Assessing skills for success in tertiary education

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In almost all countries, significant assessment activities are located at the interface between secondary and tertiary education. Of course, their structure, purpose, and form of organisation vary enormously around the world. In some countries, they are part of a comprehensive ‘baccalaureate’ that marks the completion of the secondary phase of schooling. In others, such as the UK, students take examinations in a smaller number of subjects they have chosen to study. In some jurisdictions, formally constituted examinations boards organise common assessments for all students. In others, such as in many parts of North America, the final assessments are set, organised and marked within each secondary school.

Yet throughout the world, these ‘interface assessments’ have two sets functions in common, one directed towards tertiary education and one towards secondary education.

Secondary Education ← Assessment → Tertiary Education

From the tertiary education perspective, their essential purpose is to form the basis for selection. Typically, there are fewer places at the tertiary level than there are students wishing to occupy them. In some countries (such as most Asian countries), this difference is huge, at least in some subject fields, resulting in a highly competitive situation; here, the assessment becomes a very high stakes activity. In others, such as in North America, the disparity is much smaller, resulting in somewhat lower stakes and less competitive assessment. However, in all countries, these assessments are used to determine who is offered an opportunity to study which subject at which institution at the tertiary level.

From the secondary education perspective, the assessments have a quite different though equally important function. Because schools, teachers and students all want to maximise students’ access to tertiary education, the interface assessments have a direct impact on the curriculum and instruction provided in the final years of secondary education. In some situations, an examination syllabus explicitly focuses teachers’ and students’ attention on what will be assessed. In others, the curriculum is set by a Ministry of Education and the teachers match their own assessments to that curriculum. In either case, there is a close relationship between what is taught and learned and what is assessed.

Underlying this tight relationship between the final years of secondary education, admission to tertiary education, and the assessment that occupies the interface are a series of very long-standing but largely untested assumptions. These might include the following:
**Mastery of the content of school subjects in the final years of secondary school is a good predictor of success in tertiary education;**

**The skills required for success in tertiary education are those taught in secondary education and assessed at the end of secondary school.**

The recent research experience of the authors of this paper has led them separately to think critically about these assumptions, and a presentation by one of them (McCurry) at the Belfast conference of AEA-Europe has led to a year-long conversation on the topic, a conversation that we now invite others to join. While we do not have many answers at this point, we can report some of the research that has provoked us to ask questions, and the next parts of this paper outlines aspects of this research.

**The College Mathematics Project**

The Canadian province of Ontario (population – 10m) has a system of 24 colleges of applied arts and technology along with its 19 universities. These colleges are regionally distributed throughout the province and are designed to prepare students for careers in a wide variety of skilled occupations such as nursing, accounting, electrical engineering technology. Of those students progressing to tertiary education in Ontario, some 40% attend a college (about 50% go to university and the remaining 10% to apprenticeships or private vocational colleges). Some years ago, concerns were expressed by the Deans of Technology at the colleges that too many students appeared to be failing mathematics in their first semester and that this was having a negative impact on graduation rates in technology programs. In response to this situation, the College Mathematics Project (CMP) was initiated in 2005 to explore the reasons for this situation and, more important, to engage both college and secondary school educators in discussions about how it could be improved.

Seven years later, all 24 Ontario colleges have now been involved in the project for the past three years, and the CMP research team has examined the school and college achievement records of over 35,000 students (annually) taking mathematics in their first semester at college. As a result, we have collected some quite detailed data not only about college students’ mathematics achievement but also about their secondary school mathematics backgrounds. We have confirmed, firstly, what the Deans had predicted: that over one-third of those taking mathematics in first semester of college programs (over 10,000 students, mostly in the fields of technology and business) are either failing or passing with such low marks that completion of their programs is ‘at risk.’ This is a serious problem not only for the students, for whom achievement of career goals is in jeopardy, but also for the colleges whose graduation rates are among a set of “key performance indicators” published annually by the government, and also for the Ontario economy, where a growing demand for skilled professionals in many fields is not always filled.

Over the past several years, the CMP research program has also investigated factors potentially contributing to college mathematics achievement. The prior mathematics background of the students in secondary school (i.e. the courses selected by students and their levels of achievement in

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those courses) was an obvious place to start but the results have been puzzling. The specific courses are all part of the Ontario curriculum and not therefore of direct interest to readers from other jurisdictions but we found that the courses most frequently chosen by students in the final two years of secondary school led to a very poor rate of success in college mathematics (only 52.5% achieved good grades in college, leaving 47.5% at risk). We had begun to label these as inappropriate courses for college preparation when we discovered that, somewhat to our surprise, students achieving 80% or better in those courses actually achieved very well at college (84% achieved good grades in college mathematics). It began to look as though the choice of courses in the final years of secondary school was of less importance than the students’ ability to achieve high marks, an indicator perhaps of their mathematical knowledge and skills from earlier years.

Another set of factors we have investigated has been age and gender. We had already determined that females outperformed males in college mathematics achievement although their overall enrolments in math-intensive programs, especially in technology, were much smaller. But when we analysed the achievement data by age, we found that students who came to college in their 30s, 40s and 50s achieved much higher marks in college mathematics than did students just out of secondary school. And these students had not taken any formal mathematics courses in many years. We found that women in their 30s and 40s were by far the most high achieving group; 85% of females in their 30s and 83% in their 40s received good grades in college mathematics.

We appeared to have a bizarre situation: many of the students who have taken the mathematics courses most often accepted for college admissions are outperformed at college by students whose last mathematics course might have been 20 or 30 years earlier. Clearly, the mature students are bringing something to their college education they have acquired in the ‘school of life’ including prior work experience and that this something is not just attitudinal (their commitment to education and good work habits) but also certain mathematics-related skills and abilities.

To investigate this further, the CMP research program last year included a qualitative analysis of the topics being taught in preparatory (or remedial) mathematics courses at college, courses designed for students whose mathematical backgrounds suggested that extra support was required. The major finding of this qualitative research is that much of the content of these preparatory or remedial courses was not a reflection of the Grades 11 and 12 courses in secondary school, courses that students may or may not have taken or performed well in. Rather, the vast majority of topics taught in preparatory mathematics courses were basic foundational mathematics topics, such as fractions, ratio and proportion, percentages, etc., which had originally been taught many years earlier (in about Grades 5-8 in Ontario). So, we find that one of the real keys to success in Ontario college mathematics for business and technology programs appears to be basic numeracy skills rather than the mathematics taught in the latter years of secondary school. Yet, admissions decisions are most frequently based on the assessments of achievement in these latter courses.

While basic numeracy appears to be critical to success in college mathematics, it is by far from being the only one. In presenting to a forum of secondary and tertiary educators sponsored by CMP to review its research, Katherine Hughes (Assistant Director of the Community College Research Center

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2 It should be noted that mature students make up over one-third of the overall college enrolment and that admission requirements for these students are different from those who have recently graduated from secondary school.
at Columbia University) emphasised the importance of both academic and non-academic factors in contributing to student success at college\(^3\). She also commented that the non-academic factors were significantly under-researched.

One author who has given these factors serious analysis is David Conley, the title of whose book “College Knowledge” has become a catch-phrase in the United States. He has criticised the belief that college readiness can be thought of “primarily in terms of high school courses taken and grades received”\(^4\) and he has distinguished four types of knowledge and skill that students require to be successful in tertiary education:

- **Key Cognitive Strategies:** Examples include analysis, interpretation, precision and accuracy, problem solving and reasoning. Abilities such as these have been “consistently and emphatically identified by those who teach entry-level college courses as being of equal or greater importance than any specific content knowledge taught in high school.”\(^5\)
- **Key Content Knowledge:** This refers to the “big ideas” of the subjects most related to a student’s college program – of the sort that the CMP has focused its research on – but also other key academic skills such as writing.
- **Key Self-Management Skills:** These include skills and attitudes required for success not only in college but also in life and work more generally – including study skills, time management, awareness of one’s performance, persistence, and the ability to work in groups.
- **Key Knowledge About Postsecondary Education.** This is important contextual knowledge about colleges, about college programs, and about the admission requirements and other expectations of colleges for their students. It also includes understanding about the costs associated with going to college, and (as Conley puts it) “perhaps most important, understanding how the culture of college is different from that of high school.”

The discussions at the provincial forum suggest that, while general awareness of this college knowledge – all but one component of which are considered to be ‘non-academic’ – is growing, we still lack systematic ways of ensuring that all students are provided with opportunities to acquire it. The consequence of this situation is that some students (likely those most academically and socially advantaged already) are likely to acquire sufficient college knowledge intuitively to be successful, while less advantaged students – including aboriginal students, certain ethnic groups, and those from families for whom postsecondary education is a new experience – are less likely to acquire it without support. The ‘college knowledge’ issue must therefore be considered as one of equity and one that is going to grow as the proportions of students attending postsecondary institutions grow.

As a result of our research and the deliberations arising from the research, the CMP team has made improving numeracy and enhancing college knowledge the two major themes for its report published in May 2012 and has proposed recommendations for ways in which these can be achieved in Ontario. However the CMP research raises questions about the relationship between secondary education and its concluding assessments and between those assessments and the knowledge and

\(^3\) [http://collegemathproject.senecac.on.ca/cmp/en/forums.php](http://collegemathproject.senecac.on.ca/cmp/en/forums.php)


skills required for success at tertiary education. In particular it focuses on the assumptions underlying these linkages with which we began this paper.

In many countries, the assessment system used at the present time has not essentially changed for many years. Yet the proportion of students attending tertiary education has grown enormously. Where, in the 1960s, maybe 10% of the population attended tertiary education, that number has increased to perhaps 50% today. Assuming those figures for the purpose of the argument, the task in the 1960s involved distinguishing the 10% from the 90%, whereas now it is one of distinguishing the 50% who attend tertiary education from the 50% who do not (or at least who will not immediately). Since we are now educating, at tertiary level, students of a much broader range of academic ability, are the assumptions underlying an assessment system that was designed for the 20\textsuperscript{th} century still valid in the 21\textsuperscript{st}? Or should we be rethinking the whole approach to assessment at the interface of secondary and tertiary education?

**Generic Skills: An Alternative Approach**

The College Mathematics Project suggests that specific preparation for college maths may be less effective at predicting success in college mathematics than demonstrating good fundamental mathematics skills and high levels of more general skills. These conclusions are increasingly being echoed across education worldwide. As the role of secondary education has expanded and broadened over the past 50 years, it has become less purely academic (i.e. preparation for university) in its focus and an emphasis on work-related and life skills has increased. Less emphasis has been given to the accumulation of large quantities of knowledge, and more to the development of higher-order thinking skills. The current wave of interest in what are now being called ‘21\textsuperscript{st} century skills’ involves recognition that information is readily available, and that what matters is the ability to process and use information. However, in many places, while this trend may be reflected in the philosophy and rhetoric of education, a more conservative approach to assessment has often resulted in less real change in practice being seen.

For the purposes of this discussion, we represent generic skills as a central core of thinking skills that can to be distinguished from more specific, domain and process-related abilities (see Figure 1). These central, underpinning abilities enable individuals to learn new things, to use what they have learned, and to transfer their learnings from one context to another.

A generic skills assessment aims to assess the common core of underpinning cognitive abilities by attempting to reduce the importance of knowledge (either specific or general) in the assessed performance. Rather, it emphasises the students’ ability to understand, analyse and use ideas and information rather than assessing what they know or their specific skills. A generic skills assessment tests the ability to do something unfamiliar and thus to learn at the same time. Generic skills assessments are therefore usually based on some kind of unfamiliar stimulus material that the student has to understand and analyse.

The Australian Council for Educational Research (ACER) has a long tradition of developing cross-curricular tests of generic skills and the particular test described in this paper falls within that tradition. These tests were initially aimed at identifying candidates with high academic potential for
the purpose of awarding scholarships. They were subsequently used to adjust or scale the assessments of different subjects, and across different schools. They have also been used to monitor other assessments, and in so called ‘value adding’ assessments.

These tests assess the general cognitive abilities that underpin learning. They test the general outcomes of past learning and the capacities that will be used in future learning. They do not assess specific achievements, particular curricula or specific abilities; rather, they aim to test the thinking skills involved in undertaking all kinds of academic work. Cross-curricular tests aim to minimise the significance of specific knowledge and skill by basing test items on stimulus material of some kind which candidates are asked to understand, and use to draw conclusions or to solve problems.

A distinctive feature of this kind of testing at ACER is the way it is based on the two very broad domains of Mathematics, Science and Technology (MST) and Humanities, Arts and Social Sciences (HASS). The MST and HASS domains deal with the kinds of topics and the kinds of thinking that typify these very broad curriculum areas, but the tests themselves are not based on curriculum knowledge. Instead, they ask candidates to comprehend and interpret generally accessible material that they have probably never considered before (novel material and problems) and to draw conclusions about or from this material. In this sense the ACER tests are both domain-related and generic. They assess broad abilities in both MST and HASS reasoning and the scores of these sub-tests can be reported and used separately or they can be combined into a general overall score for information processing and reasoning ability.

The Australian Capital Territory Scaling Test

The Australian Scaling Test (AST) program is developed by ACER for the Office of the Board of Senior Secondary Studies in the Australian Capital Territory (ACT)\(^6\). The AST is used for the statistical moderation of school assessments to establish comparable tertiary entrance scores from the assessments of different schools. The statistical moderation of school assessments has taken place in some Australian jurisdictions since the 1970s.

**The AST Multiple Choice Question Test (MCQ)**

The AST began in the 1970s as a 100 item multiple choice test. The AST MCQ was developed by finding rich and difficult stimulus material and asking focused and specific questions about the material. AST MCQ questions are in some sense unique to a piece of stimulus, and the construction of a form of the test from such items involves subtle judgements about breadth and balance.

The AST MCQ aims to be an authentic test of real thinking rather than artificial test gymnastics like verbal analogies, number series or abstract pattern processing test items. MCQ items are higher-

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order in that they aim to test complex conceptual thinking rather than merely requiring difficult or complicated information processing. Such items ask crucial and central questions about rich stimulus material. They attempt to minimise the testing of knowledge, and they attempt to test the ability of candidates to understand and learn from unfamiliar stimulus material.

A form of the AST MCQ offers candidates a very broad range of ideas and issues to think about. The test will go from cartoons to calculations, from art works to analysing the workings of a machine. The MCQ items aim to be as broad and balanced as can be managed in the scope of 80 items using the constrained MCQ format.

The AST Writing Test (WT)

After 10 years of exclusively using MCQ testing, a writing test was added to the MCQ in 1984. The writing test involves an impromptu response to an unknown topic, and it began to move towards a different relationship between the test and the teaching and learning in the classrooms of the system.

The AST WT is an unusual (perhaps unique) writing test. It is an assessment of verbal reasoning and writing ability in which candidates are requested to respond in an argumentative mode of writing to a range of stimulus material on a controversial social and/or political issue. AST WT papers are an A3 sheet of newspaper articles, quotations from other texts and a cartoon on a broad theme. The AST WT was designed by writing assessment specialists in consultation with practising teachers to be an authentic and hence valid test of ‘the writing process’. In the AST WT candidates have 150 minutes to write 600 words in response to the stimulus material, and they are directed to write a draft and a finished copy of the piece in the time available. Only the finished copy is collected and assessed. The stimulus in the paper offers a range of material with a more or less common theme. Quite different aspects of the stimulus can be selected for discussion by individual candidates. They are given a good deal of scope for constructing their own response to the broad theme.

The AST Short Response Question Test (SRQ)

While the addition of a writing test to the MCQ had broadened the AST assessment significantly, there was continuing concern about the limitations of the contrasting pair of tests. What was expected to be a clear difference between the performance of male and female candidates on the WT evaporated quite quickly. The comparative performance of males and female candidates became much the same once the males were taught how to deal with such a writing assessment. There was also a continuing interest in raising the correlations of the test with the assessments of particular subjects.

In 2002 it was decided to add a short response question test (SRQ) to the MCQ and WT. The aim was to further broaden the battery, to bring the performance of males and female closer together, and hopefully increase the correlations with different subject scores. A number of considerations were taken into account in designing the SRQ test. The SRQ was designed to contrast with the kinds of thinking undertaken in the MCQ, so there was to be an emphasis on open-ended rather than closed-ended questions. The test was to require less convergent thinking than the MCQ, but be less open or divergent than the WT. While candidates might be required to respond to SRQ in writing, it was not to be a test of ‘writing ability’. It was also intended that the items should try to reflect what is done
in class work so as to better correlate with school assessments, and it was hoped that the SRQ could set tasks that would make meaningful class work.

While it is useful to acquaint students with the kind of thinking involved in MCQ, there is limited value to teaching students how to deal with the AST MCQ test. The MCQ test is developed by finding rich stimulus and asking quintessential questions about it. The better the MCQ test, the more the questions are quintessential and unique to a particular piece of stimulus. One the other hand, the AST WT is designed to be teachable, and teachers have continued for more than 25 years to support the current test design because it offers a valuable stimulus to the development of writing skills, is worth teaching and has a ‘positive backwash’. Teachers in the system set out to teach the skills needed to deal with the AST WT.

With the aim of making the SRQ test teachable, there was an effort to design questions that are like those asked by the teachers in normal course work, or to ask questions that teachers might use in normal course work. With the AST WT the intention was to have no question, and to challenge candidates to develop the nature and terms of their own discussion. The decisions they would make in doing so are part of the assessment. It was decided to make some of the SRQ questions formulaic rather than the kind of unique and quintessential questions typical of the MCQ. The intention was to have some of the SRQ items use more or less the same question in different years, but to vary the stimulus that the questions were applied to. For instance, the following question was used about an image in 2004.

*What impressions are we given by the illustration on the opposite page?*

*And what is suggested by the drawing?*

*Your responses will be judged on the:*

- accuracy of the description and understanding of the material; and
- substance and quality of the interpretation offered.

More or less the same formulation was used with a different image each year since 2004. It is intended that teachers can find their own material to put into this and other question shells used in the SRQ test. The aim was to make the SRQ teachable by having a substantial number of items in each test that are archetypal. Table 1 gives the initial version of what are now called the archetypal SRQ questions. Table 2 gives an overview of the kinds of archetypal SRQ items currently used in the AST.
Designing a Bow Wave rather than Worrying about the Backwash

As with the WT, the SRQ is intended to have a positive bow wave in that the intention is to give teachers something to teach towards and students the challenge of developing the skills implicit in the archetypal questions. The schools are preparing students for the test, and there has been positive feedback from teachers to the ACT Board of Studies. This teachable generic skills test contrasts with an examination in which in which teachers coach students on the material to be examined. The teaching of a generic skills test is focused on skills rather than topics or information.

A survey of student reactions to the AST in 2009 elicited interestingly mixed feedback. Two survey questions asked candidates which questions or parts of the AST they found easiest and most difficult. The responses show that candidates are quite clear about the differences between the components of the test, and most of them show clear preferences for one or other. They distinguish between the SRQ, the MCQ and the WT in clear and intelligible terms. They know that their writing is not being assessed in the SRQ, and they know that they have to think differently in the SRQ from the MCQ. The candidates realise that the SRQ are open-ended, and that they have to identify what is at issue and construct a response to such questions. Not surprisingly, some students find such questions liberating and empowering, and some find them vague and irritating.

<table>
<thead>
<tr>
<th>KIND OF PROCESS</th>
<th>KIND OF QUESTION</th>
<th>LANGUAGE LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thinking about the human world</td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td>What is said?</td>
<td>Higher verbal</td>
</tr>
<tr>
<td></td>
<td>What is meant?</td>
<td>Lower verbal</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>How strong or convincing is this?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do you agree with this? Why?</td>
<td></td>
</tr>
<tr>
<td>Interpretation</td>
<td>How does this seem? How do you see this?</td>
<td></td>
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<tr>
<td></td>
<td>Explain your view.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thinking about the material world</td>
<td></td>
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<tr>
<td>Data processing</td>
<td>What is the status of this data?</td>
<td></td>
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<tr>
<td></td>
<td>What does this data show?</td>
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<tr>
<td>Explanation</td>
<td>How does this happen?</td>
<td></td>
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<tr>
<td></td>
<td>Why is this so?</td>
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<tr>
<td>Problem solving</td>
<td>What is the problem?</td>
<td></td>
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<tr>
<td></td>
<td>What is the solution?</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: SRQ Archetypal Questions

<table>
<thead>
<tr>
<th>Reading literacy</th>
<th>Visual literacy</th>
<th>Critical thinking</th>
<th>Research and investigation</th>
<th>Data analysis and interpretation</th>
<th>Critical numeracy</th>
<th>Systems reasoning and problem solving</th>
</tr>
</thead>
<tbody>
<tr>
<td>underlining text; note taking; comparing the meanings of texts</td>
<td>interpreting images and diagrams</td>
<td>analysing and evaluating arguments; making arguments for and against propositions</td>
<td>analysing and understanding research procedures; seeing the significance of research questions</td>
<td>understanding and interpreting numerical data</td>
<td>making calculations; evaluating numerical procedures</td>
<td>analysing and understanding how things work; speculating about how things might work</td>
</tr>
</tbody>
</table>

Table 2: An overview of the kinds of SRQ questions in the AST
There was marked improvement in the performance of candidates over the first few years following the introduction of the WT, particularly in the performance of male students. The students in the system typically perform very well on the unconstrained writing task. There has been a marked improvement in performance on SRQ archetypal questions over the 10 versions of the test. From the markers perspective, candidates are better prepared and perform better on the visual interpretation, critical thinking and the generalised data interpretation questions in particular.

The SRQ test places a good deal of emphasis on visual and diagrammatic interpretation. The work of candidates as a whole has always been good on such questions, but there seems a clear improvement over the years in the performance of those with less aptitude for such work. Few candidates now offer the kind of blindly and blankly literal responses that were a substantial minority in the first years of the test. While the candidates express their personal opinion very well in the WT, it was immediately obvious with the introduction of the SRQ that they were much less able to undertake the more impersonal and disciplined thought and argument required in the critical thinking SRQ. The critical thinking questions were made more specific and concrete to assist in this area. There has been a clear improvement over the years, and the questions are currently moving back to being more globally evaluative and critical. Current candidates are also significantly more comfortable with open-ended questions that ask for interpretations of data than they were in the past. Most of them understand that they are looking for what is significant and worth interpreting in the data offered for review.

An examination of the AST shows that it is a broad and balanced test of the thinking skills that underpin the curriculum of general education. It is broad in terms of the ideas and issues that candidates have to consider, and the kinds of thinking that is elicited from them. The candidates have to undertake quantitative and logico-deductive reasoning, and they have to undertake critical reasoning, interpretive thinking and plausible reasoning. The AST is an assessment of higher-order thinking because it challenges candidates to think about unfamiliar ideas and issues rather than rehearsing what they have learned.

It seems clear that the archetypical questions can be taught as styles of thinking, and it seems that the thinking involved is appropriate for a range of subjects. Anecdotal reports and the performance of the candidates from the markers’ perspective suggest that teachers are using the archetypal questions in preparing students for the test, and possibly in their other class work. The approach has certainly led to improved performance by candidates, and there is general acceptance in the system that preparing for the SRQ test is of educational value.

**Concluding Thoughts**

The two lines of research described here were conducted quite independently of each other and so there is not a neat complementarity between them. Nevertheless, looking at both of them together has provoked the conversation which has engaged the two authors since we met in Belfast last year. The Canadian College Mathematics Project (CMP) has shown the importance of mathematical fundamentals to student success in college programs that contain mathematics in first year, an importance greater even than the course content of the last years of secondary school on which college admissions have traditionally been based. CMP has also shown that mature students bring
an X factor to their college education that is sometimes lacking among their younger counterparts and Conlon’s research on ‘College Knowledge’ suggests some of what this X factor may comprise.

Meanwhile, the Australian Scaling Test (AST) has demonstrated that the testing of reasoning skills of senior secondary students is both an effective means of moderating more traditional assessments of content knowledge for tertiary admissions purposes and at the same time provides a worthwhile and acceptable goal for secondary students and educators. The reasoning skills being assessed by the AST correspond well with Conlon’s first category of College Knowledge – Key Cognitive Strategies – and it is reasonable to suppose that students who have developed these skills will be better equipped for success at tertiary education than those who have not. They are also some of the skills that may be acquired through the experience of life and work and brought to their tertiary education by mature students, even if they have been absent from formal education for many years.

Overall, then we conclude that we need to know more about the nature of the generic skills that contribute to student success at the tertiary level and we need to explore further how the assessment of them can be incorporated into the traditional ‘interface assessments’ at the end of secondary school. As tertiary education becomes less an activity for the intellectual elite and more one for the majority of the population, we cannot afford the loss of students who are not adequately prepared.

A hundred and fifty years ago, as compulsory education became established in most developed countries, completion of primary or ‘elementary’ school was the expectation of most students with only a small elite being selected to continue to secondary education. In the past 60 years, as secondary education became the norm for most people, the focus at the interface between primary and secondary education became less one of selection and more one of ensuring success at the next stage. The interface between secondary and tertiary is undergoing a similar transition at the present time and the goals of assessment should be changing in a corresponding way. Selection must still take place but we need to start placing much more emphasis on ensuring success. It is our view that increased attention to the assessment of generic skills is one way to promote this new emphasis.