping individuals from coping with everyday financial literacy demands is financial literacy skill itself. The theory developed in support of IALS incorporates insights from cognitive science, educational theory, sociology and economics into an overarching economic framework that can be applied to the work of the Task Force.

A Typology of Skill

The basic elements of the IALS theoretical framework are illustrated in the following series of charts.

The first chart captures what the theory says about the skills that actually exist and how they relate to each other.



There are several aspects of the chart that warrant comment.

Financial Literacy Is a Composite Skill

Perhaps the most perplexing insight to be drawn from the IALS theory is that financial literacy does not exist as a fundamental concept on a par with prose or document literacy; rather, it is best thought of as a meta-concept or an amalgam of several fundamental concepts. Financial literacy involves the application of a diverse skill set in a particular knowledge domain. Thus, coping with the financial literacy demands of everyday life involves the activation of a constellation of underlying skills that are themselves fundamental. Specifically, coping with financial literacy tasks depends upon how individuals apply, *inter alia*, oral fluency, prose literacy, document literacy, numeracy, problem solving and scientific literacy skills. This insight carries profound implications for the work and recommendations of the Task Force.

First, improving the financial literacy of Canadian adults will depend upon teaching and learning the constituent skills upon which financial literacy proficiency depends rather than financial literacy skill directly.

The Hierarchical Relationship among Skill Domains Implies an Instructional Sequence

A second insight afforded by the IALS theory is that a hierarchical relationship among the skill domains that underpin financial literacy influences both the acquisition of financial literacy and its application in the real world. This insight implies two things for the work and recommendations of the Task Force.

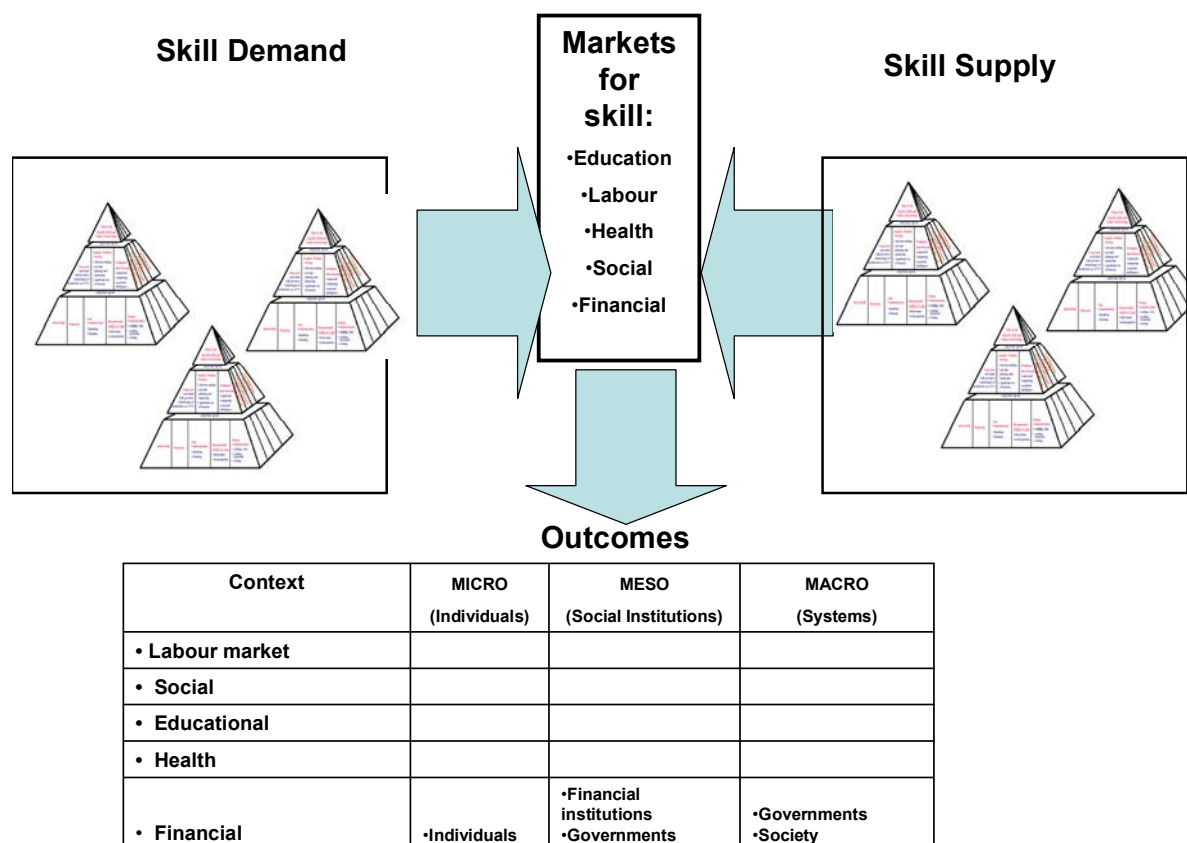
First, because financial literacy proficiency depends upon applying a constellation of skills, a weakness in any of the constituent skills will put the individual at risk. Thus, the proportion of adults whose financial literacy skill places them at risk is significantly higher than the proportion with, for example, low literacy skill since these individuals may have weakness in a variety of other skills.

Second, the hierarchy of constituent skills means that any remedial intervention requires focusing on skills that are deeper in the hierarchy. Prosaically, it would make no sense to try to teach an immigrant with weak oral fluency in English the advanced document literacy skills they need to cope with a broader range of financial literacy tasks. The skill deficiency lower in the hierarchy needs to be remedied first.

A Markets Model of Skill

The chart reproduced below reveals the role played by the skills identified in the IALS framework in a market model of financial literacy.

Theoretical Framework: a “Markets” Model of Skill



The key insight afforded by this chart is that one can conceive of financial literacy as an economic system that includes elements of the demand for financial literacy, the supply of financial literacy that adults can access to confront the demands they face, and a market that mediates supply and demand.

The three pyramids in the left-hand box imply that the demand for financial literacy can be defined in a standard hierarchy for three domains: at home, at work and in the community. This insight carries implications for the work of the Task Force at several levels.

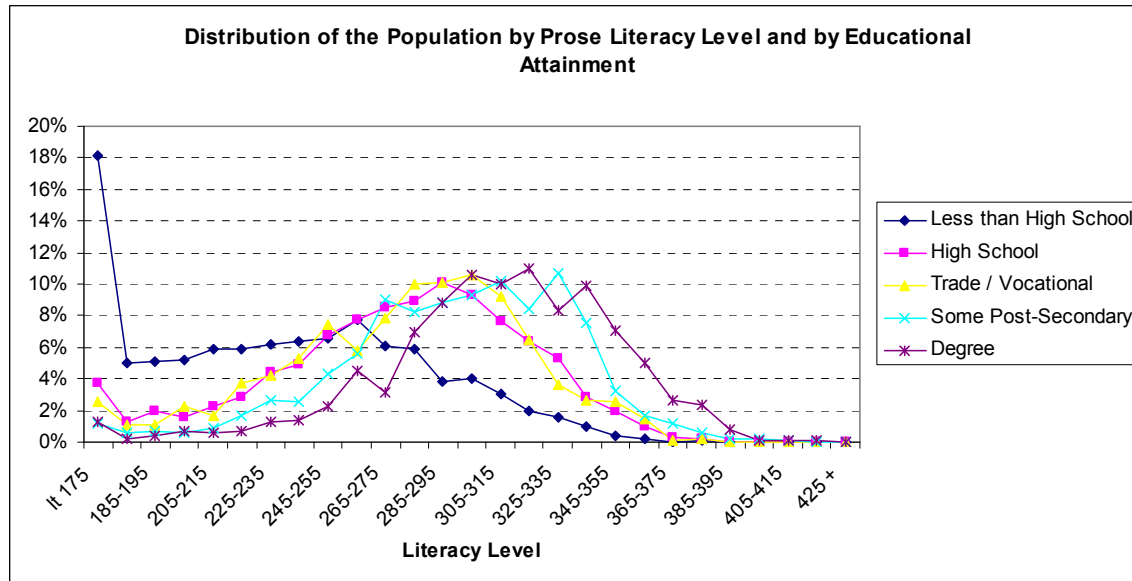
Financial Literacy Is a Relative Concept

First the chart shows that the same skill typology can be used to characterize the demand for financial literacy faced by adults in life contexts (the workplace, the home and the community) and the supply of financial literacy that adults can access to deal with the demands they confront. This opens the way to thinking about financial literacy as a relative concept, one in which the adequacy of an individual's financial literacy skill can only be judged relatively against the demands they face.

The same display also provides a means of thinking about how public policy might attempt to influence financial literacy. Specifically, the display makes it explicit that public policy can attempt to influence the demand for financial literacy skill, to influence the supply of literacy skill, or to improve the efficiency of the market for literacy skill.

How the IALSS (International Adult Literacy and Skills Survey) measures relate to more traditional measures of skill:

Analysts generally rely on indirect proxies of skill, such as years of education and educational attainment. The skill measures described in this report are based on the direct measures of skill derived through the testing of representative samples of the adult population. The test scores and associated proficiency levels have been shown to be valid, reliable, comparable and interpretable reflections of how people deal with unfamiliar tasks. Analysis has revealed that these measures provide a much more reliable indication of what people can and can't do. The following chart plots the distribution of proficiency scores around commonly used levels of educational attainment.



Source: IALSS, 2003

The chart reveals three important facts, including that:

- Average scores rise with educational attainment. Average scores rise by approximately 25 points with each additional year of education.
- At each education level one observes significant variance in skill. Some people have far more skill than their education level would imply and others far less. This variance reflects differences in the quality and quantity of initial education and the net result of skill gain and loss occurring over the adult life course. Research has established that adults need a score of at least 275 to cope independently with most of the tasks they will face in everyday life (Statistics Canada and OECD, 2005).
- The variance in scores is higher at lower education levels, indicating that many adults with low levels of formal education find a way to become highly literate and numerate.

The general conclusion conveyed by the chart is that traditional measures of skill, such as years of schooling and educational attainment, are unreliable indicators of someone's true ability to deal with financial literacy tasks.

Influencing Demand

The key means by which market players have attempted to influence the demand for financial literacy skill has involved efforts to reduce the level of demand through plain language and regulatory initiatives. The advances in reading theory incorporated into the IALS framework provide a means for understanding the underlying determinants of the relative difficulty of financial literacy tasks. The current generation of predictive models explains as much as 90 per cent of the variance in task difficulty.³

Applied to the IALS assessment, these models ensure that these determinants of difficulty are systematically sampled to provide coverage of the full range of item difficulty – an attribute that provides a means to describe the proficiency distribution in an ordered way and to link proficiency back to instruction.

Application of the same models can be used to understand the relative difficulty of financial literacy materials being produced by various market players and, by extension, to systematically reduce the difficulty of materials. Proficiency scores from the IALS study are placed on a 500-point scale, which are then grouped into five levels that reflect shifts in the relative difficulty of the underlying cognitive processes. A detailed description of the IALS proficiency levels is provided in the text box below.

3 The additive scoring models for prose literacy, document literacy and numeracy that are used to predict task difficulty have been reproduced in Appendix A of this report.

IALSS Literacy Levels

The Organisation for Economic Co-operation and Development (OECD) defines the following five levels of literacy:⁶

LEVEL 1—Very poor literacy skills.

An individual at this level may, for example, be unable to determine from a package label the correct amount of medicine to give a child.

LEVEL 2—A capacity to deal only with simple, clear material involving uncomplicated tasks. People at this level may develop everyday coping skills, but their poor literacy skills make it hard to conquer challenges such as learning new job skills.

LEVEL 3—Adequate for coping with the demands of everyday life and work in an advanced society. This roughly denotes the skill level required for successful high school completion and college entry.

LEVELS 4 AND 5—Strong skills. Individuals at these levels can process information of a complex and demanding nature.

Literacy levels are assessed on a scale of 500 and based on the completion of specific tasks. Some of these tasks are described in the table below.

Level	Score Range	Required Literacy Tasks
1	176 – 225	Tasks at Level 1 require the ability to read relatively short text; to locate or enter a piece of information into that text; and to complete simple, one-step tasks such as counting, sorting dates or performing simple arithmetic.
2	226 – 275	Tasks at this level require the ability to sort through “distractors” (plausible but incorrect pieces of information), to integrate two or more pieces of information, to compare and contrast information, and to interpret simple graphs.
3	276 – 325	These tasks require the ability to integrate information from dense or lengthy text, to integrate multiple pieces of information, and to demonstrate an understanding of mathematical information represented in a range of different forms. Level 3 tasks typically involve a number of steps or processes in order to solve problems.
4	326 – 375	Tasks at this level involve multiple steps to find solutions to abstract problems. Tasks require the ability to integrate and synthesize multiple pieces of information from lengthy or complex passages, and to make inferences from the information.
5	376 – 500	Tasks at Level 5 require the ability to search for information in dense text that has a number of distractors, to make high-level inferences or use specialized background knowledge, and to understand complex representations of abstract formal and informal mathematical ideas.

Analysis of adult literacy and numeracy skill demand data suggests that adults require a minimum of Level 3 proficiency if they are to participate fully and fairly in the global knowledge economy and information society (Statistics Canada and OECD, 1995). Research suggests that many common reading and numeracy demands can, through the application of “plain language” approaches, be engineered down to Level 2 – a point where the majority

of adults can cope. The same cannot be said about most financial literacy tasks. The author's experience in applying the IALSS models that predict relative difficulty of assessment tasks that have been included in successive rounds of international skill assessment suggests that many financial literacy tasks have an intrinsic level of difficulty that places them at Level 4 or 5 on the document literacy and numeracy scale.⁴ It would be difficult, if not impossible, to reduce the difficulty level of these tasks through "plain language" initiatives that attempt to reduce the level of skill demanded. This finding suggests that the only long-term solution to the financial literacy problem is to raise the financial literacy skill levels of the adult population. This brings us to the question of how supply-side measures designed to improve the financial literacy skills of individuals through instruction might reduce the consequences of low skills on the financial habits of Canadians.

Influencing the Supply of Financial Literacy Skills

Influencing the supply of financial literacy skills can only be accomplished through instruction. Such instruction need not be restricted to formal education delivered through traditional classroom measures; it can also include various forms of self-mediated informal and non-formal learning including internet-based instructional modules. Over the long term this objective could be met through improving the initial cycle of education. Doing so would, however, require significant incremental investment. An estimated 20 per cent to 40 per cent of youth are still leaving the secondary school system with IALSS Level 1 and 2 literacy and numeracy skills (DataAngel, 2010b; Bussiere, P., et al., 2007). As we shall see later in this report, even if such investments focus on youth alone, they will have a limited impact over the short and medium term because of the relatively small size of youth cohorts. There are simply not enough young people no matter what their skill level to move the overall population average much. Thus, any marked increase in the supply of financial

4 The assessment of the adult skill levels referred to in this volume was enabled by a set of models that allow one to predict the relative difficulty of reading, numeracy and problem solving tasks with a high degree of precision (Statistics Canada, 2005). Current models explain up to 80 per cent of the variance in relative difficulty. Application of these models to financial literacy tasks by the author confirms that many financial literacy tasks remain difficult even after an attempt to reduce their difficulty by applying plain language principles.

literacy in the adult population over the near and medium term can only be accomplished through the instruction of significant numbers of adult learners.

4. How the Financial Literacy Skills of the Population Are Likely to Change over the Medium Term

Most public policy focuses on matters of economic efficiency and equity and on return on taxpayer investment. The work of the Task Force has largely focused on understanding the state of financial literacy, on identifying means to increase the general level of financial literacy, and on reducing the negative impact of low financial literacy on individuals and the institutions with which they interact. In developing policy responses, public policy makers are obliged to make assumptions about whether the problem will get better or worse with time.

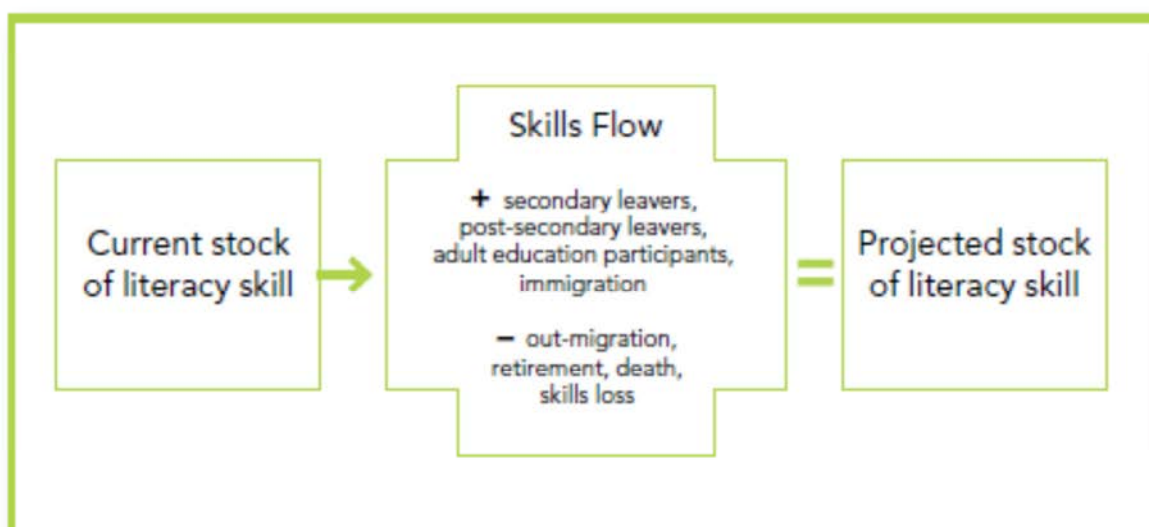
Common sense suggests that problems that are likely to get worse with the passage of time tend to get higher priority than those that are likely to get better (Murray, 2009b).⁵

Understanding the predicted evolution of Canada's literacy levels is a matter of understanding the "skills flow" expected to transform literacy levels over time. The skills flow stems from:

- Demographic shifts;
- Immigration trends;
- Younger adults leaving the secondary and post-secondary system and entering the labour market;
- Older workers leaving the labour force through retirement; and
- Skills loss with age.

5 It has been argued that politicians and bureaucrats have a natural preference for problems that are projected to get smaller over time – a choice that serves to amplify rates of improvement.

The relationship between the stock of skill and how key flows transform it over time is illustrated below:

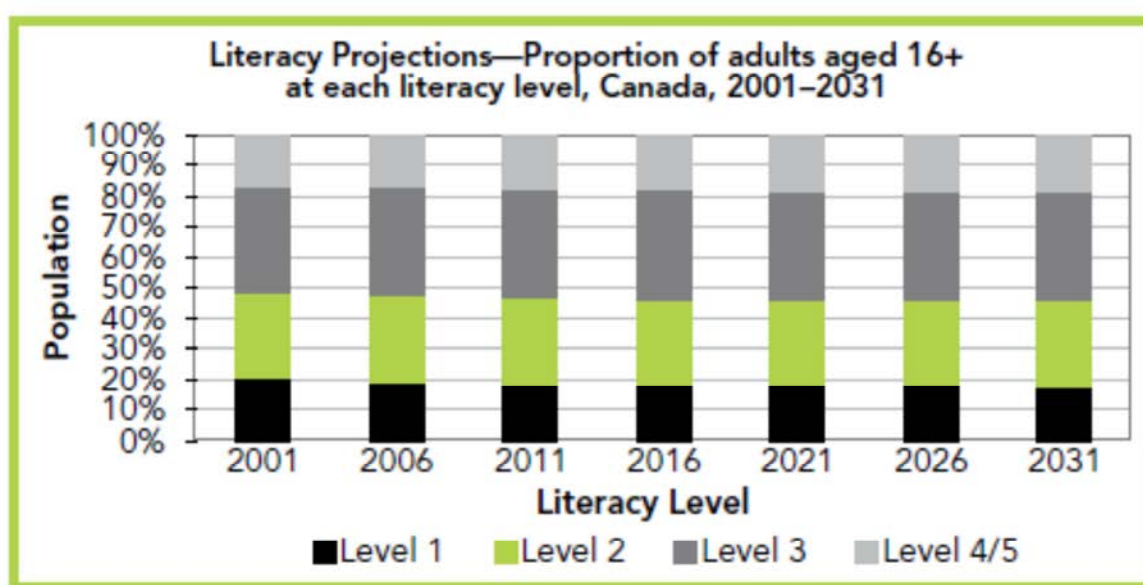


It is reasonable to assume that the same basic model applies to financial literacy. Based on this model, it would be natural for the Task Force to assume that Canadian's financial literacy levels are likely to rise over the coming decades due to increasing educational quantity and quality at all levels. Canada has one of the highest levels of educational investment in the developed world with the result that we boast one of the highest levels of educational attainment in the world. An average 85 per cent of recent youth cohorts are participating in some form of post-secondary education (DataAngel, 2010b). Focused policy attention and investment has also yielded steady increases in the average quality of educational output, in the proportions of youth leaving the secondary system with a diploma and in the rates at which adults participate in various forms of adult learning. Together these forces would be expected to have increased average literacy skill levels by 25 points and a concomitant positive impact on the supply of financial literacy (Willms and Murray, 2007).

In reality, the available evidence suggests that this is unlikely to be the case. Figure 4.1 presents projections of the proportions of Canadian adults by literacy skill level for the

period 2001 to 2016. Based on work undertaken by the author on behalf of the Canadian Council for Learning (CCL, 2008), the figures reveal a critically important fact - that the absolute number of adults with prose literacy skills below Level 3 is forecast to grow rapidly over the coming decade. In fact, the projected growth is rapid enough to leave the proportion of the adult population with prose literacy skills below Level 3 virtually unchanged to 2031.

Figure 4.1: Proportion of Adults with Prose Literacy Skills below Level 3, Population Aged 16 and Over, Canada, 2001-2016



Source: CCL, 2008

The underlying data reveal very little variation among jurisdictions – every jurisdiction will have to deal with the consequences of having large numbers of low-skilled adults.

It is useful to reflect upon why the supply of prose literacy, and by extension, the supply of financial literacy skills, is not growing at the expected rate.

The first and most obvious explanation is that, as skilled as they are, recent youth cohorts are so small that they are able to have only a modest impact on the overall supply of skill available in the adult population.

The second obvious explanation is that the proportion of immigrants is rising in the adult population. Despite the fact that immigrants are more educated on average than their Canadian peers, the available evidence suggests that significant proportions have a limited command of Canada's official languages and much lower literacy levels than indicated by the education levels (Statistics Canada and HRSDC, 2005; Coulombe and Tremblay, 2006 a and b).

The same explanation applies to a lesser extent to Canada's Aboriginal populations, particularly in the west and the three northern territories. Relatively high fertility rates are leading to rapid increases in the proportion of Aboriginals in the adult population. While this broadens the scope of school-based initiatives for increasing the financial literacy skill levels of Aboriginal populations much more rapidly than for other groups the available evidence suggests that they have much lower levels of educational attainment and literacy skill than their non-Aboriginal peers (Statistic Canada and HRSDC, 2005).

A third, less obvious explanation lies in the fact that the proportion of low-skilled youth leaving Canada's secondary education system has remained relatively unchanged over the past decade. Analysis of data from the 2000 and 2006 cycles of the Organisation for Economic Cooperation and Development's (OECD) Programme for International Student Assessment (PISA) confirms that the proportion of 15-year-old Canadian students with proficiency scores below the equivalent of IALSS prose literacy Level 3 on the PISA scale has remained unchanged over the past decade (DataAngel, 2010b). Moreover, the performance of the children of recent immigrants trails that of the children of less recent immigrants and of non-immigrants, by a considerable margin.

A final explanation for the lack of improvement in skill over the past decade can be traced to an unexpected loss of skill by adults of all ages. Analysis by Willms and Murray (Willms and Murray, 2007) suggests that prevailing levels of social and economic demands for skill have been below those needed to maintain skill levels. Analysis has shown a close association between the practice of skill and the observed magnitude of skill loss. Adults who infrequently apply their reading skills experience the greatest amount of skill loss, particularly those who use them in a workplace setting.

These latter findings have profound implications for the work of the Task Force and the policy instruments it recommends to influence Canadian's financial literacy behaviour. Most particularly the Task Force cannot presume that Canadian's have the necessary incentives to acquire financial literacy skills, nor, more troublingly, to maintain their skill levels once acquired. As noted in Section 2, above, several explanations may underlie this result. First, the average level of financial literacy demand may be so high that the cost of the required investment exceeds expected returns on that investment. Second, the services offered by the financial services industry reduce the need for individuals themselves to acquire and apply their skills. The provision of such compensatory services comes, however, at a high cost to the vendors. Any increase in the financial literacy skills of the average Canadian would serve to reduce transaction costs and hence increase the efficiency of the market for financial goods and services. The way in which the cost of such services is recovered by the financial institutions could also serve to reduce the incentive for low-skilled adults to acquire the requisite skills.

Several general conclusions can be drawn from the evidence presented in this section.

First, and most importantly, in the absence of new policy initiatives, Canada will continue to face a serious financial literacy skill deficit. More specifically, an estimated minimum 40 per cent of adult Canadian will not possess the level of financial literacy to cope with the level of demand they are likely to face. The cost to individuals in the form of sub-optimal

investment decisions⁶, and to the industry in the form of providing compensatory services, will remain high.

Second, policy makers should realize that the most obvious policy option to increasing the financial literacy levels of the adult population – increasing the skills of youth during the course of their formal education – will have a limited impact over the medium term due to the relatively small size of the youth cohorts in the population. This is not to say that efforts should not be made to increase the attention paid to financial literacy in the primary and secondary curricula. Over the long term such efforts would be expected to yield impressive results for these cohorts, so they must be part of any strategy.

Third, the confirmation that significant levels of skill loss occurred between 1994 and 2003 suggests that efforts to increase the supply of financial literacy skills through instruction are unlikely to have the desired effect on savings and investment behaviour. Such supply-side interventions would need to be paired with measures to increase the demand for financial literacy skill and to improve the efficiency of the market for financial goods and services. Measures to improve the demand for financial literacy might include the provision of advice and guidance through various forms of social marketing that serve to make individuals more aware of the need to save, to choose their investment products wisely and to seek professional advice whenever possible⁷. Improving the efficiency of the market would depend on reducing barriers to market access, including reductions in the complexity of written materials produced by the industry describing products and services, and the provision of more material that is customized to the specific circumstances of the individual and that is available at no cost over the internet. In the absence of such

6 The range of investment decisions touched by low financial literacy go well beyond the purchase of conventional investment products. Decisions about how much to work, about obtaining additional education, about how much to save for down payments and about how to compare finance options are all impaired by low financial literacy.

7 As noted earlier social marketing is only appropriate to convey the most obvious of nostrums. Advice must be customized because what is “responsible” varies dramatically with individual circumstances and because product offerings, tax regimes and economic circumstances all change rapidly.

coordinated measures the research evidence suggests that skill loss will erode any new supply of financial literacy skill almost as quickly as it is created⁸.

5. Raising the Financial Literacy Skills of Adults through Remedial Instruction

The previous section argued strongly for the need for a balanced approach to improving the financial literacy of adult Canadians, one that incorporates investments on the demand side and the supply side and that serves to improve the efficiency of the market for financial goods and service. This section focuses on supply-side measures to improve the financial literacy skills of adults through remedial instruction.

The recommendation to focus on supply-side measures to remedy Canada's financial literacy deficit leads to the question of what would be required to raise the skill levels of Canadian adults. The answer would include not only the nature of the instructional response but also the cost of upgrading the skills of different groups of learners and developing an understanding of what the direct and indirect benefits might be.

As noted above, Canada has played a central role in the development, implementation and analysis of international comparative data on the skills of adult populations. The implementation of the IALS study was made possible by scientific advances in three separate areas, each of which is described below.

First, advances in reading theory provided a framework for understanding the underlying determinants of the relative difficulty of tasks. Ensuring that these determinants of difficulty were systematically sampled to provide coverage of the full range of item difficulty provided a means to describe the proficiency distribution in an ordered way and to link proficiency back to instruction. The key scientific breakthrough realized was that

8 Evidence from the UK based on longitudinal measures of skill suggests that youth who leave the education system with low skill levels lose half of their numeracy skill – a key dimension of financial literacy – after roughly three years (Bynner and Parsons, 1998).

most of text item difficulty could be traced back to the nature of the tasks being undertaken rather than the characteristics of the texts themselves. The new theory proposes a variant of the hierarchy of tasks presented in Bloom's 1956 taxonomy as illustrated below.



Source: Anderson, L, 1995

A simple example of how these levels of learning correspond to financial literacy tasks is presented below:

- **Remembering:** Knowing what financial products are available
- **Understanding:** Translating an equation into a spreadsheet
- **Applying:** Calculating rates of return
- **Analyzing:** Comparing and contrasting available investment choices
- **Evaluating:** Selecting the most appropriate investment choice
- **Creating:** Designing new investment products

Second, advances in assessment methods allowed for representative coverage of the content domains of interest. This feature, based on randomly selected groups of respondents taking randomly equivalent sub-sets of items, allowed for test results to be interpreted as reliable indicators of how respondents would perform on any sample of equally difficult items.

Third, advances in statistical methods employed to estimate item difficulty and to summarize proficiency yielded far more reliable results than previous approaches. Moreover the new methods, based on the application of latent trait models, provided a means to compare the results of different samples of test takers and different samples of items over time.

The initial cycles of international assessment focused primarily on documenting differences in skill level within and between countries and on capturing the impact that skill had on economic, social, educational and health outcomes at the individual and macro levels.

More recently attention has shifted away from these objectives to focus on obtaining a better understanding of the learning needs of various groups of adult learners. The first such population-level study, the International Survey of Reading Skills (ISRS) was implemented in 2005 as a joint project of Statistics Canada, the National Center for Education Statistics of the US Department of Education and the Educational Testing Service (ETS). The ISRS administered an oral fluency test and a battery of clinical reading tests to assess the speaking, decoding and comprehension skills of adults with low levels of literacy skill.⁹ Patterns of strength and weakness in these assessments have been used to define six

9 As noted above, advances in the theory of reading allowed for the definition of proficiency scales that place test items and test takers on a common metric. The scale used in the IALS and Adult Literacy and Life Skills Survey (ALL) assessments employed an arbitrary 500-point scale that covers the full range of reading proficiency. The scale is then divided into five proficiency levels the lower bound of which represents a shift in the underlying skill set. Analysis has shown that these proficiency levels exert a profound influence on a range of individual outcomes (McCracken, M., and T.S. Murray, 2009). The availability of the ISRS data allows for the proficiency scales to be interpreted more literally – specifically, in verifying that zero on the scale corresponds to the complete absence of literacy.

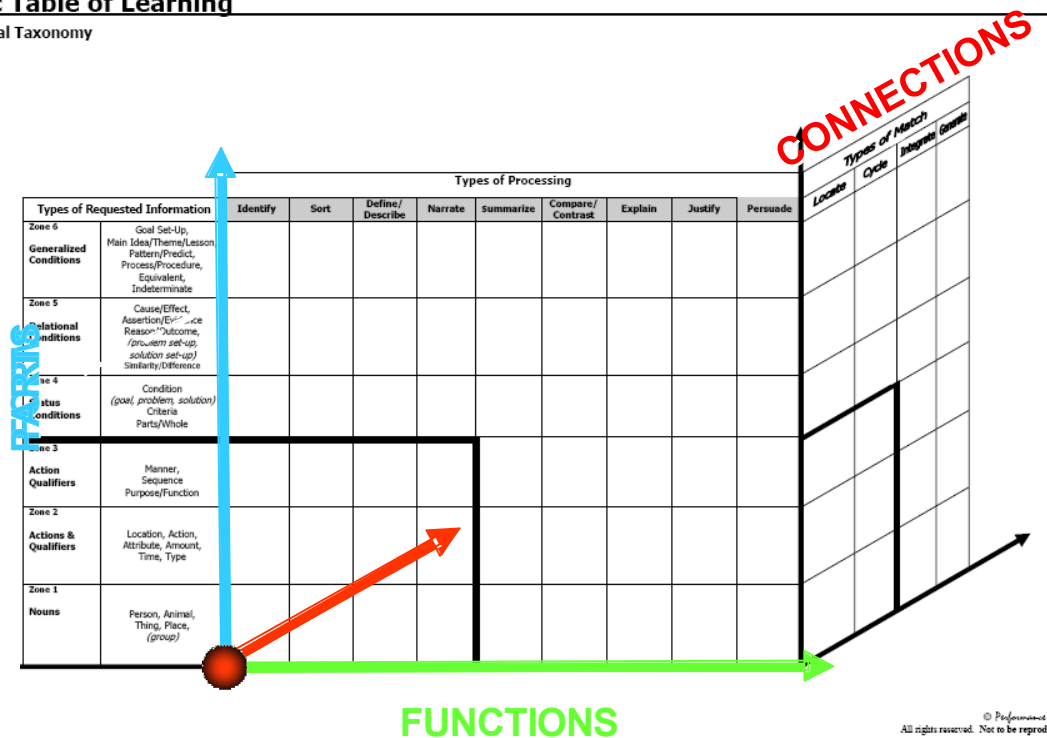
distinct groups of adult learners, each of which would require a different instructional response (Grenier, S., et al., 2007; CCL, 2008; DataAngel, 2009a). Analysis of these data allows one to estimate the costs and economic benefits that would be associated with the application of a “best practice” instructional response to each group (DataAngel, 2009a). The best estimate of costs indicates that an investment of \$29.9 billion would be required to eliminate literacy skill shortages in Canada’s adult population; \$13.7 billion of this amount would be needed to raise workers skills to the levels demanded by their occupations¹⁰ (DataAngel, 2009a). Related research also provides a first order approximation of the direct economic benefits that would be precipitated through the elimination of occupational skill shortages. These benefits include higher levels of employment, more hours of work, higher wage rates, higher tax revenues and lower expenditures on Social Assistance and Employment Insurance benefits. The analysis suggests an annual return of \$27.8 billion, a level that would represent a first-year return on investment of some 200 per cent. These findings suggest that any investment to raise financial literacy levels would also yield significant productivity benefits.

More recent research has further clarified the nature of the IALS prose literacy and document literacy proficiency levels in a way that carries great import for thinking about financial literacy (Performance by Design, 2009). In an effort to improve the utility of the assessment framework for informing instruction, Hardt extended and refined the IALS framework to include a more detailed set of predictive variables (Hardt, 2009). As illustrated below, the refined framework includes three dimensions – type of requested information, type of processing and type of match – that define a matrix of 216 combinations that can be used to predict the relative difficulty of any financial literacy task with great accuracy.

10 The balance of \$16.2 billion would be required to move those not in the labour force to prose literacy Level 3 – the level believed to be needed to participate fully and fairly in the global economy and information society.

Periodic Table of Learning

The Mosenthal Taxonomy



The variables implied in this framework, plus a fourth dimension that introduces the notion of plausible distracters, allow one to predict the difficulty of any task. The same variables can be used to systematically reduce the relative difficulty of tasks to render them accessible to a higher proportion of the population. Hardt also established an explicit link between the new framework and the mental models that provide the scaffold into which the determinants of difficulty are mapped.

Finally Hardt was able to link the framework explicitly to the underlying cognitive functions taking place in the brain. Based on a refinement of the IALS framework researchers have been able to conclude that tasks at Levels 1 and 2 involve the activation of very simple mental models and more importantly depend almost exclusively on the retrieval of information from the parietal lobe. This is the part of the brain that supports the lower order functions of remembering, understanding and applying financial information (Hardt, 2009). In contrast, the mental processes underpinning Level 3 and

higher tasks engender increasingly complex mental models that involve reasoning. They utilize the pre-frontal cortex, which is involved with reasoning and higher level functions in Blooms's revised taxonomy – for example, analyzing and evaluating financial alternatives.

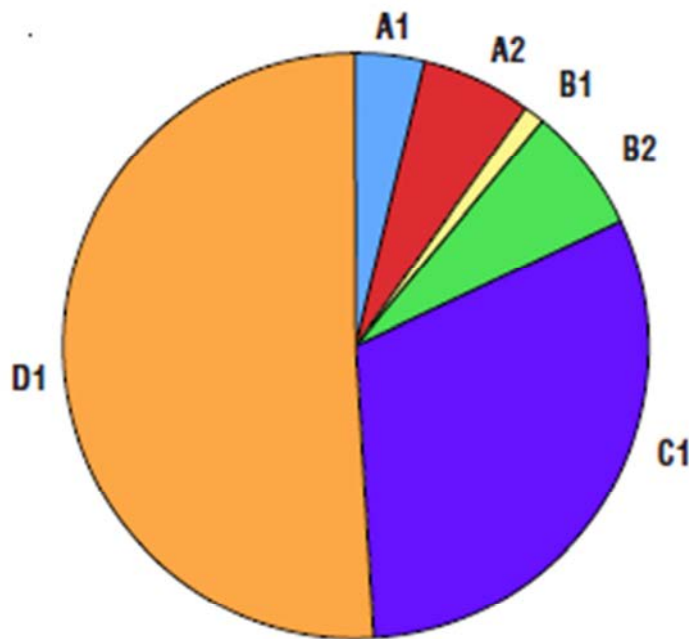
Applying this to the domain of financial literacy, the higher order functions of integrating and generating information might involve weighing advantages and disadvantages of various investment options. As noted earlier, this applies not only to the purchase of financial products but also to choices about how individuals divide their time between work and leisure and how much they choose to invest in upgrading their human capital through various sorts of learning.

Given that financial literacy demands and knowledge are in constant flux, it is a reasonable assumption that adults need a minimum of Level 3 to cope with the basic demand they will face. As noted earlier, however, many financial literacy tasks fall at Levels 4 and 5 and thus are beyond the capability of the vast majority of Canadians (DataAngel, 2009b). This implies the ongoing need for professional advisors in the financial industry and, by extension, relatively high transaction costs.

As noted above, recent research has identified distinct groups of adults with literacy and numeracy skills below the level believed to be needed to take full advantage of the educational, economic and social opportunities (Grenier, S., et al., 2007; CCL, 2007). Borrowing terminology from the world of marketing, each of these groups can be described as a literacy market segment sharing learning needs and demographic characteristics. Figure 5.1 documents the numbers of learners in each literacy market segment.

Figure 5.1: Estimated Numbers of Adults in Each Literacy Market Segment, Population Aged 16 and Over, Canada, 2006

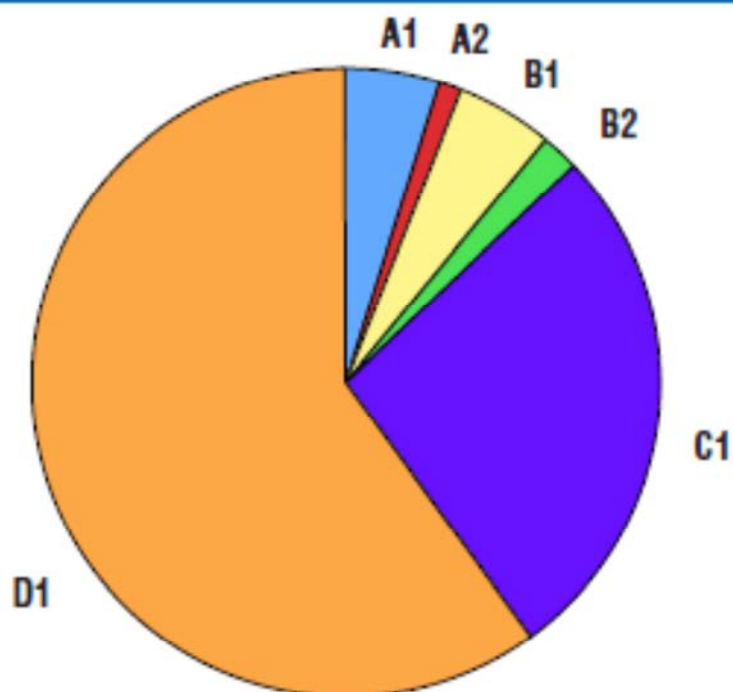
Segments in the English Canadian Literacy Market, 2003



Label	%	Number
A1 Male dropouts, reading disabled	4.0	240,000
A2 Immigrant women, little education	6.0	379,000
B1 Male, high school only	1.0	48,000
B2 Educated immigrant women	7.0	430,000
C1 Slight problems with decoding and comprehension	31.0	1,914,000
D1 No problems with mechanics of reading, lack skill to get to level 3	51.0	3,161,000

Source: IALSS 2002 and ISRS 2005.

Segments in the French Canadian Literacy market, 2003



Label	%
A1 Male dropouts, reading disabled	5.0
A2 Immigrant women, little education	1.0
B1 Male, high school only	5.0
B2 Educated immigrant women	2.0
C1 Slight problems with decoding and comprehension	27.0
D1 No problems with mechanics of reading, lack skill to get to Level 3	60.0

Source: IALSS 2002 and ISRS 2005.

Source: DataAngel, 2009a

The figure reveals a finding that is centrally important to the concerns of the Task Force – that most adults in need of higher literacy and numeracy skills, and by implication higher financial literacy skills, actually have reasonably high skill levels – generally in the middle to high end of prose literacy Level 2. Put another way, there are very few adults that fit the popular stereotype of “illiterate”. Thus, solving Canada’s financial literacy “problem” does not involve teaching large numbers of adults the mechanics of reading. Rather, it involves teaching them a focused set of cognitive skills that would enable them to cope with a much broader range of financial literacy skill demands independently, without reliance on either financial intermediaries or unreliable co-workers and family members.

This insight brings us to the question of what it would cost to raise adult skill levels through instruction enough to accomplish this goal. The analysis cited above provides some clues. The analysis reveals that, apart from differing greatly in size, the market segments differ greatly in the intensity, nature and cost of the instructional intervention that would be required to raise their skill levels. The differences are far from trivial. “Best practice” instructional responses range from 40 to 1500 hours, associated unit costs from \$229 to \$1500 per learner to attain prose literacy Level 3.

In addition to differences in unit costs, the same analysis also reveals large differences in the economic benefits that might be generated by eliminating literacy and numeracy skill shortages through instruction (DataAngel, 2009a; DataAngel, 2010b).

The analysis suggests rates of return that average 200 per cent per year in direct and indirect labour market benefits. Interestingly, these results exclude the economic benefits that would flow from increases in the level of financial literacy skill levels. The inescapable conclusion is that an investment in raising adult basic skills makes economic sense in its own right. Viewed from the perspective of the financial industry, investing to eliminate literacy skill shortages is likely to precipitate a marked increase in both the overall level of economic activity and in the total factor productivity of the Canadian economy. Such increases are bound to increase both the profitability and return on investment of the

financial services and insurance industries. Viewed from the government perspective, such investments would simultaneously improve competitiveness (as measured by output per hour worked) and wealth (as measured by output per capita), and would reduce social inequalities in economic and social outcomes by a significant margin. From the perspective of the Task Force, such investments are likely to have a marked positive impact on the financial literacy of the Canadian public.

This research summarized above has provided several insights, including that:

- There are very few adults who would be considered illiterate in the true sense of the word. Rather, the majority of adults with low literacy skills – Levels 1 and 2 on the IALSS scales – read reasonably well. Notwithstanding this general statement, roughly 85 per cent of adults with Level 1 and 2 literacy skills are limited in their ability to process complex financial literacy tasks in print and would require remedial instruction in the mechanics of reading. The balance of Level 2 adults requires remedial instruction focused on the cognitive strategies needed to solve Level 3 reading and numeracy tasks.
- Roughly half of adult workers in Canada have lower literacy skill than required by their occupation. Given that financial literacy requires the application of skills in multiple skill domains the proportion of adult workers with limited financial literacy skill is likely to be higher.
- New research shedding light on the proportion of adults who are weak in one or more of the skill domains that underpin financial literacy implies that almost 65 per cent of adults have low levels of financial literacy (Statistics Canada and OECD, 2011).
- The cost of raising literacy skill levels enough to eliminate occupational literacy and numeracy skill shortages in the employed population is estimated to be \$29.9 billion or an average of \$700 per adult. Unit costs range from a low of \$229 to a high of \$1400 depending on the number of hours of instruction, the optimal class size and the mode of instruction employed. It is reasonable to presume that raising financial literacy levels would require the same types of instructional responses.

- At first blush, this amount might seem large. Such an investment would, however, be expected to yield significant benefits. First-order approximations of the direct economic benefits that would be associated with eliminating literacy skill shortages in the employed population suggest an increase of \$27.8 billion in labour earnings. This increase implies an initial return on investment in the order of 200 per cent, a strong case for investment.
- As high as they are, the estimated rates of return on investment are likely conservative. Research suggests that the same investment would yield large reductions in demand and expenditures for health services (DataAngel, 2010a).

6. Summary and Conclusions

This volume has addressed two questions of interest to the Task Force on Financial Literacy.

First, the report explored how the conception of financial literacy adopted by the Task Force relates to broader and more fundamental notions of skill that are used for policy purposes. Canada has played a leading role in developing the theory and methods used to assess the skills of adults at the population level and to interpret what the data mean for public policy (Rychen and Salganik, 2001; Rychen and Salganik, 2003; Murray, Binkley and Clermont, 2005). This analysis highlights aspects of this work that can be used to focus the recommendations of the Task Force.

Second, the report provides data on how the financial literacy skills of adult Canadians are likely to evolve over the medium term. The priority that is given to implementing the recommendations of the Task Force, and the urgency with which they are implemented, depend critically upon assumptions about whether average financial literacy skill levels are likely to improve over time, stay the same or to decline. Even if average financial skill levels are expected to rise, the possibility exists that the proportion of adults with low levels of financial literacy might not decline.

The latter analyses suggest that, in the absence of greatly increased levels of investment, the proportion of adults with low levels of literacy skill will remain stable at about 40 per cent of the population out to 2031 – a finding that implies that the “problem” of financial literacy will be with us over the medium term. That strengthens the argument for additional investment to reduce the negative impact of low financial literacy on the Canadian economy and society.

The former analysis reveals several important facts:

- While useful for describing the nature of financial literacy “problem” in Canada, the framework adopted by the Task Force is limited in what it can reveal about how to deal with the problem from a policy standpoint.
- International work led by Statistics Canada on the measurement of adult skills provides a richer framework for considering policy options. The Statistics Canada framework provides a means to understand the determinants of the difficulty of financial literacy tasks, what influences individuals in their acquisition and application of financial literacy skills, and how financial literacy skill relates to other skills. Among other things it suggests that financial literacy does not exist *per se* but rather involves the application of a unique constellation of underlying skills in a specific domain. Key skills include prose literacy skill, document literacy, numeracy, problem solving skill, scientific literacy and oral fluency skill. Thus, learning financial literacy involves being taught the underlying skills.
- The analysis provides policy makers with insight into the range of options that might be considered and their advantages and disadvantages.
- Policy makers might choose to focus on reducing the demand for financial literacy. Much of what is produced by financial institutions is unnecessarily complex, and the IALS models of task difficulty provide a low-cost mechanism for systematically reducing the average difficulty of financial information destined for public consumption. It is important, however, to understand the limits of such a strategy. Many financial literacy tasks have an intrinsic level of difficulty that places them at Level 4 or 5. Engineering these tasks down to Level 2, where most Canadians are, would be next to impossible. This suggests an on-going role for financial advisors.

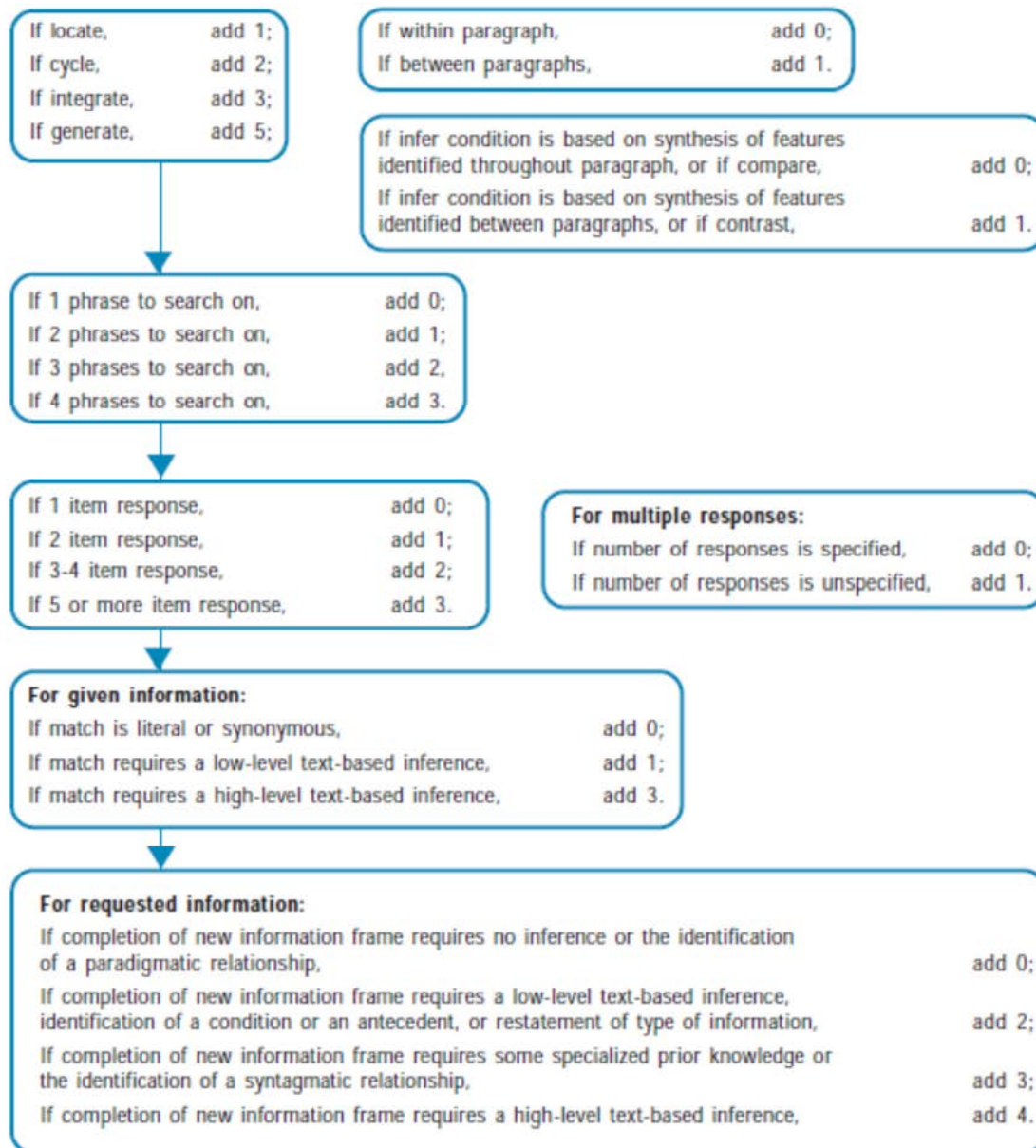
- Policy makers might also concentrate on improving the efficiency of the market for financial products and services by removing price and access barriers and by funding social marketing designed to alter attitudes and behaviours related to financial matters and, most importantly, to encourage individuals to seek professional advice.
- Finally policy makers might find ways to improve the financial literacy skills of adult Canadians through remedial instruction. In the first instance, this would involve improving the financial literacy skills of students leaving the secondary system. Unfortunately, there are too few students to have a marked impact on the available supply of financial literacy skill over the medium term. Thus, there is a need to consider investing in skill upgrading for adults. Such investment would necessarily have to focus on improving the oral fluency, prose literacy and numeracy skills of low-skilled adults. The evidence suggests that raising adult literacy and numeracy skill would require a significant investment but would yield an even greater economic return. Thus there is no need to justify the investment solely on financial literacy grounds.

The research findings cited above are important for the work of the Task Force and its recommendations. It shows that:

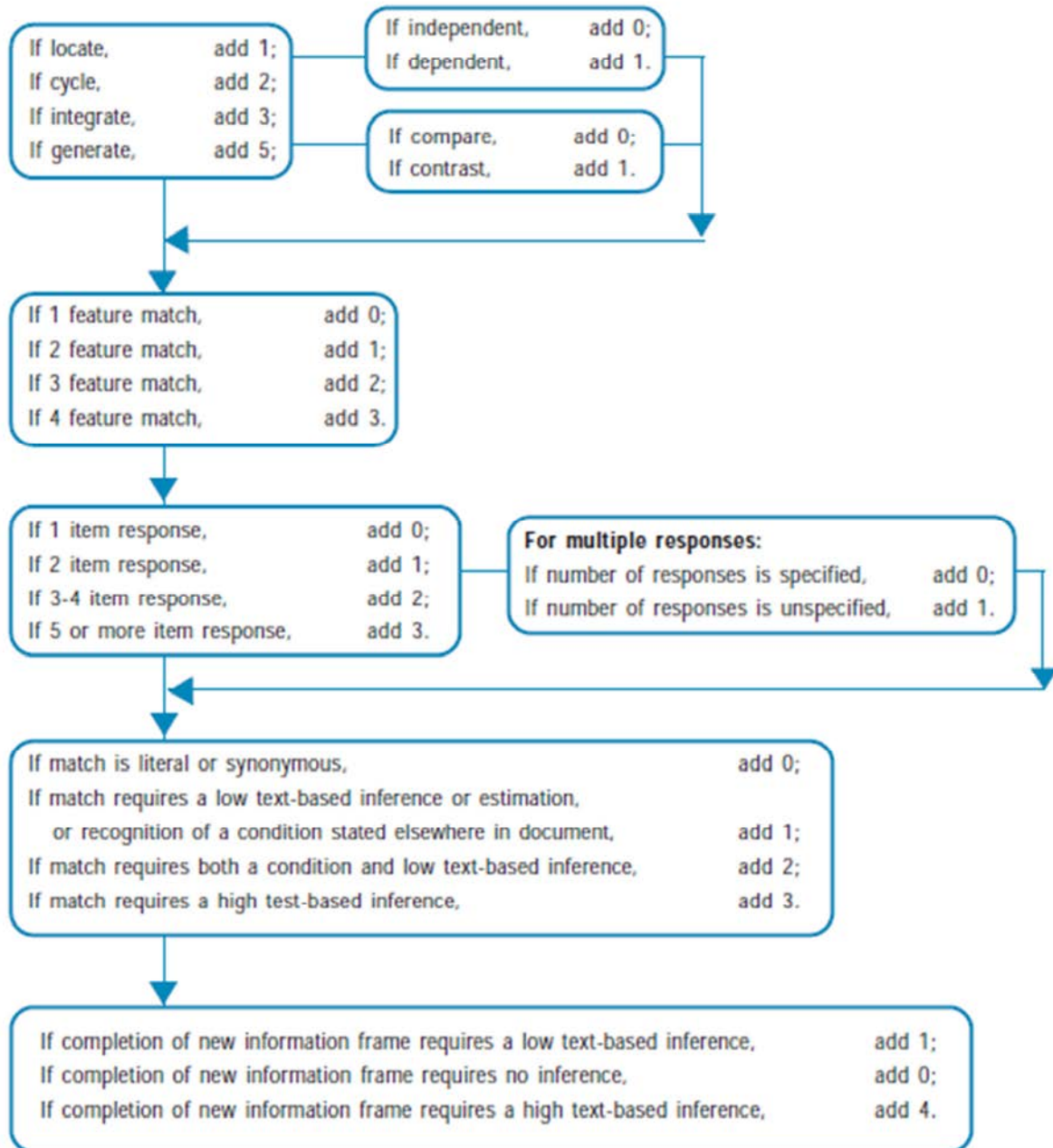
- Raising the financial literacy levels of adults could only be achieved by raising proficiency levels in the underlying skills – most specifically, prose literacy, document literacy, numeracy and problem-solving skills, and oral fluency for adults whose mother tongue is neither English nor French.
- Raising the supply of literacy and numeracy, and, by extension, financial literacy, would require significant incremental investments. Economic theory suggests that, as the primary recipients of any associated economic benefits, individuals and their employers should pay for these investments. The case for government funding of these investments rests on arguments about the negative economic consequences associated with a slower-than-needed investment by market participants.
- Higher financial literacy levels would allow Canadians make better financial decisions and financial institutions to reduce their transaction costs. The magnitude of these benefits would, however, pale in comparison to the estimated direct economic benefits of eliminating literacy and numeracy skill shortages that underlie weak financial literacy.

Annex A: Predictive Scoring Models for Task Difficulty in Prose Literacy, Document Literacy and Numeracy

An additive scoring model for prose literacy tasks



An additive scoring model for document literacy tasks



Scoring for each of the complexity factors

Complexity Factor 1. Type of match/Problem transparency		
How difficult is it to identify and decide what action to take? How many literacy skills are required?		
Score 1	Score 2	Score 3
<p>In the question and the stimulus, the information, activity or operation required:</p> <ul style="list-style-type: none"> • is clearly apparent and explicit—and all required information is provided • is specified in little or no text, using familiar objects and/or photographs or other clear, simple visualizations • is about locating obvious information or relationships only • closed question—not open-ended 	<p>In the question and the stimulus, the information, activity or operation required:</p> <ul style="list-style-type: none"> • is given using clear, simple sentences and/or visualizations where some translation or interpretation is required • is located within a number of sources within the text/activity. • fairly closed question 	<p>In the question and the stimulus, the information, activity or operation required:</p> <ul style="list-style-type: none"> • is embedded in text where considerable translation or interpretation is required and/or • may need to be derived or estimated from a number of sources within or outside the text/activity and/or • the information or action required is not explicit or specified • more complex, open-ended task

Complexity Factor 2. Plausibility of distractors		
How many other pieces of mathematical information are present? Is all the necessary information there?		
Score 1	Score 2	Score 3
<ul style="list-style-type: none"> • no other mathematical information is present apart from that requested—no distractors 	<ul style="list-style-type: none"> • there is some other mathematical information in the task that could be a distractor • the mathematical information given or requested can occur in more than one place • may need to bring to the problem simple information or knowledge from outside the problem. 	<ul style="list-style-type: none"> • other irrelevant mathematical information appears • mathematical information given or requested appears in several places. • necessary information or knowledge is missing, so outside information or knowledge needs to be brought in

Complexity Factor 5. Expected number of operations		
How many steps and types of steps are required?		
Score 1	Score 2	Score 3
one operation, action or process	application of two or three steps, the same or similar operation, action or process	integration of several steps covering more than one different operation, action or process

Complexity Factor 3. Complexity of mathematical information/answer required				
How complex is the mathematical information that needs to be manipulated?				
Score 1	Score 2	Score 3	Score 4	Score 5
Context Based on very concrete, real life activities, familiar to most in daily life.	Based on common, real life activities.	Based on real life activities, but less often encountered.	Based on real life activities but unfamiliar to most	Based on abstract ideas or unfamiliar activity in a context new to most.
Quantity Whole numbers to 1,000 Fractions, decimals, percents • benchmark fractions ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$) • decimal fraction for a half only (0.5) and equivalent as a percentage (50%)	• large whole numbers including millions • other benchmark fractions, like $\frac{1}{3}$ and $\frac{1}{10}$ • common decimals, like 0.1, 0.25 to 2 decimal places • common whole number percents, like 25% and 10%.	• large whole numbers including billions • other fractions • decimals to 3 decimal places (other than money) • all whole number percents	• negative integers • all remaining fractions, decimals and percentages	• all remaining types of rational (and some irrational) numbers including directed numbers
Pattern and relationship • very simple whole number relations and patterns	• simple whole number rates and ratios • whole number relations and patterns	• rates and ratios • relations and patterns including written everyday generalizations	• complex ratios, relations, patterns • simple formula	• formal mathematical information such as more complex formulae, knowledge of relationships between dimensions or variables, etc
Measures/Dimension/Space • standard monetary values • common everyday measures for length (whole units) • time (dates, hours, minutes) • simple, common 2D shapes • simple localised maps or plans (no scales)	• everyday standard measures length, weight, volume, including common fraction and decimal units • common 3D shapes and their representation via diagrams or photos • common types of maps or plans with visual scale indicators	• other everyday measures (area included) including fraction and decimal values • more complex 2D and 3D shapes, or a combination of 2 shapes • area and volume formulae • common types of maps or plans with ratio type scales	• all kinds of measurement scales • complex shapes or combinations of shapes	
Chance/Data • simple graphs, tables, charts with few parameters and whole number values • simple whole number data or statistical information in text	• graphs, tables, charts with common data including whole number percents—whole number scales in 1s, 2s, 5s or 10s • data or statistical information including whole number percents	• graphs, tables, charts with more complex data (not grouped data) • more complex data or statistical information including common average, chance and probability values • scales: more complex whole number, fractional or decimal	• complex graphs, tables or charts including grouped data • complex data or statistical information including probabilities, measures of central tendency and spread	

Complexity Factor 4. Complexity of Type of operation/skill How complex is the mathematical action that is required?				
Score 1	Score 2	Score 3	Score 4	Score 5
Communicate no explanation - a single simple response required (orally, or in writing)	• no explanation - a simple response required (orally, or in writing)	• simple explanation of a (level 1 or 2) mathematical process required (orally, or in writing)	• explanation of a (level 3) mathematical process required (orally, or in writing)	• complex, abstract and generative reasoning or explanation required
Compute • a simple arithmetical operation (+, -, x, ÷) with whole numbers or money	• calculating common fraction, decimal fraction and percentages of values • using common rates (e.g. \$/lb.); time calculations; etc • changing between common equivalent fraction, decimal and percent values, including for measurements e.g. $\frac{1}{4}$ kg = 0.250kg	• more complex applications of the normal arithmetical operations such as calculating with fractions and more complex rates, ratios, decimals, percentages, or variables • simple probability calculations	• applications of other mathematical operations such as squares, square roots, etc	• more advanced mathematical techniques and skills e.g. trigonometry
Estimate	• estimating and rounding off (when requested) to whole number values or monetary units	• estimating and rounding off to requested number of decimal places	• making a contextual judgment re whether a found answer is realistic or not and changing the answer to the appropriate correct rounded (but not necessarily mathematically correct) answer.	
Use formula/model	• evaluating a given formula involving common operations (+, -, x, ÷)		• developing/creating and using straight forward formulae • using strategies such as working backwards or backtracking (e.g. 15% of ? = \$255)	• generative reasoning • using and interpreting standard algebraic and graphical conventions and techniques
Measure • knowing common straight forward measures • naming, counting, comparing or sorting values or shapes	• visualizing and describing shapes, objects or geometric patterns or relationships • making and interpreting standard measurements using common measuring instruments	• using angle properties and symmetry to describe shapes or objects • estimating, making and interpreting measurements including interpolating values between gradations on scales • converting between standard measurement units within the same system	• calculating measures of central tendency and spread for non-grouped data • converting between non-standard measurement units within the same system • counting permutations or combinations	• converting between measurements across different systems
Interpret • locating/identifying data in texts, graphs and tables • orientating oneself to maps and directions such as right, left, etc	• reading and interpreting data from texts, graphs and tables • following or giving straight forward directions	• interpolating data on graphs • calculating distances from scales on maps	• generating, organising, graphing non-grouped data • extrapolating data • reading and interpreting trends and patterns in data on graphs, including slope/gradient	• graphing grouped data • calculating measures of central tendency and spread for grouped data

Annex B: References

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Statistical Tables

Table 5.3: Market Shares by Cost Shares, English Market in Total, 2006

Language and market segment	Number of potential learners	Cost of remedial instruction (\$000)	Share of cost by market segment	Proportion of literacy shortage by market segment
English				
Latent A1	440,450	\$2,162	17%	6%
Latent A2	565,400	\$1,320	10%	8%
Latent B1	206,350	\$1,008	8%	3%
Latent B2	262,050	\$1,651	13%	4%
Latent C	2,112,850	\$4,205	32%	29%
Latent D	2,253,000	\$2,057	16%	31%
Latent E	1,092,100	\$460	4%	15%
Latent F	260,000	\$87	1%	4%
Potential English learners	7,192,200			
French				
Latent A1	108,600	\$545	10%	5%
Latent A2	24,750	\$98	2%	1%
Latent B1	177,300	\$961	18%	8%
Latent B2	41,550	\$310	6%	2%
Latent C	721,800	\$2,125	39%	34%
Latent D	680,450	\$1,224	22%	32%
Latent E	291,600	\$160	3%	14%
Latent F	70,350	\$30	1%	3%
Potential French learners	2,116,400			
Total Potential learners	9,308,600			