Mapping adult literacy performance

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To find other material of interest, search VOCED (the UNESCO/NCVER international database <http://www.voced.edu.au>) using the following keywords: adult education; assessment; labour market; language; literacy; measurement; numeracy; outcomes; participation

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NCVER's in-house research and evaluation program undertakes projects which are strategic to the VET sector. These projects are developed and conducted by NCVER's research staff and are funded by NCVER. This research aims to improve policy and practice in the VET sector.

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About the research

Mapping adult literacy performance

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Both national and international research demonstrate the relationship between increasing levels of language, literacy and numeracy proficiency and positive outcomes, such as improved economic performance and social cohesion. Being able to measure the level of proficiency in these skills and any changes in their levels is important for getting a sense of how well language, literacy and numeracy programs are working.

In Australia there are a number of tools used to measure language, literacy and numeracy proficiency. Among these are the Adult Literacy and Life Skills (ALLS) survey conducted by the Australian Bureau of Statistics (ABS) and the Australian Core Skills Framework (ACSF).

The primary purpose of the Adult Literacy and Life Skills survey is to identify and measure the literacy and numeracy skills of adult populations within and across a number of participating Organisation for Economic Co-operation and Development (OECD) countries. However, it has two drawbacks. First, it is relatively coarse and is designed to provide a summary of literacy and numeracy rather than act as an assessment tool. Second, it is only administered every ten years.

By contrast, the Australian Core Skills Framework was designed to be used as an assessment tool at the student level. It makes learning relevant to the individual and provides evidence of progress, so that a learner's performance in a core skill can be assessed and their strengths and weaknesses identified. The framework is used in two key federal government programs — the Language, Literacy and Numeracy Program and the Workplace English Language and Literacy program — and in a variety of other settings, including the South Australian Certificate of Education.

This paper outlines a study the National Centre for Vocational Education Research (NCVER) is undertaking to determine whether performance levels on the literacy and numeracy scales of the Adult Literacy and Life Skills survey can be reliably mapped to the performance levels of the Australian Core Skills Framework. The initial stage is promising, with an expert panel concluding that it is feasible to map Adult Literacy and Life Skills survey items to Australian Core Skills Framework levels. The second stage will involve a larger-scale study to empirically align the two frameworks. If this stage is successful, then various possibilities arise for monitoring the language, literacy and numeracy skills of various groups against the Adult Literacy and Life Skills survey scale.

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Managing Director, NCVER

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Introduction

The National Centre for Vocational Education Research (NCVER) is undertaking a study to determine whether it is possible to align the performance levels of two frameworks for measuring the language, literacy and numeracy skills of adults; namely, the Adult Literacy and Life Skills (ALLS) survey and the Australian Core Skills Framework (ACSF). Both frameworks have five levels of performance and it is sometimes assumed that these levels are equal. But are they?

Measures of adult literacy

The Adult Literacy and Life Skills survey, and its predecessor, the International Adult Literacy Survey (IALS) were developed to enable the collection of comparable international data on literacy and numeracy proficiency. In 1992 the Organisation for Economic Co-operation and Development (OECD) stated that, internationally, low literacy levels were having a significant impact on economic performance and social cohesion at an international level. But trying to get a better sense of the extent of literacy problems, and the policy implications that would arise from these, was thwarted by the lack of data (cited in National Center for Education Statistics 1998, p.13).

The focus of the International Adult Literacy Survey, the Adult Literacy and Life Skills survey, and the current survey, the Programme for the International Assessment of Adult Competencies (PIAAC), is always on the skills that an individual needs to participate fully and successfully in a modern society. These types of surveys are designed to provide performance information at aggregate levels such as the adult population and by important sub-groups (for example, gender, location). Further, given the cost associated with the management and administration of such large-scale international surveys, the period of time between surveys is generally long, in the order of five to ten years. In Australia, the International Adult Literacy Survey was administered in 1996, the Adult Literacy and Life Skills survey in 2006 and the Programme for the International Assessment of Adult Competencies is scheduled for late 2011. While such surveys provide important information about Australia's skills position relative to other countries, this timeframe does not permit the close monitoring of progress against national goals.

The Australian Core Skills Framework (ACSF), released in December 2008, describes performance in the five core skills of reading, writing, oral communication, numeracy and learning.[1] It is intended to act as a national framework for describing and discussing English language, literacy and numeracy performance, with benchmarks against which to assess and report on the progress of individuals or learner cohorts. The framework is built on the National Reporting System for Adult Literacy and Numeracy (NRS) — a tool used since 1995 for reporting outcomes from adult English language, literacy and numeracy (LLN) provision in the federally funded Language, Literacy and Numeracy Program (LLNP) and the Workplace English Language and Literacy (WELL) program. Although the Core Skills Framework is much broader in scope than the National Reporting System, it maintains the five performance levels developed for the National Reporting System.

While the use of the Australian Core Skills Framework was not originally mandated in situations other than the Language, Literacy and Numeracy and the Workplace English Language and Literacy programs,

[1] The focus on the ACSF does not downplay the importance of alternative adult literacy and numeracy frameworks such as tests of vocational English proficiency.

it is being adopted across a range of contexts and for a range of purposes. All general education curricula have been mapped to the ASCF; South Australia has adopted the framework as part of the South Australian Certificate of Education (SACE), using attainment of exit level 3 in each core skill as a minimum requirement for achieving the certificate; and Victoria University has adopted the framework as part of its whole-of-university strategy to support students' literacy and numeracy skills development. In the vocational education and training (VET) sector, several industry skills councils are sponsoring national professional development on the ACSF for trainers in their fields, and the Department of Education, Employment and Workplace Relations (DEEWR) has recently funded industry skills councils to map training package units to the framework.

A main difference between the ALLS and the ACSF is the assessment purpose. The large-scale ALLS survey is a summative and evaluative tool. That is, it is used to give a summary of learners' knowledge and skill at a point in time and does not provide feedback to inform future learning.

The Core Skills Framework can be used as either a summative or a formative tool. At any point in time, a learner's performance in a core skill can be measured against the descriptors (called 'indicators' and 'performance features') associated with each of the five levels, and a level of performance assigned. In terms of its use as a formative or diagnostic tool, any activity or test can become an assessment instrument if it is mapped to the ACSF and then used to identify an individual's specific strengths and weaknesses. The performance features offer a means of providing detailed performance feedback and identifying where the focus of subsequent effort might yield useful results. Progress over time can be monitored against the levels, and also against specific indicators and performance features.

Although the ACSF has been used primarily as a formative tool, there is increasing interest in its summative capacity. For example,

- Kangan-Batman TAFE has recently developed a series of contextualised assessment instruments described in ACSF terms, which are being trialled as tools to identify commencing students' language, literacy and numeracy performance.
- Victoria University is trialling ACSF-based contextualised activities to establish language, literacy and numeracy performance benchmarks for commencing students as a precursor to tracking, monitoring and measuring performance improvement over time.
- The Australian Council for Educational Research has benchmarked its 'vocational indicator' assessment instrument to the ACSF.

Why is this project being undertaken?

In late 2008, as part of the National Skills and Workforce Development Agreement, a Council of Australian Governments (COAG) directive specified that the proportion of the working-age population with low foundation skill levels be reduced to enable effective educational, labour market and social participation, and that the proportions at ALLS levels 1, 2 and 3 be monitored as a means of checking progress (Council of Australian Governments 2008). That is, the objectives are stated in terms of ALLS survey levels.

However, as discussed earlier, key federal government programs such as the Language, Literacy and Numeracy and the Workplace English Language and Literacy programs routinely use the ACSF to assess the state and progress of individual or group literacy and numeracy skills. It must be noted that these programs provide information on a very small proportion of the population — some 100 000 per year —

who fall within the target area specified by the Council of Australian Governments. Of other initiatives with a language, literacy and numeracy focus that could be used to provide further information on the literacy and numeracy progress of various learner groups, none can be measured and reported on using the ALLS or PIAAC tests but they could be monitored against the ACSF benchmarks.

Thus, this project aims to investigate whether performance levels on the ALLS literacy and numeracy scales can be reliably mapped to the performance levels of the ACSF, essentially meaning that ACSF performance levels could be used as a proxy for ALLS performance levels.[2] This would make it possible to provide more frequent information on the literacy and numeracy development of identified target groups of the adult population than is available from the large-scale international testing programs.

Has such a mapping exercise been done before?

In 2002 an exercise to map the National Reporting Service against the International Adult Literacy Survey was undertaken, since it seemed, on the surface at least, that the two measures were directly comparable, as both had five levels of competence. A general alignment was found but not a direct one-to-one relationship between the five levels of each scale. Indeed, there were no IALS tasks at NRS level 1 (Hagston 2002).

Literacy assessment in the two frameworks[3]

The ALLS scale is constructed around a few key aspects that contribute to the difficulty in reading and responding to text. These include:

- the length and density of the text
- the number of pieces of information that are required; the number of pieces of information that are presented (that is, distractors)
- the extent to which the reader must generate inferences based on given information or use assumed knowledge
- the presence of pointers, such as headings (ABS 2008, p.77).

All these aspects come together to form a single cluster of factors that contribute to item difficulty, so that for each item a single score of known precision is reported.

The ACSF has four principles that are taken into account when determining performance. These are:

- the nature and degree of support provided[4]
- prior knowledge and familiarity of context, text, task and topic

[2] It is important to note that the purpose of this project is not to evaluate the utility of either the ACSF or ALLS but rather to evaluate their possible commensurability.

[3] Further information about the ALLS is provided in appendix A. Additional information about aspects of performance, assessment and feedback in the ACSF is provided in appendix A. For a copy of the ACSF please go to DEEWR Australian Core Skills Framework (<http://www.deewr.gov.au/Skills/Programs/LitandNum/WorkplaceEnglishLanguageandLiteracy/Documents/AustralianCoreSkillsFramework.pdf>)

[4] When the ACSF is being used for summative purposes, it is assumed that the learner can perform to a particular level without support. If the ACSF is being used for formative purposes and some support is provided, then this is taken into account when determining the learner's performance level.

- the complexity of the text, including its length, specificity, information content, vocabulary and degrees of abstraction
- the task complexity, including the number of pieces of information required, number of processes involved and the extent of required inference (Department of Education, Employment and Workplace Relations 2008, p.8).

It would appear then that there are substantial similarities between the factors that contribute to task difficulty in both the ALLS survey and the ACSF. Both frameworks include the length and complexity of the text, its information content (density) and the extent to which the reader is required to generate inferences. This compatibility suggests that at least qualitative mapping of the performance levels between the two frameworks is feasible.

About the project

There are two stages to this project. The first was a feasibility study undertaken in 2010 to determine whether a potential mapping between the two frameworks is reasonable. This involved an expert group, including developers of the ACSF, together with an experienced item developer and a literacy practitioner. The group was asked to assess where a number of prose and document literacy and numeracy ALLS items fitted within the ACSF framework,[5] based on the assumption that a learner would attempt to perform the tasks independently. Since ALLS items have known locations on its relevant scale, the consensus judgment of panel members provided a qualitative link between the two scales.[6]

For this phase, items that represented levels 1 and 2 and the lower part of level 3 of the ALLS prose and document literacy and numeracy scales were used, since individuals whose literacy performance lies within this range have tended to be of most interest in programs that use the ACSF as a tool in literacy improvement.[7]

It was found that there was only one instance of a member of the expert panel having difficulty in assigning an ACSF level to an ALLS prose, document or numeracy item. Therefore, in general, it is reasonable to assume that the performance levels of ALLS items can be mapped to the ACSF levels.

The second stage of the project involves a larger-scale research study to empirically align the two frameworks onto a single scale for the domains of reading and numeracy. In an online survey, teachers/tutors familiar with adult literacy and numeracy concepts will anonymously rate a student whose literacy and/or numeracy levels are most familiar to them against statements and sample tasks drawn directly from both the ACSF and ALLS frameworks. The ratings can then be analysed and, using

[5] For the feasibility phase a version of the Delphi method (Linstone & Turoff 2002) was used. Further information about the Delphi method is provided in appendix B, along with qualitative descriptions of performance at the various levels of the two frameworks and a brief description of the ALLS items used in this study.

[6] A quantitative link could be generated, but this would require the judgments of many experts. In the first phase of the research, the focus is on establishing whether qualitative mapping is feasible before possibly committing to the complexity and cost of a quantitative mapping activity.

[7] The items used were developed by Statistics Canada and the Educational Testing Service (ETS). Items used in IALS, ALLS and PIAAC are confidential as it is important to be able to use common items across assessment occasions in order to monitor progress in literacy achievement over time. Statistics Canada and the ETS allowed NCVER to use the items, subject to confidentiality undertakings being entered into by all project participants. The items used in this study were selected by Statistics Canada and the Educational Testing Service and are not required for the PIAAC. NCVER is grateful to Statistics Canada and the ETS for permission to use their items and for their assistance in selecting items for the current study.

Item Response Theory, placed onto the same scale of measurement.[8] This is the most direct method for determining and comparing the complexity of the two frameworks.

And then what?

We do not yet know what the outcomes of this second stage will be, but it would not be unreasonable to assume that a relatively close alignment between the performance levels of the two frameworks will occur. If this is the case, then ACSF-based information from various interventions could be reported, if required, against the ALLS-based targets specified by the Council of Australian Governments. Some of the options are discussed below.

Monitoring the progress of those with very low language, literacy and numeracy skills

As indicated earlier, at the time of writing only two federally funded adult literacy programs are required to report against the ACSF: the Language Literacy and Numeracy and the Workplace English Language and Literacy programs.

- Potential LLNP participants are assessed against ACSF benchmarks and enter different streams of the program depending on their ACSF level. The majority are at ACSF pre-level 1, level 1 or level 2 in most or all core skills, but some entering the vocational stream may already be at ACSF level 3 in some core skills. Providers must show evidence that a learner has progressed over the initial 200 hours of language, literacy and numeracy training. For those starting at very low levels, this is measured by an increase in at least two indicators within two different core skills. Although theoretically it should be possible to aggregate these data to provide a snapshot of the progress of the 100 000 participants a year, it is unclear whether the current data-capture software has the capability to deliver this kind of information. However, providers do give these data as part of their reports, so it could be collated.
- In the WELL program, there is no baseline assessment of either individuals or groups, but the ACSF is used to describe the performance of a WELL cohort at the end of the training program. If expressed in ALLS terms, the exit scores could provide some comparable information on the language, literacy and numeracy performance of groups of workers. However, the data would only be useful for measuring the impact of the program itself if entry-level benchmarks were also established.
- The implementation of a national Foundation Skills Training Package may make it possible to gather detailed and consistent information about the language, literacy and numeracy progress and performance of specific target groups, many of whom may be members of, or aspiring to enter, specific industries.
- All students sitting for the South Australian Certificate of Education are required to demonstrate literacy and numeracy skills to a minimum of ACSF exit level 3, either through explicitly designed literacy and numeracy units mapped to the ACSF or through SACE-endorsed literacy- and numeracy-rich subjects, in which C grade is equated with ACSF exit level 3. A study of the success rates of this

[8] Item Response Theory (IRT) encompasses the design, analysis and scoring of tests, questionnaires and similar instruments for measuring abilities, attitudes, or scales that describe a particular concept, in this case, adult literacy and numeracy. It is based on the application of related mathematical models to testing data. Item Response Theory underpinned the development of the ALLS scale and is also is the preferred method for the development of tests such as the National Assessment Project — Literacy and Numeracy (NAPLAN) and the OECD Programme for International Student Assessment (PISA).

large cohort of senior secondary students in South Australia and the Northern Territory could provide insight into the potential of this approach to raise the literacy and numeracy skills of young adults in the school sector. Given the evidence that the SACE requirements are already having an impact on approaches adopted in middle schooling, there is potential for the longitudinal tracking of the impact of a formal language, literacy and numeracy policy with set minimum requirements in the secondary schooling sector.

Monitoring the LLN skills of those in vocational education and training

Learner cohorts in vocational education and training are operating across all ACSF skill levels. Streamlined training packages are to have an explicit focus on 'foundation skills', although at the time of writing an agreed definition of this term is still under discussion. While it is generally understood that it will involve an explicit focus on language, literacy and numeracy, it has not yet been decided if this will be expressed in ACSF terms. However, the Department of Education, Employment and Workplace Relations has made funding available to industry skills councils to map training packages to the ACSF, so the data are likely to be available, even if the ACSF itself does not become an officially endorsed component.

A pilot study has shown the potential of the mapping process to provide ACSF-based information that could be directly relevant to the Council of Australian Governments targets if expressed in ALLS terms. For example, it can now be demonstrated that, in order to complete a Certificate III in Electrotechnology, a learner will have developed and demonstrated skills in numeracy to ACSF level 5 and reading, oral communication and writing to ACSF level 4. Thus, anyone achieving this qualification can be assumed to be operating above ALLS levels 3 in reading and numeracy — at least in the language, literacy and numeracy relevant to their disciplines. If all training packages are mapped consistently to the ACSF, completions data could be used to show the minimum language, literacy and numeracy performance in ACSF terms of anyone completing training units in a particular industry sector. A closer mapping of the ALLS survey and the ACSF would allow this information to be translated into ALLS terms.

The ACSF mapping of training packages is only one part of a broader picture. The Core Skills Framework is increasingly being used as the basis of language, literacy and numeracy training for VET practitioners. There is also a growing emphasis on the pre- and post-entry LLN assessment of learners undertaking vocational training, using generic and contextualised assessment tools benchmarked against the ACSF. Again, this provides an opportunity to conduct longitudinal research in identified target areas to provide evidence of the impact of various interventions. Such research might use ACSF benchmarks to assist trainers and learners to identify specific areas of strength and weakness and thus inform the design of teaching methodologies, as well as to identify ALLS reference points to provide a snapshot of the language, literacy and numeracy progress of those engaged in formal training in the industry in question.

Monitoring language, literacy and numeracy progress at undergraduate levels

There is a growing concern about the LLN skills of students entering undergraduate courses, with over one-third of universities conducting or planning to introduce post-entry language, literacy and numeracy assessment (Dunworth 2009). The focus on language, literacy and numeracy is about to increase significantly following the announcement by the Australian Universities Quality Agency (now the Tertiary Education Quality and Standards Agency) that it will be evaluating language, literacy and

numeracy processes and outcomes, and will be looking for evidence that students have improved discipline-related language, literacy and numeracy skills during their course of study.

Victoria University is the first university to adopt the ACSF as the platform for a whole-of-university language, literacy and numeracy strategy. At the time of writing, the aim is to use the framework to:

- map the context-specific LLN requirements of courses in both vocational and higher education
- inform the design of course materials, methodologies and assessment to support students' LLN skill development in discipline and career-relevant areas
- benchmark the post-entry LLN performance of all students, with a particular emphasis on the aspects most relevant to their chosen course of study and career
- monitor student progress over time.

While it is not yet clear whether other universities will follow suit, Victoria University could provide one site for the evaluation of the impact of a systematic approach to LLN across both vocational and higher education. While post-entry and exit data will be expressed in ACSF terms, it could also be translated into ALLS performance levels if the mapping proposed in this study is successful.

Data capture

While we can see there are potentially many sources of language, literacy and numeracy data, this leads to further questions about how we might best capture ACSF data to use as evidence of literacy and numeracy progress against the ALLS survey and its successors. It may, for example, require the development of a new data-collection system, perhaps as part of a research program incorporating case studies and broader statistical sampling.

Conclusion

The ACSF is increasingly being used in a variety of settings and has the potential to become the bridge between international measures such as the ALLS survey and its successors and the reality of language, literacy and numeracy performance in identified Australian contexts.

However, it should also be noted that neither ALLS nor ACSF data alone will change language, literacy and numeracy skills performance. Providing adults in different walks of life with the opportunity to achieve a prescribed benchmark of adult literacy and numeracy performance may require a greater investment in support per individual than is currently being committed and/or changes to funding structures. It will need a larger and possibly more diverse adult literacy workforce than exists now and a broadening of the contexts within which language, literacy and numeracy assistance is actively incorporated.

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Appendix A: About the ALLS survey and the ACSF

Adult Literacy and Life Skills survey

The ALLS survey in Australia is a national survey that provides information on the knowledge and skills of 15 to 74-year-olds for:

- prose literacy: the ability to understand and use information from various kinds of narrative texts
- document literacy: the knowledge and skills required to locate and use information contained in various formats
- numeracy: the knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations
- problem-solving: goal-directed thinking and action in situations for which no routine solution is available.

The ALLS survey administered tests on these and also sought the participants' self-assessment on prose and document literacy and numeracy. For each literacy domain, proficiency is measured on a scale ranging from 0 to 500 points, with these continuous scores grouped into five skill levels (only four levels were defined for the problem-solving scale) with level 1 being the lowest measured level of literacy. The survey collected a range of data on income and employment and also on social capital and wellbeing (ABS 2008, p.4).

Australian Core Skills Framework[9]

The ACSF identifies five core skills, namely learning, reading, writing, oral communication and numeracy. Each skill is enacted for a purpose and the set of purposes, circumscribed as 'aspects of communication', includes personal, cooperative, procedural, technical, systems, and public communication.

Performance in each core skill is described across five performance levels from level 1 (low) to level 5 (high). At each performance level, indicators are used as broad descriptors. Performance is further elaborated through the use of 'performance features', which are grouped in strands called 'focus areas'. As an example, for reading the focus areas include purpose and audience, complexity, prediction and prior knowledge, text structure, textural analysis, critical literacy, textual clues, grammar and vocabulary.

Four variables impact on performance at any point in time — the nature and degree of support, familiarity with the context, complexity of the text and complexity of the task. While it is expected that an individual may need high support during the initial learning phase, support should not be required in summative assessment. In the feasibility phase of the current study, experts were asked to

[9] Please note that at the time of writing the Australian Core Skills Framework was being reviewed.

assume that individuals would complete the tasks without support, thus, rendering the ALLS survey and the ACSF more directly comparable.

A comparison of the performance levels and associated descriptors or performance features of the two frameworks is presented in table A1.

Table A1 Comparison of ALLS prose, document, numeracy and quantitative literacy (IALS) and ACSF reading and numeracy performance level descriptors

Performance level	ALLS			IALS	ACSF	
	Prose	Document	Numeracy	Quantitative literacy	Reading	Numeracy
1	Most of the tasks in this level require the respondent to read a relatively short text to locate a single piece of information which is identical to or synonymous with the information given in the question or directive. If plausible but incorrect information is present in the text, it tends not to be located near the correct information.	Tasks in this level tend to require the respondent either to locate a piece of information based on a literal match or to enter information from personal knowledge onto a document. Little, if any, distracting information is present.	Tasks in this level require the respondent to show an understanding of basic numerical ideas by completing simple tasks in concrete, familiar contexts where the mathematical content is explicit, with little text. Tasks consist of simple, one-step operations such as counting, sorting dates, performing simple arithmetic operations or understanding common and simple percentages such as 50%.	Tasks in this level require the respondent 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 respondent to borrow.	Someone at level 1 can read short simple texts of personal interest with an explicit purpose and containing highly familiar vocabulary. Appropriate reading tasks will involve one or two processes e.g. locating, recognising literal information.	A person at this level can find and recognise key mathematical information in simple activities or texts, and apply simple mathematical and personal problem-solving strategies in very familiar contexts. They use everyday, informal language to express mathematical concepts. Appropriate numeracy tasks will involve one or two processes e.g. locating, recognising numerical information.
2	Some tasks in this level require respondents to locate a single piece of information in the text; however, several distractors or plausible but incorrect pieces of information may be present, or low-level inferences may be required. Other tasks require the respondent to integrate two or more pieces of information or to compare and contrast easily identifiable information based on a criterion provided in the question or directive.	Tasks in this level are more varied than those in level 1. Some require the respondents to match a single piece of information; however, several distractors may be present, or the match may require low-level inferences. Tasks in this level may also ask the respondent to cycle through information in a document or to integrate information from various parts of a document.	Tasks in this level are fairly simple and relate to identifying and understanding basic mathematical concepts embedded in a range of familiar contexts where the mathematical content is quite explicit and visual with few distractors. Tasks tend to include one-step or two-step processes and estimations involving whole numbers, benchmark percentages and fractions, interpreting simple graphical or spatial representations, and performing simple measurements.	Tasks in this level typically require the respondent to perform a single arithmetic operation (generally 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 working of the question or the format of the material (e.g. a bank deposit form or an order form).	Someone at level 2 can identify the main points in short, unambiguous written texts on familiar topics and using familiar vocabulary. Appropriate reading tasks will involve a limited number of familiar processes e.g. identifying, comparing and contrasting.	A person at level 2 can identify and understand the relevant mathematical information in familiar texts or activities; can apply the appropriate problem-solving strategy in familiar contexts. Appropriate numeracy tasks will involve a limited number of familiar processes e.g. identifying, comparing and contrasting, such as comparing information in two-column tables.

Performance level	ALLS		IALS		ACSF	
	Prose	Document	Numeracy	Quantitative literacy	Reading	Numeracy
3	Tasks in this level tend to require respondents to make literal or synonymous matches between the text and information given in the task, or to make matches that require low-level inferences. Other tasks ask respondents to integrate information from dense or lengthy text that contains no organisational aids such as headings. Respondents may also be asked to generate a response based on information that can be easily identified in the text. Distracting information is present, but is not located near the correct information.	Some tasks in this level require the respondent to integrate multiple pieces of information from one or more documents. Others ask respondents to cycle through rather complex tables or graphs which contain information that is irrelevant or inappropriate to the task.	Tasks in this level require the respondent to demonstrate understanding of mathematical information represented in a range of different forms, such as in numbers, symbols, maps, graphs, texts, and drawings. Skills required involve number and spatial sense, knowledge of mathematical patterns and relationships and the ability to interpret proportions, data and statistics embedded in relatively simple texts where there may be distractors. Tasks commonly involve undertaking a number of processes to solve problems.	Tasks at this level generally require a single operation but the operations are more varied i.e. some multiplication and division tasks. Sometimes two or more numbers are needed to solve the problem and the numbers are frequently embedded in more complex displays. Terms such as 'how many' and 'calculate the difference' are still used, as in the lower-level tasks but some tasks require the respondent to make higher-order inferences to determine the appropriate operation.	At level 3 an individual understands a range of texts on familiar subjects that may contain simple diagrams and charts. Identifies the main messages in longer routine texts requiring integration of a number of ideas and pieces of information and containing some specialised vocabulary. Appropriate tasks include a number of steps within one task e.g. sequencing, basic inferencing, extrapolation and integration.	Someone at level 3 can find and interpret mathematical information that may be partly embedded in both familiar and less familiar tasks and texts; use a variety of mathematical and problem-solving strategies in both; use both informal and formal mathematical language. Appropriate numeracy tasks include a number of steps within one task, such as sequencing, basic inference, extrapolation and integration e.g. use technological devices appropriate to the work context to measure and record data and act on that information.
4	These tasks require respondents to perform multiple-feature matches and to integrate or synthesise information from complex or lengthy passages. More complex inferences are needed to perform successfully. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent.	Tasks in this level require respondents to perform multiple-feature matches, cycle through documents, and integrate information; however, they require a greater degree of inference. Many of these tasks require respondents to provide numerous responses but don't designate how many responses are needed. Conditional information is also present and must be taken into account by the respondent.	Tasks at this level require respondents to understand a broad range of mathematical information of a more abstract nature represented in diverse ways, including in texts of increasing complexity or in unfamiliar contexts.	Tasks at this level require the respondent to perform a single arithmetic operation where typically either the quantities or the operation are not easily determined i.e. for most tasks the question or directive does not provide a semantic relation term such as 'how many' or 'calculate the difference' to help the respondent.	Someone at level 4 understands texts with relatively complex syntactic structures that may incorporate some technical specificity and information presented in graphic, diagrammatic or visual form. Texts may use specialised vocabulary and contain embedded information, abstraction and symbolism.	A person at level 4 can extract and evaluate mathematical information embedded in a range of tasks and texts; apply a range of mathematical and problem-solving strategies; appropriately use a range of informal and formal mathematical language.

Performance level	ALLS		IALS		ACSF	
	Prose	Document	Numeracy	Quantitative literacy	Reading	Numeracy
4 cont ...			These tasks involve undertaking multiple steps to find solutions to problems and require more complex reasoning and interpretation skills, including comprehending and working with proportions and formulas or offering explanations for answers.		Appropriate reading tasks may involve complex task analysis involving application of a number of processes e.g. synthesising ideas and information within a text or from several texts, critical reflection and evaluation.	Appropriate numeracy tasks may involve complex task analysis involving application of a number of processes such as extracting, comparing and interpreting information e.g. a person works in a team to develop an operating budget for a project that involves multiple sources of income and expenses.
5	Some tasks in this level require the respondent to search for information in dense text which contains a number of plausible distractors. Others ask respondents to make high-level inferences or use specialised background knowledge. Some tasks ask respondents to contrast complex information.	Tasks in this level require the respondent to search through complex displays that contain multiple distractors, to make high-level text-based inferences, and to use specialised knowledge.	Tasks in this level require respondents to understand complex representations and abstract and formal mathematical and statistical ideas, possibly embedded in complex texts. Respondents may have to integrate multiple types of mathematical information, draw inferences, or generate mathematical justification for answers.	Tasks at this level require the respondent to perform multiple operations sequentially, and they must dis-embed the features of the problem from the material provided or rely on background knowledge to determine the quantities or operations needed.	Someone at level 5 understands highly complex, lexically dense texts from a broad range of text types, including those incorporating a high level of technical specificity. Sophisticated task analysis e.g. selecting, synthesising and critically evaluating evidence, arguments and ideas from complex primary and secondary sources with highly embedded information.	A person at level 5 understands, analyses and synthesises highly embedded information across a broad range of task or texts; chooses and applies highly complex mathematical and problem-solving strategies and communicates mathematical concepts using a wide range of informal and specialised language. Appropriate tasks are complex and include interpretation, analysis, reflection, synthesis, evaluation and recommendations e.g. applying statistical techniques to analyse data.

Source ABS (1996, pp.113–19, 2008, p. 77); Department of Education, Employment and Workplace Relations (2008, pp.42–58, 112–33).

Note: Only two dimensions of the ACSF performance criteria are shown; namely, the nature of the text and the complexity of the task. Level 1 of the ACSF includes a high level of external support, while performance at level 5 involves little or no support. By contrast, performance on ALLS items is entirely independent.

Appendix B: Delphi method and descriptions of ALLS items

The Delphi method

The so-called Delphi method represents a variety of approaches to seeking and reporting expert opinion on an issue. Variations of the method revolve around the extent to which, and at what stages of the process, experts share their opinions, with a view to reaching consensus judgments (Linstone & Turoff 2002).

In the present study, the panel of experts was selected according to their knowledge of the ACSF, and in one case, for their knowledge of other literacy assessment practices. All panel members have extensive experience of literacy development and assessment, especially for adults.

Panel members signed a confidentiality undertaking in relation to the ALLS and IALS items they would rate.

Panel members were provided with information about the project and specifically about the procedures that were to be followed in its execution. The documentation provided included information on the objectives of the first phase of the study and a brief outline of possible subsequent phases. Panel members were also provided with an initial set of five literacy items with instructions to rate these before attending a face-to-face meeting convened in mid-August 2010.

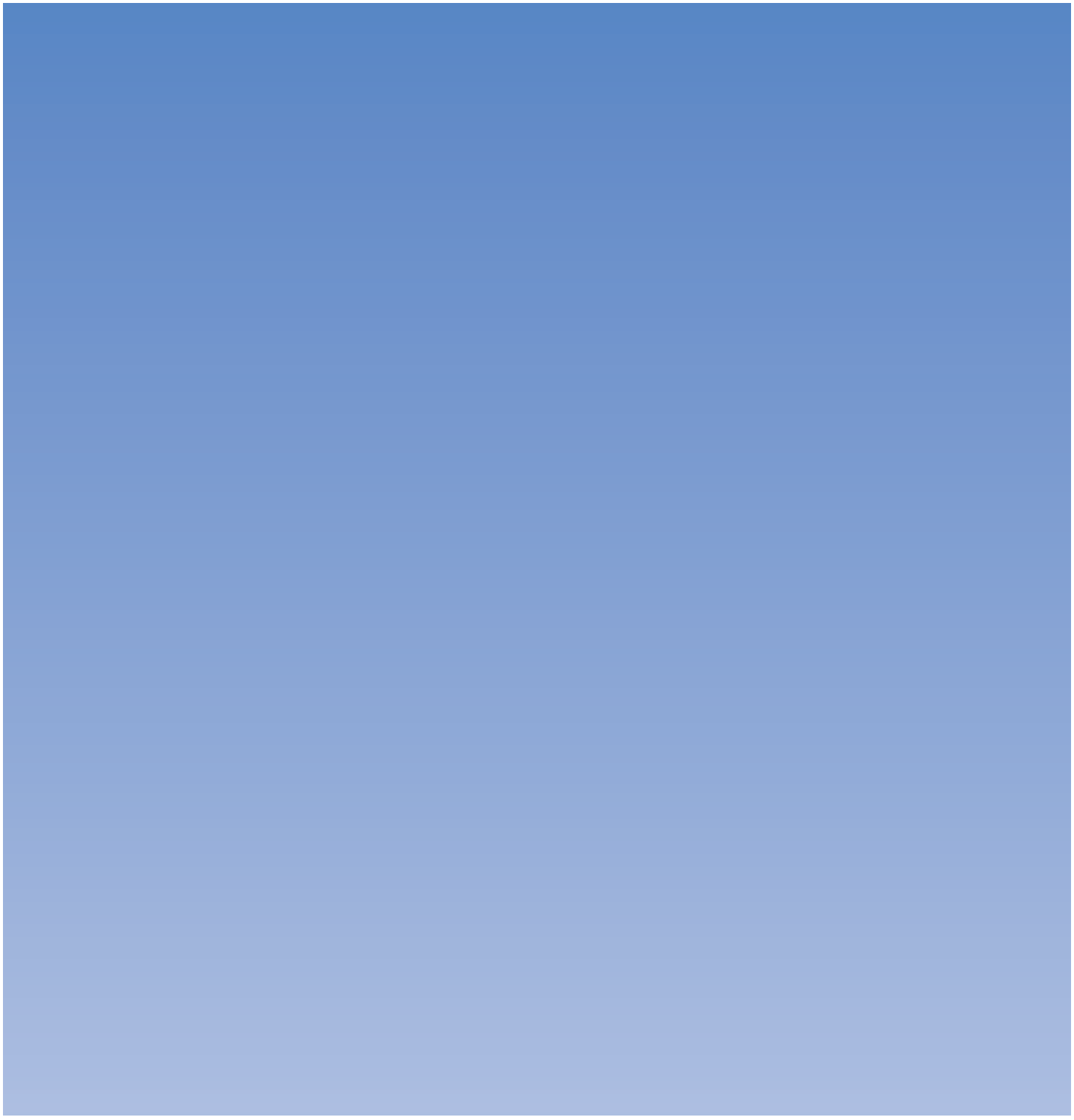
At this meeting information about the project that had been provided in advance of the meeting was reiterated. In particular, the relationship between the project and the evaluation of progress against Council of Australian Governments skills targets were emphasised. There was considerable discussion among panel members about the initial set of items, the ACSF levels and performance features. The discussion had the desired effect of bringing to the fore differences in interpretations of the performance descriptions of the ACSF, although there appeared to be considerable agreement in the performance levels assigned to items.

Following the meeting, panel members were asked to rate an additional set of ten items independently and to return their ratings to the NCVER facilitators. After rating items, panel members were provided with information on the ALLS difficulty levels of the items that they assessed.

Description of items

The ALLS items used in this study are secure items; they cannot be released publicly. In order to provide readers with a sense of the items used, brief descriptions of them are provided. Not all of the items described below were provided to members of the expert panel.

Item	Description
1	This item is presented as a letter advising patrons of a concert performance. It has some structured information about the performance and one paragraph of text.
2	This item takes the form of an advertisement seeking support for a charity. It has a large-text title, a graphic and three short paragraphs, with the target information in the second paragraph.
3	The prompt for this item is a one-page three-column brochure on a water treatment. The text is presented in relatively short paragraphs and the content is clearly signposted by the use of bold large font headings.
4–6	Three forms that seek support for a charity are presented on a single sheet. The questions require information to be read from the three forms. The headings for the forms provide clues to direct the reader's attention.
7–8	The prompt for this item is an article that might occur in a newspaper or on a brochure on fire safety. It is in two columns on a single sheet. The text is separated using headings and bullet points.
9	Information on oil consumption is presented graphically using two clearly labelled pie charts. The required information can be read directly from the labels of one of the charts.
10	Information is presented as a newspaper article on nuclear waste in four columns. Instructions direct the test-taker's attention to a chart, in which information is presented with clearly labelled numbers.
11	The prompt for this item is a job application form. Four pieces of information are provided and each corresponds to one item on the form.
12	The prompt is the text of an article on growing a variety of decorative plant. It has a large bold-type heading and an introductory paragraph. It occupies about one-half of an A4 page in three columns. The text is divided into short paragraphs with bold headings.
13–14	This is a well-spaced article on alcohol consumption. It includes several paragraphs of text, two lists and a table. The information required to answer the first question is presented directly in the first paragraph and the answer to the second question can be found at the end of the article.
15–16	Information is presented in two graphs on fireworks. One, containing the information for the first question, is a simple line graph. The answer to the second question can be read from a stylised graph.
17	Information is presented as a newspaper article in four columns in nine separate sections. Instructions direct the test-taker's attention to a two brief articles identifiable by their headings. The task is to identify a sentence that contains target information. The second article and some of the information in the target article are distractors.
18	Information about a job interview is presented as a pamphlet. The instructions for the task are simple and clear. Headings in the text help to direct the test-taker's attention to the required information.
N1	Information about election results for three candidates is presented. The information is brief and clearly set out. The task is to tally the total number of votes cast.
N2	This is a short newspaper article about the amount of a particular toxin in breast milk. The prompt is a bar graph depicting the amount of toxin in breast milk in three time periods. There are two questions which require the respondent to describe changes in the levels of the toxin. Knowledge of percentages is required for one question.



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