



Australian Council for Educational Research



Looking beyond the results - what's sitting behind international surveys? Lessons for teaching



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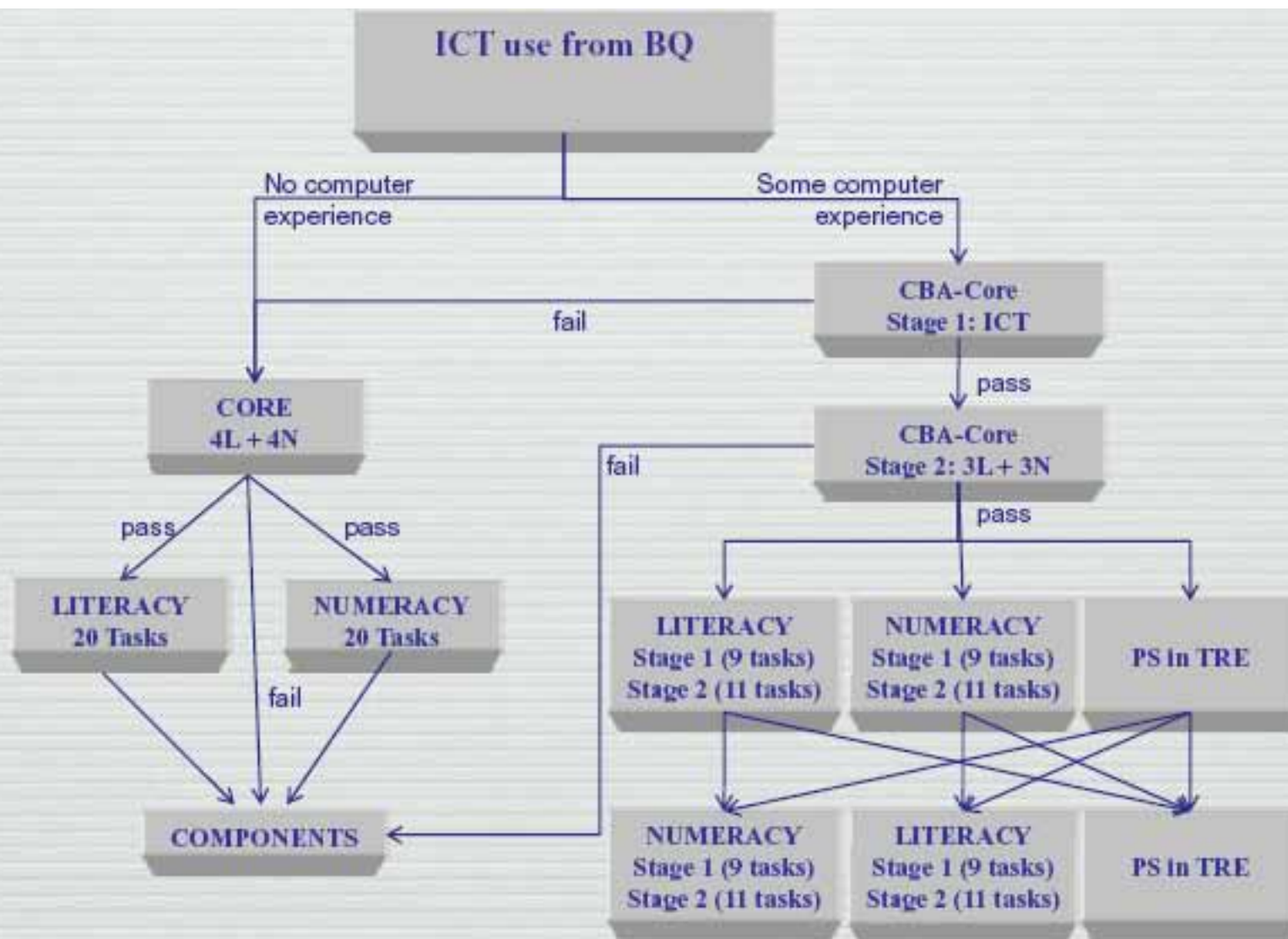


PIAAC: an overview

The Programme for the International Assessment of Adult Competencies (PIAAC)

- is an international survey of adults 16-64 years of age
- will measure the domains of
 - literacy (reading)
 - numeracy
 - problem solving in technology-rich environments
- through two modes of administration
 - paper and pen
 - computer
- will allow comparison with the results of the Adult Literacy and Life Skills Survey
- literacy also includes the components of reading
- is to be administered in OECD and partner countries (including Australia) this year.

PIAAC Assessment





PIAAC

Sitting behind the survey is a theoretical framework of literacy and numeracy - a framework that offers insights for teachers about what literacy and numeracy in the 21st century incorporates and the factors that make tasks difficult.

- *PIAAC Numeracy: A Conceptual Framework*, OECD Education Working Papers, No. 35, OECD Publishing.
<http://dx.doi.org/10.1787/220337421165>
- *PIAAC Literacy: A Conceptual Framework*, OECD Education Working Papers, No. 34, OECD Publishing.
[http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=edu/wkp\(2009\)13&doclanguage=en](http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=edu/wkp(2009)13&doclanguage=en)



Literacy definition

Literacy is *understanding, evaluating, using, and engaging with* written texts to *participate* in society, to achieve one's goals, and to develop one's knowledge and potential.



Literacy Framework characteristics



- **Medium** - pen and paper, digital
- **Text type** – argumentation, description, exposition, instruction, narration, records
- **Social contexts** – work, personal, community, education
- **Task aspects** - access & identify, integrate and interpret, evaluate and reflect
- **Reading components** assessment



Reading components

In previous surveys, the information on the reading abilities of adults with poor skills was often insufficient to get an understanding of their difficulties and build a description of their abilities.

The assessment of component skills is intended to provide a greater level of information about the skills of individuals with low levels of literacy proficiency.



Reading components

Assesses:

- Word meaning (of everyday words)
- Sentence processing (making a judgement of whether the sentence is sensible)
- Passage comprehension (time taken to read passage + choosing between correct and incorrect words to gain meaning).



Numeracy definition

Numeracy is the ability to access, use, interpret, and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life.



Numeracy Framework characteristics



Numerate behaviour involves managing a situation or solving a problem...

1. in a real context:

- everyday life; - work; - societal; - further learning

2. by responding:

- identify, locate or access
- act upon, use: order, count, estimate, compute, measure, model
- interpret
- evaluate / analyse
- communicate



Numeracy Framework characteristics



3. to mathematical content/ information/ ideas:
 - quantity & number
 - dimension & shape
 - pattern, relationships, change
 - data & chance
4. represented in multiple ways:
 - objects & pictures
 - numbers & mathematical symbols
 - formulae
 - diagrams & maps, graphs, tables
 - texts
 - technology-based displays

A text/task

\$49 Plan

\$59 Plan

\$79 Plan

\$99 Plan

\$129 Plan

The Plan

\$550

calls & MMS to standard Australian numbers (excludes overseas)

+ Unlimited +

text to standard Australian numbers (excludes overseas)

1.5^{GB}






data to use in Australia

= \$59

Per month for 24 months. Minimum cost \$1416

[Buy Online](#)

The Phones

<div>HTC Desire S</div>  <div> <div>\$59 Freedom[®] Connect Plan</div> <div>+</div> <div>HTC Desire S Handset</div> <div>=</div> <div> <div>\$59 a month for 24 months</div> <div>Total Min Cost \$1,416</div> </div> <div>BUY NOW</div> </div>	<div>Samsung GALAXY Ace</div>  <div> <div>\$59 Freedom[®] Connect Plan</div> <div>+</div> <div>Samsung GALAXY Ace Handset</div> <div>=</div> <div> <div>\$59 a month for 24 months</div> <div>Total Min Cost \$1,416</div> </div> <div>BUY NOW</div> </div>	<div>Motorola Defy</div>  <div> <div>\$59 Freedom[®] Connect Plan</div> <div>+</div> <div>Motorola Defy Handset</div> <div>=</div> <div> <div>\$59 a month for 24 months</div> <div>Total Min Cost \$1,416</div> </div> <div>BUY NOW</div> </div>	<div>Samsung Galaxy S II</div>  <div> <div>\$59 Freedom[®] Connect Plan</div> <div>+</div> <div> <div>\$20 after using MRO Bonus for 24 months</div> <div>Samsung Galaxy S II Handset</div> </div> <div>=</div> <div> <div>\$79 a month for 24 months</div> <div>Total Min Cost \$1,896</div> </div> <div>BUY NOW</div> </div>	<div>Apple iPhone 4 16GB</div>  <div> <div>\$59 Freedom[®] Connect Plan</div> <div>+</div> <div> <div>\$15 after using MRO Bonus for 24 months</div> <div>Apple iPhone 4 16GB Handset</div> </div> <div>=</div> <div> <div>\$74 a month for 24 months</div> <div>Total Min Cost \$1,776</div> </div> <div>BUY NOW</div> </div>
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A task or three

Use the text to answer the questions:

- How long is the Plan for the Samsung Galaxy S II?
- How much would you pay per month for the Apple iPhone 4?
- What financial benefit is there to buying the Freedom Connect BYO Plan?

<http://www.telstra.com.au/mobile/plans/freedom-connect-plans.cfm>



A task or three



Discuss, with your neighbours

- What did you do in order to answer the questions?
- What reading skills and processes did you use to undertake to answer the questions?
- What mathematical skills did you need to undertake to answer the questions?
- What, in terms of maths and reading, made some questions more difficult (or would have made them more difficult for a student)?



The processes in solving a real life problem

- Reading: understanding the text and task - both literacy and language which includes the numbers.
- The maths itself: what maths, how complex, how many steps, and what type?



Task text complexity

- **Semantic complexity** – concrete to abstract
- **Amount of inferencing required**
- **Competing information**
- **Prominence of information required**
- **Amount of information required**



How does this impact on literacy teaching?

- Ensure tasks and activities cover the range of social contexts and text types
- Create tasks that cover the range of cognitive operations - access & identify, integrate and interpret, evaluate and reflect
- Teach students how to “read” the a task or question
- Help students develop strategies to access and identify information, integrate and interpret (relate parts of texts to each other), evaluate and reflect (draw on knowledge, ideas and values external to the text)

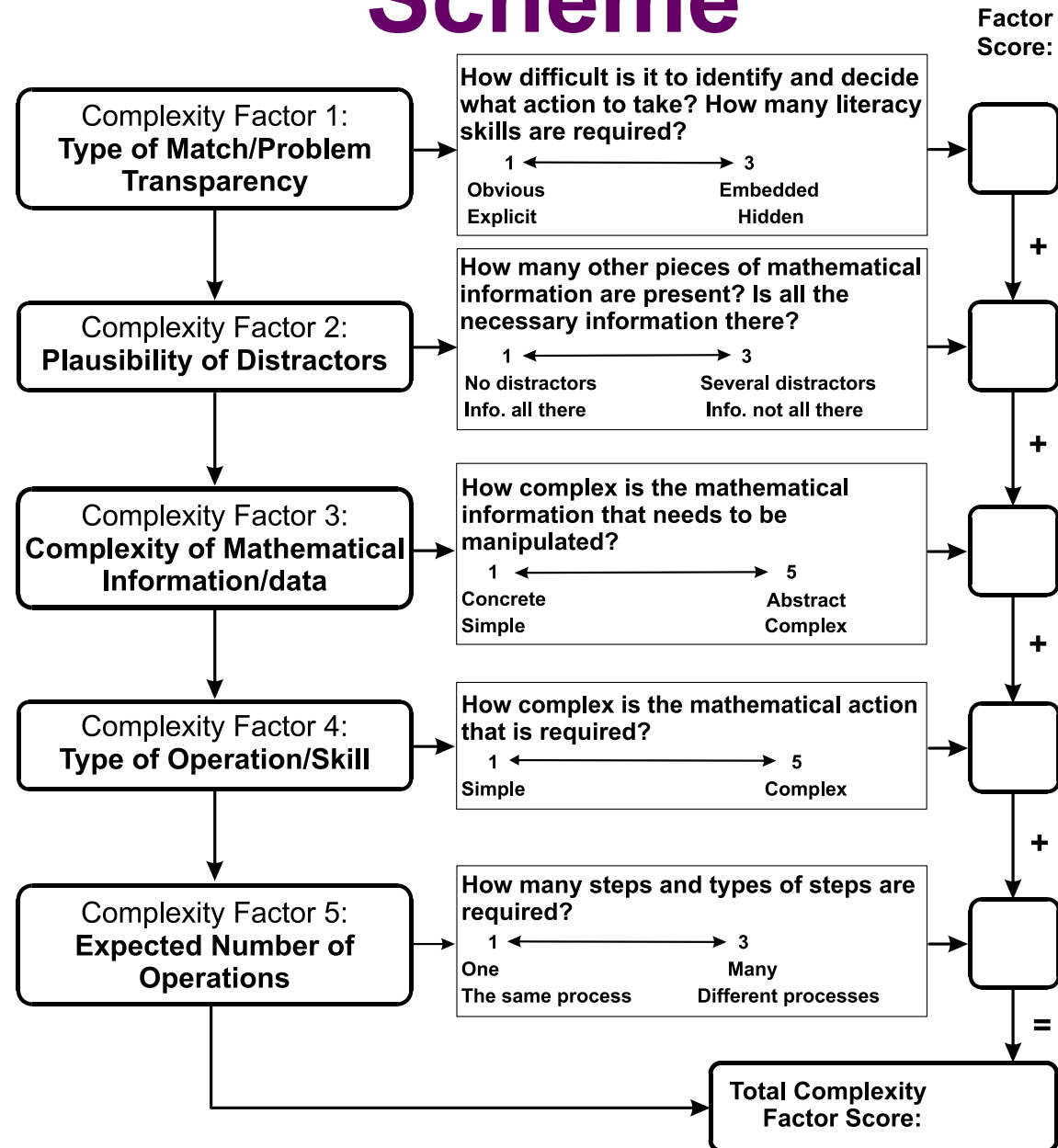


The ALL/PIAAC Numeracy Complexity Scheme

Aspects	Category	Range
Textual aspects	1. Type of match/problem transparency	Obvious/explicit to embedded/hidden
	2. Plausibility of distractors	No distractors to several distractors
Mathematical aspects	3. Complexity of Mathematical information/data	Concrete/simple to abstract/complex
	4. Type of operation/skill	Simple to complex
	5. Expected number of operations	One to many



The ALL/PIAAC Complexity Scheme





The ALL/PIAAC Complexity Scheme



Complexity Factor 3. Complexity of mathematical information/answer required

1	2	3	4	5
<u>Pattern and relationship</u> - 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



The ALL/PIAAC Complexity Scheme



Complexity Factor 4. Complexity of Type of operation/skill

1	2	3	4	5
<u>Compute</u> - a simple arithmetical operation (+, -, x, ÷) with whole numbers or money	<ul style="list-style-type: none">- 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	<ul style="list-style-type: none">- 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	<ul style="list-style-type: none">- applications of other mathematical operations such as squares, square roots, etc	<ul style="list-style-type: none">- more advanced mathematical techniques and skills e.g. trigonometry



The ALL/PIAAC Complexity Scheme



Complexity Factor 5. . Expected number of operations

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



How does this impact on numeracy teaching?



- You are a literacy and language teacher too!
- Teach students how to “read” the text, and the task or question
- Ensure tasks and activities cover the range of social contexts
- Create tasks that cover the range of cognitive operations and content areas – including the Complexity of mathematical information/answer required; Type of operation/skill and Expected number of operations
- Create your own problems (use elements from the scheme to develop different levels of items) – start each lesson with a problem based within the content area you are currently teaching



Questions





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