INFORMATION SKILLS IN THE NEW ZEALAND CURRICULUM: A BLUEPRINT FOR EDUCATION?

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ABSTRACT: The development of the 'information society' or 'information age' creates a global context for instruction in information skills. Ensuring that students have skill in handling, understanding, and producing information is increasingly considered a vital educational goal. This paper reviews the literature on information literacy, focusing on the common elements and aspects of information skill sequences and components. The nature of information skill as presented in New Zealand curriculum documents is reviewed and evaluated against international trends. Possible implications for assessment and education are examined.

"The challenge for education in the 21st century is to prepare students for a phase of social existence without precedent - the information society."
(Todd, McNicholas, & Sivanesarajah, 1992)

The information age or society has become a common metaphor for recent changes in the western world. This paper aims to understand the skills, knowledge, and abilities students will need to be taught in order to succeed in the midst of these changes. After a brief excursion into the nature of the 'information society' my attention will focus on the nature of information literacy or skill, its components, its presence in the New Zealand Curriculum Framework and subject documents, and how assessment of information ability might be carried out. I will conclude with some reflection on the question posed in the title of this paper.

The Information Age/Society

There has been much talk of a new age or revolution in human society especially as a result of changes in information technology over the last quarter of a century. It has been argued that an information society is a new stage characterised by a new paradigm; handling information (Plomp, Brummelhuis, & Pelgrum, 1997). Porat (1977) and Bell (1976) popularised the concept of the information economy being a post-industrial phenomenon during the 1970s. Now it is commonly accepted as a given (see introductory quote) for many information literacy theoreticians and practitioners. However, information work is not new to this last twenty five years. Schement (1990) has demonstrated the ascendance of information work in the US economy since the 1920s and 30s. What we are experiencing now Schement argues has its origins in the managerial need to control large corporate work forces and flows and is not a product of the post-war technology boom as others have argued.

Nevertheless, the importance of information in our so-called 'post-industrial' society has been abetted by technological innovation. Whether or not one accepts the idea that a revolutionary new stage in human civilization is upon us, there is no doubt that information and communication technology is making a profound difference to the information environment for which we are now educating children.

One of the key characteristics of this new environment is the pace of change. Information technology change has been extremely rapid. Mr. G. Moore, co-founder of INTEL, stated in the 1950s when the microprocessor was first invented, that the 'density of microprocessors roughly doubles every two years' (Cone, 1997, 21 July). So one can easily imagine the capacity of computers in another 20 years when the presently suspected end of Moore's law is reached, given the speed and capacity of the present Pentium II chips. Another example of rapid change in information technology is electronic communication. The Internet was invented in the 1960s and the World Wide Web was only introduced in 1989. And yet Netscape sold a 100,000 user license for Navigator to General Electric in the USA in 1995 even before the product's release.

These rapid changes extend to the adoption and implementation of information and communication technology. Singapore, for example, is planning itself as "a knowledge society" (Elledge, 1997). Its goals include: by the year 1999 there will be 100 PC's in every primary school and 10% of lesson time will include information technology (IT). New Zealand already has 1/3 of households with Internet access and an NZCER survey (Brown & Strafford, in press) this year found that 50% schools plan to have WWW connections by the end of 1998.

Paul Romer, a Stanford economist, believes that ideas, rather than information itself, are powering this economic expansion. "Most economic effort used to be spent using existing ideas to transform the physical world," he says. "Today, companies like Merck and Microsoft have most of their people working on new ideas, with the end product being a formula or bit string that is valuable. Once you've got the idea at the end of the expensive process, a fraction of your people are engaged in transforming physical objects."(Cone, 1997, 21 July) Romer thinks the idea-driven economy is sustainable. "We can increasingly economize on using people in jobs they're best at," he says. "The pace of change reflects the accumulation of new ideas, and that's what drives growth."

The need for information education has been highlighted in discussions on vocational or occupational requirements of the future. Information skill was one of the necessary skills highlighted in the Secretary of Labour (USA) SCANS report of 1991. Sir Chris Ball, speaking in New Zealand half a decade ago, said (1991, p. 4) "The nature of work is changing. Skilled brain power is replacing disciplined muscle power. ... Competitive economies in future will depend on the success of educational systems in producing a systematic and nation-wide advanced level of education and training, rather than a small leadership elite. The first industrial revolution depended on the exploitation of natural resources; the post-industrial revolution will depend on the effective development and deployment of human potential."

In addition to these technological and vocational-orientation changes, education has been affected by various curriculum reform movements of the last two decades. Higher order thinking (eg. problem solving, critical thinking, and metacognition) is needed for flexibility in a changing work world. Self-responsible, self-directed, self regulated learning for lifelong learning is also considered essential for success with rapidly evolving technology. Resource-based learning exposes students to large volumes of, especially primary source, materials on topics and links libraries with instruction. Some educators use inquiry-based learning (that is, authentic, meaningful question or problem solving involving motivated individual search with a metacognitive dimension) as a means of educating children for the information society. Recent trends in educational measurement away from multiple choice and norm referencing towards constructed response and criterion referenced (or standards) assessment have also influenced information education.

Whether the information society is a revolutionary new stage in human civilization has certainly not been demonstrated to me. However, there are definitely changes in the way we work, entertain ourselves, carry out commerce, and so on because of the impact of information technology and other economic and political forces. It is in the context of these larger social phenomena that the information skills of the New Zealand curriculum sit and in which New Zealand teachers are obliged to teach information skill. I will now review the nature of information skills.

Information Literacy

The preferred term in the field of information skill has evolved from *library skills*, to *information skills*, and finally to *information literacy*. It is this term that will be used in this paper as an umbrella term incorporating all dimensions of information handling ability. Christina Doyle has offered us the most commonly quoted definition (Doyle, 1994, p. 1) of information literacy.

"The ability to access, evaluate, and use information from a variety of sources."

Eisenberg has contrasted information literacy with the library based 'source approach'

(Eisenberg & Brown, 1992) and the subject based 'content approach' (Eisenberg & Spitzer, 1991). He claims the library approach is meaningless since it is divorced from meaningful content and because it is library bound, thus ignoring all other sources and formats of information. The content approach is inadequate since it is not possible to keep up with all the growth in 'knowledge' that is overwhelming teacher and student ability to comprehend. Thus one is left with a cognitive approach that enables students to know how to find answers or know how to learn. Information literacy is that cognitive approach since it requires problem solving and critical thinking attitudes in conjunction with some information handling skills to create new knowledge.

> "Living in the information age demands a new form of literacy, one that is based on the skills associated with solving information problems. Being information literate does not mean memorizing facts; nor does it even mean memorizing the steps involved in the information problem-solving process. Rather, information literacy means the ability to use an information problem-solving process in a way that empowers the user to learn and to adapt to technological changes not yet envisioned." (Eisenberg & Spitzer, 1991, p. 120)

However, there are in fact many definitions for information literacy. My reading has led to nearly 60 different lists which describe or define information literacy or the information literate person. Approximately 60% were from the USA and around 25% were Australian. Definitions began to be published in the 1970s; these were feature oriented and rather imprecise. From the 1980s began a real trend of defining information skills in the context of information literacy. These descriptions were expanded in 1990s with the integration of curriculum, assessment reforms.

There are two main types of definitions. The first type are those which suggest sequenced process stages through which a student works in order to answer their information problem. The stages are not strictly unidirectional and linear; recursion and skipping over stages are often experienced.

Table 1:

Sample Definitions: Sequential Stages

Kuhlthau, 1985	***Eisenberg & Berkowitz, 1988***	***NSW 1988, SA 1991, WA 1994[1]***	***AASL[2], 1995; Michigan, 1992; Wisconsin, 1993***	***Gawith, 1987***
1. initiation	*1. task definition*	*1. define*	*1. define need*	*1. decide*
2. selection	*2. information seeking*	*2. locate*	*2. initiate search strategies*	*2. find*
3. exploration	*3. location / access*	*3. select*	*3. locate resources*	*3. use*
4. formulation	*4. information use*	*4. organise*	*4. assess and comprehend information*	*4. record*
5. collection	*5. synthesis - organise and present*	*5. present*	*5. interpret information*	*5. present*
6. presentation	*6. evaluation*	*6. evaluate*	*6. communicate information*	*6. evaluate*
7. assessment			*7. evaluate product and process*	

[1]New South Wales, South Australia, West Australia

[2]American Association of School Librarians

Table 1 shows some typical examples of such type. As Eisenberg pointed out (Eisenberg & Spitzer, 1991) despite the difference in terminology there is a great deal of similarity in the various definitions.

The second type eschews stages and tends to describe critical features or capabilities of a fully information literate person. These are the ideal to which students are to be educated so that they can function fully in the information society. These characteristics are not often attained until well into adulthood. Table 2 shows a few examples of this type of definition.

Table 2:

Sample Non-Stage Definitions of Information Literacy

SUNY[3], 1992	***Bruce, 1996***	***ACRL[4], 1991***	***U. of Wollongong, 1996***
identify and analyse types of information need	*ability to use information technology*	*how information is identified and defined by experts*	*know basic terminology*
recognise difference in information provided by different sources	*ability to find information*	*how information sources are structured*	*understand research process*
plan logical search strategy	*executing a process*	*how information sources are intellectually accessed*	*recognise and avoid plagiarism*
use variety of print and non-print information tools	*controlling information*	*how information sources are physically organised and accessed*	*access information in various forms*
use library organisation system	*building up a personal knowledge base*		*critically evaluate information*
	gaining novel insights		*maintain accurate records*
	using information wisely		*use library effectively*

Table 3 is a compilation of the various staged or sequenced definitions. There appear to be three major time sequences around which the various information activities, attitudes, and characteristics can be organised. There are those things which most often take place before the information problem-solving search begins, those that take place during the search, and those that cluster after the search has been successful.

[3]State University of New York

[4]Association of College and Research Libraries

Table 3:

Information Literacy Phases and Attributes

Phase	*Activity*	Attributes from various Definitions of Information Literacy
Before	***Plan** Process*	plan; think forward; define task; prepare for independent, self-directed learning
	Develop Ideas Pertinent to Problem	recognise, determine, analyse, formulate, explore, or reflect on information need or gap; brainstorm; overview or immerse in or explore topic; relate to and regroup prior knowledge; select, narrow, or choose topic; develop thesis; formulate (central search) questions; identify key words and names; define subject and purpose; form and trial idea
	Develop Problem-solving Goals	set goal to create knowledge; form intent to learn; identify information use (coping, helping, enlightening, enriching, edifying); generate commitment to intensive use of time and labour; have goal of an independent, wholistic, individual perspective
	Utilise Pertinent Affective Traits	appreciate value and power of information; recognise information is basis of intelligent decision making; develop values that promote information use; develop appropriate attitudes (eg. persistence, detail attention, caution in accepting sources); make ethical, responsible, wise use of information; fulfill responsibilities and rights in democratic society; recognise and avoid plagiarism
	Utilise Pertinent Knowledge Bases	sound knowledge of standard information structures (as defined by experts) and information agencies (physical access) and how sources are intellectually accessed; knowledge of information processes and resources in one field of study; knowledge of how to use a variety of basic information technology; have awareness of knowledge explosion
During - 1	***Find** Sources*	select search strategy; seek; search; explore; find; locate; access; collect; acquire; gather
	Appraise Sources	identify or appraise or evaluate sources; recognise strength, weakness and impact of information sources; develop or create (alternative) logical search strategies
During - 2	***Comprehend** Content of Sources*	comprehend; decode information in many forms (written, statistical, graphs, charts, diagrams, tables, verbo-visual presentation of knowledge, etc.); read; examine; interrogate; assess; evaluate evidence; appraise; search and establish relevance; recognise propaganda, distortion and misuse of information; select or reject; extract; record, store information; paraphrase
During - 3	***Apply** Content to Problem*	interpret; analyse; synthesise; reorganise; use; establish conclusions; organise; infer; integrate; process; gain novel insights; apply information to work situations; mould solutions to problems
After - 1	***Present** Answer*	shape; present; communicate; retell; act on information; share; create; ability to generate and manipulate information with electronic processes
After - 2	***Evaluate** Answer and Process*	evaluate process and product; review; assess strategy effectiveness; think back; reflect on outcomes; use feedback mechanisms

In the Before (Plan) stage terms have been grouped around three main activities: cognitive planning of the information activity, cognitive brainstorming of ideas connected to the information need, and development of goals for the information problem solving activity. Listed at this stage, though they must be made use of throughout the whole information process, are two sets of pertinent ability; affective traits and conceptual knowledge of information structures and systems. The first During stage (Find) has two organising concepts: seeking behaviours, and critical appraisal of sources being found. The second During stage (Comprehend) includes the various cognitive activities involved in understanding the found sources for relevant answers to the information need. The third During stage (Apply) includes the cognitive actions of applying the newly found and understood information

to the creation of an information solution. The After stages involve communication of the information solution (Present) through some sort of oral, visual, or written presentation and metacognitive reflection (Evaluate) upon the information processes and products utilised in the information problem-solving process. The 6 terms in bold face are the summary terms I use to describe the major activities in information literacy processes.

Figure 1:
Information Literacy Components

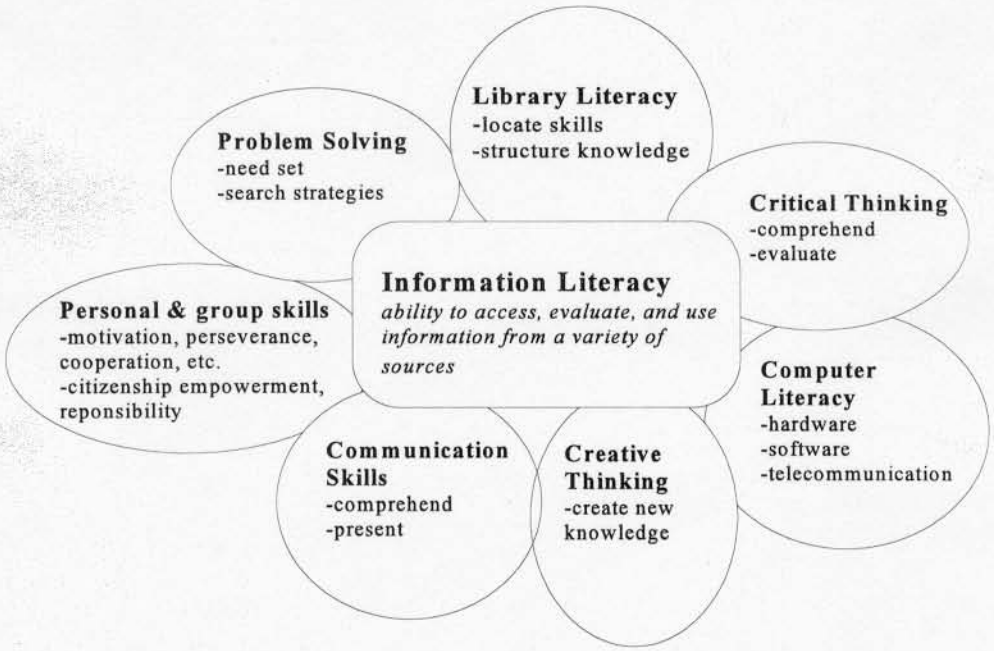


Figure 1 shows the connections among the various literacies and skills that are integrated in the information literacy literature.

Another way to examine information literacy is to group the various skills and abilities by psychological domain. There are 3 main areas of human psychology affecting ability and performance in information literacy: Cognitive, Affective, and Physical.

Cognitive Skills were listed by Bloom (1956) in the long-famous taxonomy. Stripling's (1993) set of cognitive reactions specifically related to information skills are included in the table. The affective domain includes attitudes, values, interests, beliefs, self-concept, and self-efficacy. The various information literacy descriptions mention key values, attitudes, characteristics, and qualities needed. In addition, key elements from the New Zealand Curriculum Framework Essential Skills, Krathwohl, Bloom, & Masia's affective taxonomy (1964), and Candy (cited in Todd 1996, p. 4-6) have been included in the affective domain.

Briefly, to establish just what is meant by the terms in the affective domain the following definitions are offered. Attitudes are feelings or opinions which respondents can evaluate for direction (positive - negative) and intensity (strong - weak). Beliefs are hypotheses concerning the nature of objects and the types of actions that should be taken with respect to them. Values are cognitive beliefs or information about the attributes of a psychological object. These are enduring

ideas which guide behaviour about important, correct, worthy or desired standards that have been developed in response to experience in certain conditions. Self-efficacy is the set of beliefs and attitudes a person has toward their own ability to successfully perform a specific task. Self-concept is the set of beliefs and attitudes or perceptions a person has toward his or her own self. This is a learned judgement or evaluation of one's own worth. Interest is the preference a person has for a particular activity.

Table 4:

Psychological Domains of Information Literacy

Cognitive Domain	analyse apply challenge comprehend evaluate explain know recall synthesise transform
Affective Domain	commitment, perseverance confidence cooperation, interdependence curiosity, openness diligent, hard work, enterprise ethical, integrity, wisdom fairness forethought goal focus honesty independence, self-sufficiency, self-management, self-responsibility initiative, self-motivation, venturesome methodical, disciplined, thorough, attention to details responsibility, trustworthiness self-reflection, self-awareness thoughtful, questioning, cautious acceptance
Physical Domain	filing of documents handwriting manipulation of objects (books, periodicals, files, fiche) operation of machinery, for example: audio cassette calculator cd-rom phone fax micro-fiche keyboard modem mouse personal computer photocopier scanner VCR operation of software (eg. word processor, database, spreadsheet, WWW) physical motion (library locations)

The physical skills involved in information literacy revolve around the various communication and information technologies used in storing, accessing, and communicating information. Generally these motor skills, though required, are not considered the primary agenda in information literacy. However, the New Zealand Curriculum framework Information Skills does require students to use a range of information technologies confidently and competently.

This is a good point at which to consider what the various New Zealand curriculum documents have to say about information literacy.

New Zealand's Curriculum

One begins with the New Zealand Curriculum Framework Essential Skills to grasp what the Ministry expects students to learn within the context of the Essential Learning Areas. These essential skills have been separated from each other for analytical purposes. It is the hope of the curriculum framers that students will learn all these skills in an integrated fashion as they learn across the curriculum in the eight essential learning areas. The Essential Skills are (Ministry of Education, 1993a, p. 17–20):

- Communication
- Numeracy
- Information
- Problem-solving

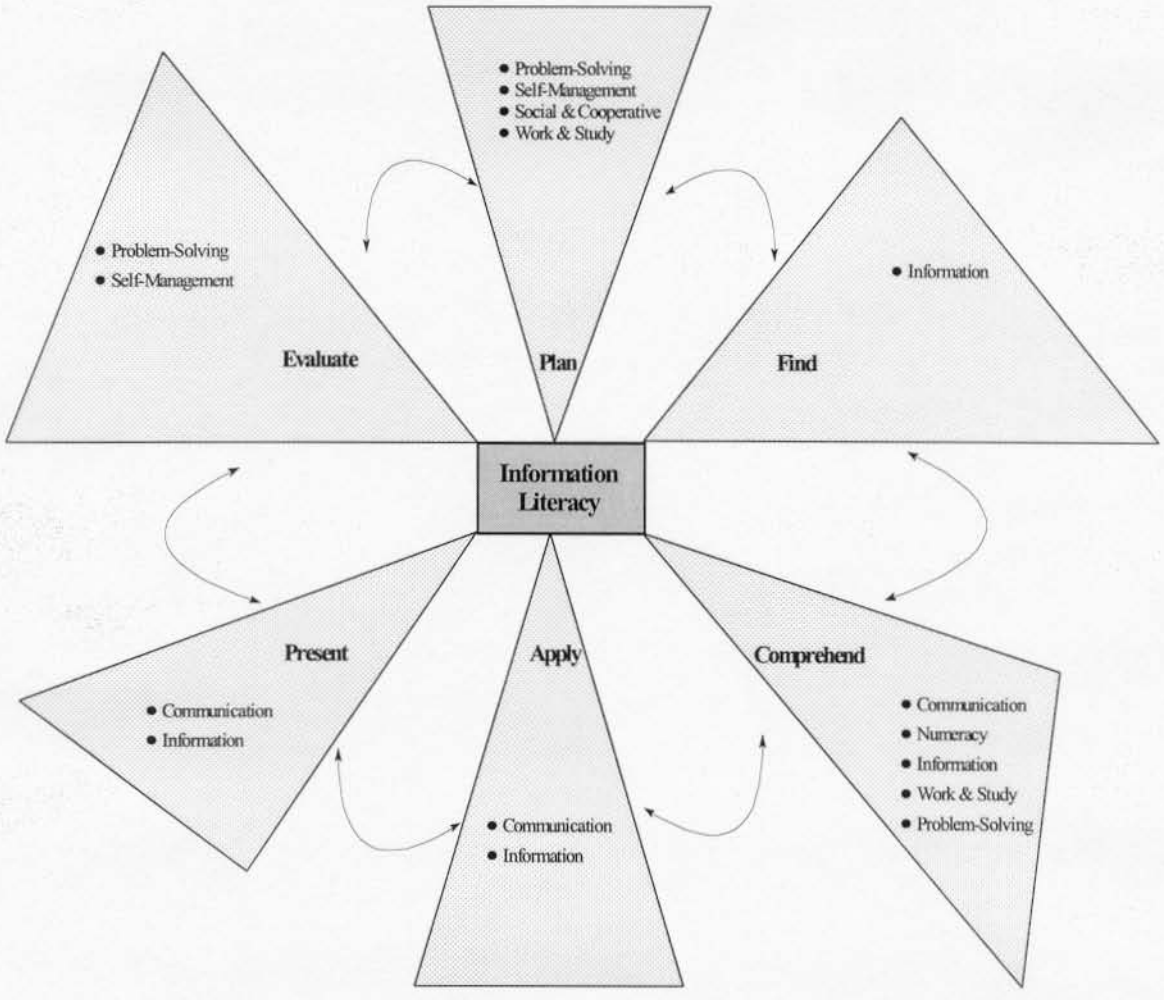
- Self-management and Competitive
- Social and Co-operative
- Physical
- Work and Study

The characteristics of Information skills are:

- identify, locate, gather, store, retrieve, and process information from a range of sources;
- organise, analyse, synthesise, evaluate, and use information;
- present information clearly, logically, concisely, and accurately;
- identify, describe, and interpret different points of view, and distinguish fact from opinion;
- use a range of information-retrieval and information-processing technologies confidently and competently. (Ministry of Education, 1993a, p. 18)

Figure 2:

Relationship of New Zealand Curriculum Framework Essential Skills to Information Literacy



This is a very similar understanding to the metacognitive, problem-solving approach to information advocated in the Information Literacy literature. Figure 2 shows how the Information Skills definition covers 4 out of the 6 major phases in the information literacy definition given earlier

in Table 3.

It is interesting to note that the New Zealand Information skills do not cover the Plan or Evaluate (the first and last) stages of information literacy.. Those aspects are covered elsewhere in the Essential Skills; specifically, Problem-solving and Self-management skills. However, it should be noted that information skill is the only essential skill that focuses on the Find phase.

The New Zealand curriculum framework has been extended with new curriculum documents into a limited number of essential learning areas. Final documents have been published for mathematics, science, social studies, and English, while information technology is still in draft form. Science, social studies, and English have the most to say about information literacy.

Science

Science (Ministry of Education, 1993b) has a whole set of Investigative Skills and Attitudes which constitutes one of the integrating strands. The whole set of dimensions, which appear to be sequentially staged, are:

- Focus and Plan,
- Gather Information
- Process and Interpret
- Report.

This appears to encompass the whole information literacy description and is consistent with the many staged definitions. For example, the information gathering dimension includes the following components:

- coherent, purposeful questions
- observation and measurement using appropriate instruments
- seeking and locating information in texts, people and media
- selecting and evaluating information.

This is indicates that the New Zealand Science curriculum, albeit using a 'research' and 'experimentation' approach to information, is consistent with the nature of information literacy.

Social Studies

Social studies has three processes, one of which is entitled Social Inquiry. This "embodies the tradition of rational, objective empirical inquiry. This process includes asking questions, gathering information, processing information, concluding, generalising, reflecting and evaluating." (Barr, et al., 1997, `p. 9). The actual curriculum document makes the problem-solving nature of Social Inquiry even more apparent. "Inquiry is focused through the use of questions or hypotheses. ... once the inquiry has begun and information has been gathered, students may need to return to the original questions or hypothesis, which may need to be modified in the light of the information collected." (Ministry of Education, 1997, p. 17). Thus, Social Inquiry appears to be totally consistent with the Information Literacy view of information skill.

English

The English curriculum (Ministry of Education, 1994) has placed the whole breadth of the information literacy process in every level of the curriculum. Processing information is one of the three language processes that are to be taught in integration with the language functions (Table 5).

The information processing descriptions encompass the 3 language functions (oral, written, visual) as sources of information. The use of appropriate technology for collection and presentation of information is explicitly mentioned. The key activities of information literacy that can be found

in information processing are:

- ask questions
- listen, gather, view, identify and retrieve
- select, record
- interpret, synthesise,
- assemble, organise
- present
- analyse and evaluate processes

Table 5:

Achievement Objectives for Information Processing (English)

Levels 1 and 2	Levels 3 and 4	Levels 5 and 6	Levels 7 and 8
ask questions, and listen to, interpret, and present information, using appropriate technology; identify, retrieve, record, and present coherent information, using more than one source and type of technology, and describing the process used; view and use visual texts to gain and present information, become familiar with and use appropriate technologies, and write letter and number forms legibly to present ideas.	select, assemble, and interpret information, using appropriate technology; gather, select, record, interpret, and present coherent, structured information from a variety of sources, using different technologies and explaining the processes used; view and use visual texts to retrieve, interpret, organise, and present information coherently; use appropriate technology, including fluent handwriting, for effective presentation.	assemble information from a range of sources, and select and present it clearly and coherently, using appropriate technology; using appropriate technologies, retrieve, select, and interpret information from a variety of sources, and present accurate and coherent information for a range of purposes, analysing the processes used; view and use visual texts to retrieve, interpret information from visual texts and present it effectively, using appropriate production technologies for different purposes.	interpret and evaluate information from a range of sources, and select and present accurate information coherently, using appropriate technology; using a variety of resources and types of technology, retrieve, select, interpret, synthesise, and present accurate and coherent information, evaluating the processes used; select, interpret, and synthesise information from visual texts and present it effectively, using a range of visual and layout features and appropriate technologies for a variety of purposes.

The problem with the English curriculum vision of information literacy is the difficulty in establishing the distinguishing characteristics that separate one level from the other. It appears that the degree of Bloomian activity, the increasing sophistication of appropriate technology, the range of technology and sources used are used to separate levels. Whether that will be sufficient to establish reliable assessment is yet to be determined.

This review of the New Zealand curriculum documents on information skill points out clearly that New Zealand has a framework highly compatible with the international vision of information literacy. I will now consider how the curriculum documents and the literature on information literacy can be integrated in assessment.

Implications for Assessment

Having defined the domain of Information Literacy and investigated its presence and nature in the New Zealand curriculum framework and subject documents it is necessary to contemplate how such a wide body of skills, knowledge, affect, and ability could be assessed. Such assessment can be used to encourage and reward student learning, guide instruction, and inform reporting. Table 6 provides an outline of how both measurement and assessment techniques could be used to delve into the architecture of student knowledge, ability, and affect within the domain of information skill. All assessment should make enquiry about the student's ability to understand, know, and perform the actual activities and tasks that make up information problem-solving.

Cognitive

Cognitive aspects can be measured through Selected Response (SR) and Constructed Responses (CR). SR will be such things as multiple choice, fill-in-the-blanks, matching and other forms of choosing an answer. Constructed responses are items that require students to write their own answers derived from the stimulus material and their own intellectual resources and capacities. These will generally be brief, being highly constrained in order to ensure high degrees of reliability and comparability. A limited range of information literacy stages are measurable with accuracy and reliability. However, most other aspects are assessable through observation and self-report.

Behaviour

Behaviour is overt action towards an object. Insight into affective aspects of a student can be inferred through observation of behaviour by others (teachers, parents, peers) or oneself (using recorded diaries or logs) or through verbally stated self-reports. When certain information literacy behaviours occur, they can be recorded against a checklist by teachers or the student. Self-reported ratings of how frequently one engages in essential information literacy actions can be relatively easily reported in the manner of the NZCER Study Habits Evaluation and Instruction Kit (SHEIK) (Jackson, Reid, & Croft, 1979).

Affective

As mentioned earlier the affective domain includes a wide range of attributes and educational opportunities. There are a variety of techniques that can be used. This section touches only on those that are most obviously amenable to teacher observation or student self-report in classroom settings.

Values can be assessed by asking both what the respondent believes others should do in a situation (projective item) and what they themselves would do in the same situation (direct item). A student's beliefs or values system impacts on their information literacy behaviour. It may be more appropriate to assess this aspect on a pre-test and post-test basis to see how much more the students understand of the appropriate values for success in information literacy activity.

Attitudes and beliefs can be assessed through self-report using Likert-type response items. The Likert-type response scales (strongly disagree, disagree, neither agree or disagree, agree, strongly agree) are usually quick and reliable to construct. Interests can be self-rated by responding to activity statements with simple di- or tri-chotomous responses; for instance Like me (L) - Unlike me (U) or I Like (L), I am Indifferent (I) or I Dislike (D). Self-efficacy can be assessed by responding with a Likert-type scale as to the level of self-confidence, difficulty, or resilience in carrying out a task activity or by use of semantic differential scales.

The shaded area represents affective aspects that can be assessed but which have less immediate use for a classroom teacher. If a child has been identified as having inappropriate attitudes, or

Table 6:

Development Framework for Measurement and Assessment
Information Skills—Cognitive and Affective

	Cognitive		Behaviour		Affective Assessment				
Information Literacy Stage	**Measure**	**Assess**	**Occurrence**	**Frequency**	**Values**	**Attitudes**	**Interests**	**Self-efficacy**	**Beliefs**
Plan	✘	✔ Checklist	✔ Checklist	✔ Self Rate	✔ paired-items direct/projective	✔ Likert-type	✔ 3 level rate L-I-D	✔ Likert-type semantic diff	✔ Likert-type
Find	✔ SR/CR	✔ Checklist	✔ Checklist	✔ Self Rate	✔ paired-items direct/projective	✔ Likert-type	✔ 3 level rate L-I-D	✔ Likert-type semantic diff	✔ Likert-type
Comprehend	✔ SR/CR	✘	✔ Checklist	✔ Self Rate	✔ paired-items direct/projective	✔ Likert-type	✔ 3 level rate L-I-D	✔ Likert-type semantic diff	✔ Likert-type
Apply	✔ SR/CR	✘	✔ Checklist	✔ Self Rate	✔ paired-items direct/projective	✔ Likert-type	✔ 3 level rate L-I-D	✔ Likert-type semantic diff	✔ Likert-type
Present	✘	✔ Checklist	✔ Checklist	✔ Self Rate	✔ paired-items direct/projective	✔ Likert-type	✔ 3 level rate L-I-D	✔ Likert-type semantic diff	✔ Likert-type
Evaluate	✘	✔ Checklist	✔ Checklist	✔ Self Rate	✔ paired-items direct/projective	✔ Likert-type	✔ 3 level rate L-I-D	✔ Likert-type semantic diff	✔ Likert-type

interests there is little a teacher can do immediately to change the student's interior domain, beyond referring them to a career or personal counsellor. However, self-efficacy has strong pedagogical applications. Teachers can reassure students who believe they are incapable when the teacher observes that they really are capable. Teachers can also plan teaching in those areas where students have identified accurately their lack of competence. Teachers can also make use of the discrepancy between high self-efficacy rating and low observed performance rating for planned intervention opportunities. Self-efficacy is also useful because its predictive power comes from the specificity of content; the specific desired activities of information skill are what students rate themselves on.

Product

The English curriculum is eminently suited to assessment of information literacy products or presentations. Written or multi-media products can be evaluated using criteria derived from transactional writing and presenting. Oral presentations (seminars, speeches, etc.) can be assessed with criteria from speaking from texts and interpersonal speaking.

These represent the areas of assessment that constitute the framework for NZCER's present work in development of Information Skills assessment instruments. Having seen how information skill can be a blueprint for assessment, I would like to conclude with some thoughts on whether the Information Literacy view of learning is a blueprint for education.

A Blueprint?

There is no doubt that there are advocates in the information literacy community that argue that information literacy is the tool that will integrate disciplines, curricula and employment opportunities enabling students to enter into a lifelong self-directed learning.

Ross Todd (1996) has argued that the information literacy skills taught in Marist Sisters' College, Australia assisted the development of student autonomy ("students find information skills a powerful mechanism for enabling them to clarify their learning needs, evaluate their learning and diagnose their learning needs, barriers and difficulties, and a useful framework for reflecting on their learning progress." p. 11); increased student ability to construct knowledge ("mastery of content as an impact of information skills instruction is clearly demonstrated in a year long experimental study" p. 13); improved a range of intellectual skills (eg. ability to apply all stages of information skills, separate trivial from significant, relevant from irrelevant, raised confidence when working alone, improved lateral information seeking, p. 14–15), and raised overall self confidence and self esteem.

Doyle (1994, p. 4) claims that information literacy integrates the school curriculum better than traditional separate subjects: "As student prepare for the 21st century, the traditional basic courses in reading, mathematics, and writing need to be coupled with communication, critical thinking, and problem solving skills. Information literacy is the platform upon which these skills can stand, consisting as it does of knowledge of resources and tools of access, skilful search strategies, and appropriate techniques of processing information."

Thus there are powerful voices that make persuasive arguments for information skill or literacy as the blueprint for education. Those voices are not really being heard as yet in New Zealand. I doubt that the more extreme positions will be adopted widely here. Yet the principles of information literacy activity and its goals have already been accepted, though perhaps not yet widely understood or practised. It is hoped that this paper will increase understanding of what is meant by information skills, processing information, the inquiry process, and the investigative skills and attitudes. The development of assessment tools based on this framework may in a roundabout way instantiate information literacy as a blueprint for education. That is certainly still the question.

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