



Department of
Education

MAKE THEIR HEADS SPIN!

IMPROVING LEARNING IN THE MIDDLE YEARS



STEPPING OUT

Make their heads spin! - Improving learning in the middle years
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PREFACE

Make Their Heads Spin! Improving learning in the middle years highlights key issues related to the specific context of the middle years of schooling. It aims to raise the awareness of teachers, school leaders, professional development consultants and researchers about factors that impact on teaching, learning and assessment in these contexts. A clear depiction of the context is provided in this text, along with practical suggestions for how and where the improvement efforts might be focused.

This text is intended as a practical resource that will provide a point of reference for schools considering positive action for change, as they strive to cater for the special needs of adolescent students.



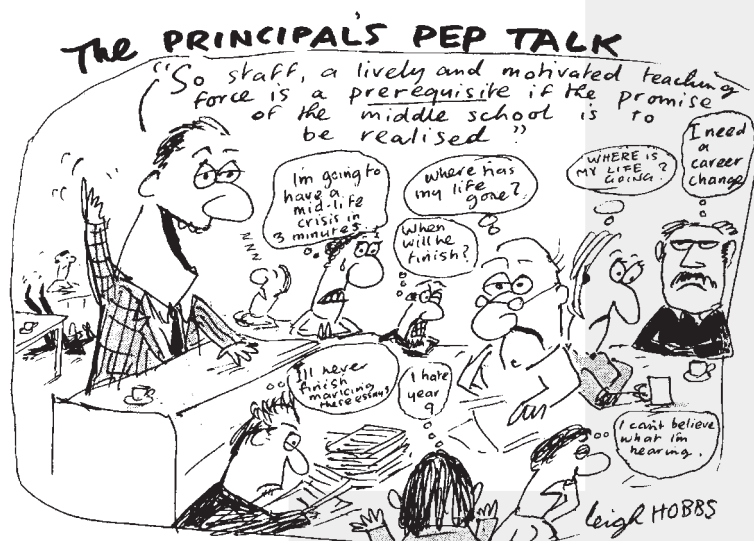
THE MIDDLE YEARS CONTEXT

INTRODUCTION

The new millennium is a time in education in Australia when interest in raising standards of achievement is fast becoming a preoccupation. This interest is revealed in the convergence of three developments:

- ✱ the shift to an outcomes focused curriculum
- ✱ the emergence of middle schooling
- ✱ the emphasis on literacy as a state and national priority.

Throughout the country, the shift to an outcomes focus can be seen in curriculum framework statements, in progress maps, which depict outcomes in all learning areas, and in new outcomes focused syllabuses being implemented in schools. The messages that accompany this shift underline the importance of clear expectations for students and the need for teachers to reflect closely on, and to adjust strategies to ensure that standards are achieved.



The intensified process of reflection is encouraging many school leaders and teachers to question whether traditional school structures are assisting or hindering progress towards higher standards of achievement. This is particularly so in lower secondary schooling. Consequently, there is a rising tide of interest in exploring alternative patterns of organising this phase of schooling, such as grouping teachers in learning teams. These developments characterise what is termed ‘middle schooling’.

The emphasis on literacy is expounded at both state and national levels. State and national plans and strategies set out the accountability requirements for schools. They contain common messages about the importance of literacy as a prerequisite for making further progress through the curriculum. The convergence of all these powerful factors has spotlighted the area of lower secondary schooling, where, for many students, learning seems to stand still or even decline.

WHAT MAKES LEARNING DIFFICULT IN THE MIDDLE YEARS?

The middle years of schooling (often dubbed the forgotten, Cinderella stage of schooling) are under scrutiny in a number of countries around the world, as increasing pressure is placed on governments, schools and teachers to improve standards.

In Australia, the pressure is fuelled by the requirements of the National Literacy Plan, the publication of the nationally agreed literacy benchmarks and the achievements of Australian students against those benchmarks. Additional funds for literacy improvement are increasingly tied to the benchmarks. Despite the fact that many schools have implemented innovative and successful programs for students at this stage of schooling, a significant number of students continue to fall through the net.

Most primary students make the transfer across the ‘divide’ with a minimum of fuss. They make friends easily, enjoy having a variety of teachers and a choice of subject matter within the learning areas, and generally thrive in this new and challenging context. Others, however, do not always find it to be a rewarding experience. Research shows that the majority of primary students start their middle schooling with great enthusiasm, but by the end of their first year, many start to show a ‘dip’ in their achievement and attitude to learning. The problem tends to compound the following year, as the same students become bored and uninspired by their schoolwork, and preoccupied with their friendships. Their marks drop; they develop a poor image of themselves as learners and fall even further behind. They engage in negative ‘trying out’ behaviour, neglect to hand in assignments and start to skip classes. Their marks decline even further and the gaps in their learning widen. An antiwork peer group culture can quickly develop, without a full appreciation of the fact that working hard now will make a real difference to achievement later.

Unfortunately, these negative minority groups can have a large impact on the culture of the larger cohort of students (Rudduck et al. 1996). Students whose behaviour is not



usually problematic start to find schoolwork to be 'boring'. They become disengaged from their learning and start falling behind. The disengagement occurs for a variety of reasons. It is often difficult to detect, define and measure, and it can change over time.

Why do a significant number of adolescent learners make little progress academically? And why do so many teachers find it difficult to help students learn more effectively?

While it might be tempting to point to factors outside the school or to the students themselves to account for lack of motivation and progress, a more productive strategy is to identify those aspects of the school context itself that provide particular difficulties for students entering the middle years. A useful starting point for doing this is to try to understand what the journey from primary school to other school settings feels like for the students themselves.

THE JOURNEY FROM PRIMARY SCHOOL

Primary-school students generally like school. They are accepted socially by their peers, get on well with their teachers, enjoy doing schoolwork and view the curriculum as something that is useful and relevant (Hill 1993, p. 14). They enjoy being at the top of the 'pecking order' in their last year of school, and relish the extra responsibilities and privileges that this brings.

When the same students arrive at secondary school, they immediately become the youngest, most inexperienced and most powerless of the school population. The culture shock they experience during this transition process can be similar to the culture shock experienced when moving from Hawaii to Bosnia (Hargreaves 1998). They have to adjust to a larger sized campus, new surroundings, a more impersonal culture, a diverse curriculum, new ways of learning and a different organisational structure. The differences between the primary and secondary contexts are stark, even though students from both sectors are chronologically similar.



Perhaps the most important differences students have to face in relation to their learning are to do with three issues:

- ✱ school organisation (time, curriculum and structures)
- ✱ approaches to teaching and learning
- ✱ increasing literacy demands.

Interestingly these three issues are also the issues that many teachers identify as ones they would like to address in order to help students learn more effectively.

SCHOOL ORGANISATION

Structures

Traditional secondary-school classes and timetables tend to be organised in much the same way that they were organised twenty or thirty years ago, despite the fact that they now cater for the needs of a very different generation of students.

If you walked into a (high) school today, you'd know just what to do. It looks very similar to the way it was. There are more subjects to be taken, but the organisation, the division of learning along neat subject faculty lines, the 40 minute lesson, the changeovers—the sheer impersonality of it all—is alive and well. (Eyers et al. 1992)

The traditional structure of secondary schools, perhaps more than any other structure, impacts sharply on what teachers do and how students respond. The way a school is organised imposes limits on how teachers work together to exchange ideas, to share information about students and to become involved in decision-making.

Of course, organisational structures do not automatically determine what happens in a school—people do. But organisational structures do influence the culture significantly. The challenge for schools is to critically analyse the impact of their own organisational structures on students' learning. The degree to which the school culture is affected by the organisational structure of the school will differ from context to context. In an analysis of secondary schooling, Fullan and Hargreaves (1991) describe the contrasting cultures that can emerge as a result of different organisational structures.



At one end of the continuum the culture can be characterised as 'fragmented individualism', as represented in the diagram.



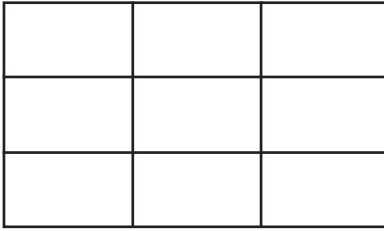
Fragmented individualism

Teachers in this type of culture tend to work alone in their classrooms, in professional isolation. They construct learning programs and evaluate their success as separate, stand-alone 'units of delivery'. The only meaningful feedback they receive about the effectiveness of their teaching comes from their own observations of the students they teach.

This means that there is a ceiling limit on the effectiveness and innovation of their teaching practice, which is confined to their own experiences, their own interpretations and their own motivation to seek improvement. Inevitably, this type of organisational structure results in a narrower range of teaching practices.



Further along the continuum, Fullan and Hargreaves (1991) describe what they term as a 'Balkanised culture', represented in the following diagram.



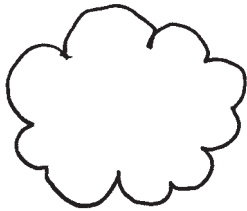
Balkanised groups

In this environment, departments or faculties tend to operate as separate, sometimes competing groups within the school. This reduces teachers' collective capacities, restricts opportunities for them to share their knowledge and experiences, and reduces openness, trust and support between teachers from different learning area faculties.

In this type of organisation, there is potential for teachers to have inconsistent expectations for students' performance across the school, and for there to be poor continuity in monitoring students' progress.

By contrast, and at a further point along the cultural continuum, there is the 'collaborative' secondary-school culture. Teachers in this environment recognise that teaching is difficult, and that giving and receiving help does not imply incompetence. They flesh out issues together in order to reach agreement, and seek continuous improvement in their teaching. They examine their existing practices critically, continuously trial and modify their programs, seek better alternatives and work hard to bring about improvement, both in their teaching and in students' learning.

This type of collaborative culture tends to be more receptive to change.



Collaborative culture

Imagine that you can become a better teacher, just by virtue of being on the staff of a particular school; just for that one fact alone. (Little 1990, cited in Fullan and Hargreaves 1991, p. 46.)

Time

In primary schools, students reap the benefits of learning in a smaller, nurturing environment with one teacher, and with one group of students. Flexible time allocations in the primary school make it possible for teachers to incorporate innovative methods of teaching and to plan a multidisciplinary or integrated curriculum. Students' pastoral care and learning needs are easier to identify, because they can be routinely observed working in a range of different contexts, over longer periods of time. There are plenty of opportunities for students to talk and work collaboratively with others, because the majority of primary classrooms are set up to facilitate small-group learning.

Time is organised differently in secondary schools. The large number of students and the need to match specialist teachers to class groupings, causes secondary schools to place the timetable at the forefront of their planning and organisation. Timetabling constraints can place severe limits on innovative teaching practice. By the time the class has settled, latecomers have been accommodated, the roll has been taken and links have been made to the last lesson, a considerable amount of teaching/learning time has already been absorbed.

Forty- or fifty-minute periods make it difficult for teachers to retain continuity, rigour and consistency between lessons, because it can be days before they are with the same group of students again. Time constraints also make it difficult for them to develop effective working relationships with students, to implement integrated learning programs, to team teach with their peers, to work collaboratively with each other and for students to spend the time that is required to work through processes that lead to better learning.

Curriculum

The intended curriculum, or what the teacher wants students to know and do, can seem perfectly obvious from the teacher's point of view. But Lemke (1999, p. 22) points out that the nature and relevance of classroom activities within the curriculum are not always be framed for students in a way that is motivating or sufficiently clear to them. He suggests that many students are expected to have mastery of advanced literacy skills that are not necessarily taught in the lower years of schooling, and that it can often be taken for granted that students will achieve and demonstrate mastery of these skills 'on the job'.

In many secondary contexts, students are exposed to a curriculum divided into discrete units or learning-area compartments and to a wide range of specialist teachers. Teachers from different learning areas teach in separate classrooms and often can be unaware of what is being taught in other classrooms or across different learning areas.

The daily routine in some secondary schools has been likened to a production line:

Students come onto the production line at approximately 9 a.m. and during the first few periods, have an English component instilled, followed by a maths, science, humanities, creative arts, technology component and so on. Up to five or six components might be fitted over the period of a day, with teachers having limited knowledge of the learning that preceded or followed their input. (Morgan 1993)

Time is tight and this means that teachers are often unable to share teaching experiences, to plan cross-curriculum learning programs, to share their skills, knowledge and expertise, to moderate their judgements about students' achievement on common assessment tasks, or to analyse issues related to individual and groups of students that they all teach.

Consequently, links that help students establish wider views of topics, or enrich their understandings, skills and knowledge, are seldom made across the curriculum. Learning can become fragmented if schools are not careful, because students pick up small chunks of information from each learning area and do not always get to see the whole picture. Even if the learning experiences themselves are extremely effective, it is difficult for students to make meaningful connections across learning areas if few links are made between learning areas or to their own life experiences. When they experience disconnected and fragmented learning on a daily, weekly or yearly basis, they have to try to make many of the links themselves. Not all are able to do this.



APPROACHES TO TEACHING AND LEARNING

Curriculum organisation flows over into teaching and learning practices. In the middle years, the curriculum shifts from being generalised and integrated, to being structured and specific. It also becomes more concept or content based. Tight timelines mean that learners are often required to take on a more passive role, and that the pedagogy gets narrower.

Adolescent learners often become flooded with information and have to scurry through copious amounts of content from each learning area. Middle years teachers, faced with an array of classroom groupings, challenging behaviours and demands for course coverage, can be easily tempted to play it safe by restricting the pedagogy, narrowing the curriculum design and limiting the degree of interaction.

One detailed study of 460 students (Kirkpatrick 1995) revealed some of the following perceptions students had of secondary school:

- ✱ It was more important to submit work on time than to concentrate on 'doing their best'.
- ✱ They were expected to complete, rather than learn, a large volume of work.
- ✱ Content was covered rapidly, encouraging superficial approaches to learning and work-avoidance behaviour.
- ✱ Standards and expectations were not 'spelt out'. Opportunities to use other students' work as guidelines or models were not used.
- ✱ There were fewer opportunities to participate in group work than at primary school. They felt that this denied them opportunities for learning informally about standards of performance, and about different learning strategies. Feedback from teachers tended to be limited, rather than informative or instructive.
- ✱ Links were not always made with what had previously been learnt in primary school. Many considered they had 'done' the work before, and therefore there was no need to exert any effort.
- ✱ There were fewer opportunities for them to engage in independent work, and self-regulate their learning behaviours.
- ✱ The organisation of the secondary classroom and timetable made it difficult for them to discuss academic work with their teachers in a discreet manner.

For adolescent learners, the first flush of enthusiasm and any successful learning experiences can seem to have happened a long while ago—and the finishing line for the schooling journey still seems a long way ahead. As a student in one study commented, 'All these boring worksheets ... the answers come ten minutes later anyway, so why do them?' (Victorian Field Study 1994).

TRY THIS

- ✱ Discuss, at the whole-school or subject-area level, the impact that the current timetable has on the quality of learning.
- ✱ Review the timetable. Look at ways to solve the issues. Ask questions such as:
 - Can the timetable undergo a major rethink? If this is not possible, can ‘chunks’ of time be created so that students work longer with teachers, and move around the school less?
 - Can different departments work together in those ‘chunks’ of time?
- ✱ Think about the possibility of:
 - creating teams of teachers, who work for longer periods of time with particular year groups;
 - having groups of students from a range of classes work with Arts, Physical Education or Design and Technology teachers, while teachers from other areas plan together (for at least 2–3 consecutive periods);
 - having two teachers team teach an integrated subject (i.e. English and SOSE), for a double period or whole morning timeslot;
 - looking at possibilities for integrating the curriculum across subject areas;
 - having one teacher take two subjects (Maths/Science) with a particular group of students.
- ✱ Explore alternative timetabling arrangements that are not linked to the upper-school timetable.
- ✱ Implement cross-curriculum programs of various timespans that are less rigidly based on units and that draw on local contexts, concepts or themes.

Content versus processes

Teachers often share their students’ perceptions. Many secondary school teachers comment that there is too much content to deliver in too little time and have pointed out the similarities between driving cattle through a gate, and moving students through a mass of curriculum content.

Content is important, but it is just as important to remember that much of what is taught today might well be irrelevant or superseded in a few years’ time. Students complain that they spend far too much time learning about things that they do not believe will ever be useful to them. What really matters, and what is important, is that they are equipped with transportable tools for learning, such as critical thinking, problem solving, and creative and lateral thinking, which can be applied to any body of content.

Simply ‘covering’ or teaching a topic does not guarantee that learning has occurred. Students learn best when they are given time to process and absorb or internalise the information. They need time to listen, read, think, talk, plan, write and time to reflect on and represent their understandings. They need to do these things independently, and with others. Once they have internalised the information, they can then apply or translate it to other contexts.



Assessment

As students make the transition from upper primary to lower secondary school, the stark differences experienced in curriculum organisation and pedagogy carry over into the assessment regime they face. Part of the transition experience is an increase in the seriousness with which the community regards the business of schooling. The process of sifting and sorting students for further phases of education and for life beyond schools starts in earnest in early secondary school. As a consequence, the assessment policies and practices of most middle schools, and the formality and weight put on the reliability of assessments, reflect this increase in seriousness.

Adolescent learners are faced with a diet of frequent, content-focused testing within each learning area, the advent of formal ‘exams’ in senior schools and a much stronger emphasis on formal expository writing. The purpose of the assessment process shifts to a preoccupation with the allocation of grades or levels. This information often starts to count towards the ‘external’ purpose of assessment, to meet requirements for access to learning areas in senior-secondary years or for certification. There is much more of a feeling in the secondary school context that assessment is something that is ‘done’ to students. All too often the compromise is weighted towards responding to the external pressures, at the expense of the needs of adolescent learners.

Some of the features of assessment in the middle years are:

- ✱ **Over assessment**—there is a tendency to over-assess students in middle school to cope with the increasing demands of the curriculum and to supply information for accountability purposes.
- ✱ **Narrowness**—while there is a lot of assessment going on, much of it is narrow in focus and is concentrated on measuring whether students have acquired course content.
- ✱ **Lack of integration**—much of the assessment is summative and can be regarded as being tacked on to learning and teaching, rather than being an integral part of it.
- ✱ **Student numbers and specialisation**—teachers in primary schools get to know their students well and are able to collect rich diagnostic information. The sheer weight of student numbers that secondary teachers have responsibility for, and the limited time they see them, makes the use of devices such as developmental continuums problematical.

Secondary school teachers feel snowed under when they are given a large amount of information that they cannot use effectively. A change in assessment practice to include a combination of formal and informal tasks, and a collaborative approach to curriculum planning will benefit both teachers and adolescent learners and assist teachers in making informed judgements about individual students’ progress.

TRY THIS

Some less formal strategies teachers may find useful in helping them gather data to support judgements about student progress include:

- ✱ Be honest. Seek assistance from other experienced teachers. Link up with an experienced mentor or buddy.
- ✱ Ask other teachers how they handle the things that concern you.
- ✱ Be realistic about what can be achieved. Set small goals at first.
- ✱ Get to know the class by observing their behaviours for a while.
- ✱ Set up checklists that identify specific criteria.
- ✱ Sort out who has, and who has not mastered certain skills.
- ✱ Divide lessons into sections. Provide a plenary or introduction at the start of each lesson. Plan a whole class explicit teaching or discussion session; followed by small-group work and then individual activities. (Tip: change the groups regularly, according to skills, friendships, types of tasks, ability levels etc.)
- ✱ Move around groups and individual students, teaching at the point of need.
- ✱ Share resources with colleagues, rather than reinventing the wheel each time.

INCREASING LITERACY DEMANDS





The biggest single challenge adolescent learners face is the sharp increase in demands on their literacy skills. The first year of secondary school is probably the most difficult, because of the:

- ✱ increased amount of reading in all learning areas;
- ✱ increased difficulty in level of concepts in all readings;
- ✱ variations in teaching methods that each new learning area the teacher presents;
- ✱ comparatively large classes, which make individual assistance difficult either before or after lessons;
- ✱ peer pressure, which prohibits being identified as needing assistance, let alone accepting any prolonged help.

Literacy is not 'one thing', evenly spread across the curriculum. It looks different, and takes on different forms in different learning areas and classrooms (Kress 1999). Each learning area has its own curriculum literacies (specific terminology, concepts, skills and understandings) and ways of viewing the world that must be understood. There are some similarities in what students might do by way of writing, reading, listening and speaking in each learning area, but the results tend to be different, because each learning area uses its own language, conventions and structures. A procedure written in a Science or Physical Education lesson, for example, will not look the same as a procedure written in an English lesson. There may be similarities in the form of the writing, but the terminology, tone and content of the procedure will differ. Students have to learn to adapt to the varying literacy demands across the curriculum and to master these variations.

STEPS TO WRITING A BOOK BLURB ON A NOVEL

by Melissa Miers (student)

ENGLISH PROCEDURE**Purpose**

To give instructions to fellow students on how to write a book blurb.

Organisation

*Have a **goal** or **aim** that states what is to be done.*

*Include the **materials** or **requirements** needed to complete the task.*

*The **method** is presented as a series of steps.*

*The final step is an **evaluation** of the success of the procedure.*

Language features

Detailed, factual description of what needs to be done.

Detailed information on how, where and when.

Imperative voice.

Technical language used in English.

To write a good book blurb you must first make sure you know what a blurb is and what they are used for. **Book blurbs are brief accounts of a novel designed to entice readers to select that book.**

Visit the library and read the blurbs contained on as many novels as you can in a twenty-minute period. **Write down the most appealing blurbs and share them with a group of your classmates to consider what makes them effective. The following headings might be helpful:**

- Blurbs selected
- The purposes of these blurbs
- How the blurb 'sells' the novel.

Collect at least one book review of a novel you have read, other than the one you are going to review yourself. Work with a group of your classmates and make a set of notes on how these reviews use language to 'sell' the novel. You might find the following headings helpful:

- How do they begin?
- How much of the story is told?
- What type of wording is used?
- How are they concluded?

As a group, write up a set of criteria for writing a good book blurb.

Write down the subject or theme of the book and brainstorm ideas about the novel you have read. You should make sure you will have enough material to write approximately ten lines about your novel.

Write your rough draft, checking to see if you have fulfilled the criteria set out in the steps above.

Write up a polished copy to share with your group.

Have your group members give written feedback on the effectiveness of your book blurb against the criteria they developed.



THE PROPERTIES OF YEAST

SCIENCE PROCEDURE

Purpose

To outline the process for understanding the properties of yeast fungus.

Organisation

*Have a **goal** or **aim** that states what is to be done.*

*Include the **materials** or **requirements** needed to complete the task.*

*The **method** is presented as a series of steps.*

*The final step is an **evaluation** of the success of the procedure.*

Language features

Detailed, factual description of what needs to be done.

Detailed information on how, where and when.

Imperative voice.

Technical language used in Science.

Aim:

To study the properties of the yeast fungus and how it is widely used in everyday life.

Materials and equipment:

- Microscope
- Slide and coverslip
- Dropping pipette
- Glass or beaker
- Measuring spoons
- Sugar
- Warm water
- Fresh yeast

Method:

1. Dissolve a spoonful of sugar in a beaker of warm water.
2. Place a small amount of yeast into the sugar solution.
3. Store the beaker in a warm place for approximately one hour.
4. Using the pipette, place a drop of the solution on a slide.
Place the coverslip on the slide.
5. Observe the solution under the low-power lens of the microscope.

Observation/Conclusion

- Using your science journal, note your observations, in written and diagrammatic forms.
- Research three uses of yeast in everyday life.

WHAT ADOLESCENT LEARNERS FACE IN LITERACY

Curriculum literacies

All learning areas place literacy demands on students. A ‘literacy demand’ refers to any task that requires students to use literacy skills to demonstrate skills and/or understandings. The literacy demands of each learning area can differ in both subtle and overt ways, and they increase in complexity and difficulty as students move through their schooling.

First Year

impact
comet fragments
accurate
nebulae
black holes
quasars
pulsars
perigee
waning
solar eclipse
kuiper belt
neap tide

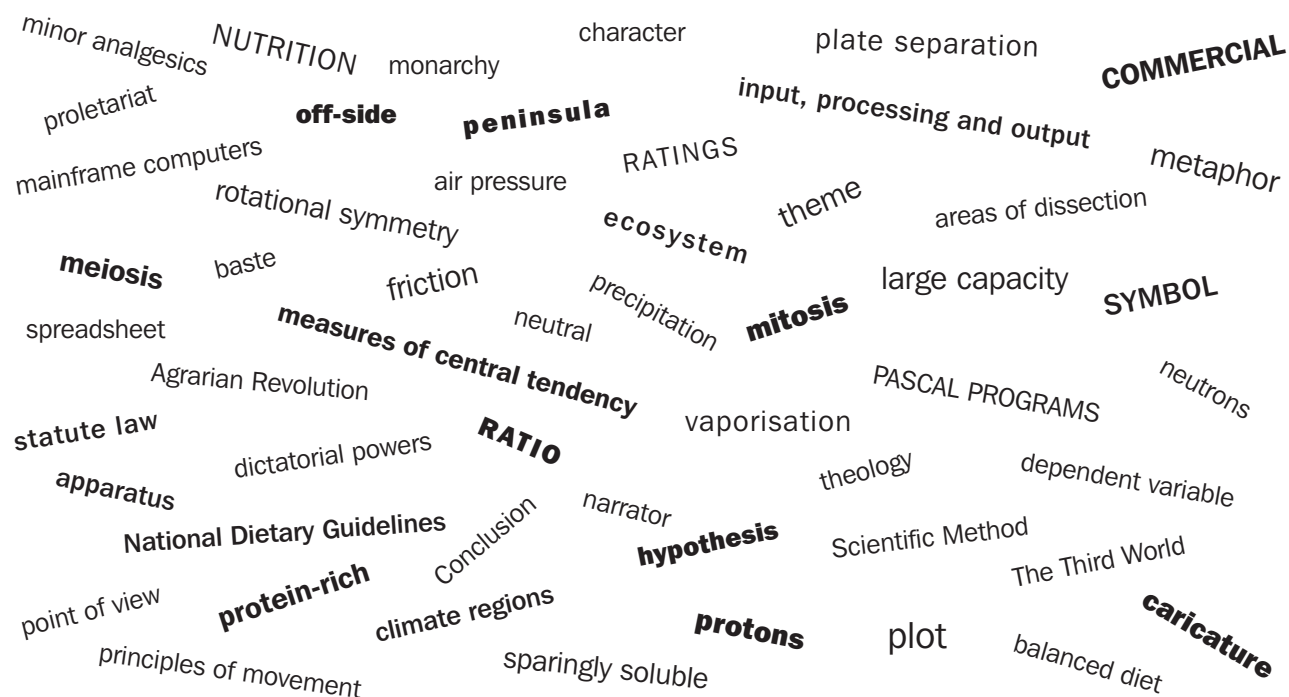
Second Year

satellite
sun synchronous
geosynchronous
infrared light
remote sensing
maria
microgravity
geosynchronous
vaporising
power
gravitational force
cosmonauts

Third Year

nuclear fusion
neutron star
absolute magnitude
photosphere
chromosphere
plagues
prominences
emission spectrum
solar stills
photovoltaic cell
interstellar
spicules

Those who struggle to meet the literacy demands of different learning areas are likely to have difficulty adequately demonstrating effective learning outcomes. In every lesson, students face a wide range of challenging literacy demands. For example, students have to be able to recognise, understand and use the specialised vocabulary of each learning area.





Students have to be able to read, make meaning of, locate and extract important information embedded in different genres and in texts specific to each learning area:

EXAMPLES OF DIFFERENT LEARNING AREAS TEXTS

Inertia also works on moving bodies. A body in motion will keep moving at the same speed and in the same direction (uniform motion) unless some outside force is exerted on it and causes some change. The moving body's inertia is its property of resisting my attempt to change its motion.

PQRST is a square-based pyramid with a base of side length 14 mm, and height of 6 mm. The point x is vertically below T on the base, and point y is midway along PQ.

I collapsed in the armchair in a fit of despair. I had no way of knowing if my thoughts and feelings had actually reached her in some way and motivated her phone call, or if she had simply followed some intuition of her own.

The **climates** of Europe are (low pressure areas) called dominated by the **westerlies**. **mid-latitude** lows. Mid-latitude lows produce the cool, These are **on-shore winds** that blow from the Atlantic cloudy and damp weather Ocean. They are associated so common in north-western with **rain-bearing depressions** Europe.

Rare earth metal (lanthanides) are used to make very powerful super magnets. Ferrite used in ordinary magnesiodymium (a rare earth) can make a super magnet. In medicine, super magnets are used in extremely sensitive probes that provide scans inside the human body.

Students must internalise and then transform information into a variety of written or oral forms that demonstrate their understanding.

EXAMPLES OF WRITING TASKS IN SCIENCE

The water in a mountain stream is usually crystal clear. After heavy rain, however, the stream would become muddy. Explain, in your own words, why this is so.

Describe what happened to the mothballs. Draw a picture to illustrate your observations.

Make a scale diagram showing the Earth's timeline from its beginning up until now, showing the first life, dinosaurs at 200 million years ago, and the first early humans at 2 million years.

What is the difference between speed and velocity?

Footprints left in sand on the Earth's surface last a very short time. Why should footprints on the Moon last for thousands of years?

Define the word 'drug'. Explain why tobacco and alcohol are drugs.

What are the major uses of uranium? Why is the mining of uranium so controversial?

What other forms of biochemical evidence are there to support evolution?

Students must also become adept at:

- ✱ reading and writing multimedia texts;
- ✱ using different learning technologies;
- ✱ critically analysing and interpreting new types of texts in different ways; and
- ✱ understanding how texts explicitly and implicitly influence them.

Multiplicity of demands

Recent research (Wyatt-Smith & Cumming 1999) suggests that teachers can often be unaware of the literacy demands they place on students. In the middle years of schooling, students spend less time explicitly learning literacy skills, because it is assumed that they have accumulated the skills that are required to tackle more complex literacy demands. The literacy demands of different learning areas increase as students move up the school, and they are expected to tackle not one literacy demand at a time, but a range of writing, speaking, listening, interpreting and critical thinking demands simultaneously.



One student, observed in a science classroom during a study:

... was interpreting a stream of rapid verbal English from his teacher, and the writing and layout information on an overhead transparency. He was writing layout diagrams, symbolic notations, and mathematics in his personal notebook; observing the teacher's gestures, blackboard diagrams and writing; observing the actions and speech of other students, including their manipulation of demonstration apparatus, and the running commentary of his next-seat neighbour. In fact, he quite often had to integrate and co-ordinate most of these either simultaneously or within a span of a few minutes. There is no way he could have kept up with the content development and conceptual flow of these lessons without integrating at least a few of these different literacy modes almost constantly. (Lemke 1999, p. 23)

These types of demands are compounded for many students, because in some learning areas:

many of the words are new or unfamiliar, the meanings being made are about strange matters of which he or she has no personal experience, the diagrams and graphs and formulas may bear only an outline resemblance to any seen before, the problems are difficult for his or her current level of mastery, the subject matter is abstract, and the problems of mutual co-ordination and calibration of all of these channels and literacies and activities are very substantial indeed. (Lemke 1999, p. 23)

This scenario is acted out, not just in one classroom, but also in a range of classrooms, every hour, every day and every week. In every lesson, students face a wide range of challenging literacy demands. The degree to which they master these demands impacts on their academic success.

Students who struggle to meet the literacy demands of different learning areas are likely to have difficulty adequately demonstrating effective learning outcomes. This is because attaining competence in a learning area means attaining competence in being able to read, write and talk about it. This is what is meant by the term 'literacy'.

WHAT CAN BE DONE TO IMPROVE THE SITUATION?

What might reduce the difficulties so many adolescent learners experience in the middle years of schooling?

Some teachers strongly believe that their teaching methods and strategies significantly affect the learning outcomes of their students. This belief reflects an 'internal locus of control'. Other teachers do not share this belief and attribute students' success and failure in the classroom to things beyond their own control, such as students' intelligence levels, attitudes, levels of motivation and home backgrounds. This belief reflects an 'external locus of control'.

A study of 300 Australian teachers (Westwood 1995) found that a large majority (62 per cent) attributed learning problems to factors within students (such as limited intellectual ability, or a poor concentration span, deficient memory processes, restricted vocabulary, sensory impairments, a lack of interest, low motivation, negative attitudes, bad behaviour, laziness, hyperactivity and learned helplessness).

A significant number (14 per cent) of the teachers attributed students' learning problems to factors related to family background culture (non-English-speaking background, low literacy levels in parents, single-parent family, poor home management). Only 10 per cent of the comments reflected an awareness of the fact that curriculum content and teaching methods can cause students to have learning problems.

Within the student 62%	Within the family background or a culture 14%	Within the peer group 3%
Within the curriculum 8%	Within the teaching approach 2%	Within the student/teacher relationship 4%
Within the school/classroom environment 6%	Other 1%	

Factors attributed to learning problems (Westwood 1995).

The above diagram reflects the tendency to overestimate the contribution of factors within the learner, and to underestimate the powerful influences of teaching methods and the school curriculum. Yet the variable over which teachers have most control is the way in which they teach:

The most effective strategy for dealing with learning problems is to improve the quality of instruction. (Ginsburg 1988, p. 236, cited in Westwood 1995, p. 21)

So what can teachers do to help students learn more effectively in the middle years? There is no simple recipe or solution that can be implemented, because the task requires flexible approaches and the will to try alternative courses of action. The precise combination of elements that work in any one particular school depends on the needs of that school. However, when teachers share common understandings about:

- ✱ the unique needs of adolescent learners;
- ✱ the powerful factors that impact on learning in the middle school;
- ✱ the literacy demands that students encounter across different learning areas; and
- ✱ the principles that underpin adolescent learning,

they can work together to plan relevant, motivation and effective teaching and learning programs that improve this particular group of students' learning outcomes.

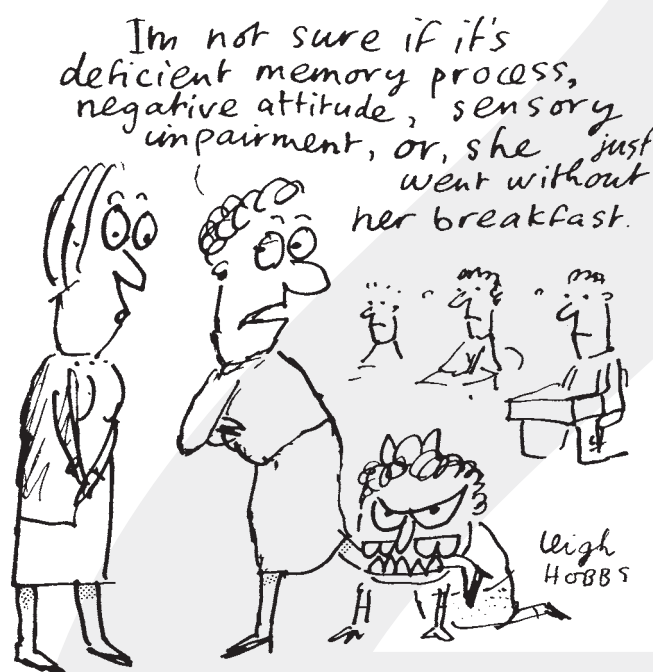
Teachers can make a difference!



ADOLESCENT LEARNERS

ADOLESCENCE—BETWEEN CHILDHOOD AND MATURITY

Adolescents between the ages of 10 and 16 years are adjusting to profound physical, social and emotional changes. During this period they are beginning to develop a strong sense of their own identity and learning how to establish personal and working relationships with adults. They are also beginning to establish their own sexual identity. They can be passionate and egocentric about issues that they believe in, and their behaviour can be erratic, fluctuating from being cynical, sullen, withdrawn and resistant one minute, to being suddenly fun-filled and gregarious the next. They are certainly less biddable than younger children! During adolescence, students start to accept responsibility for making their own decisions. Whilst they are growing towards independence, many of them are still not able to be self-regulating.



SO WHAT IS DIFFERENT ABOUT ADOLESCENT LEARNERS?

Adolescent learners no longer think like younger children. They are conceptually more sophisticated as learners and are able to think in ways that become progressively more abstract and reflective. They are starting to show concern about wider, contemporary issues and are trying to make sense of the social and political world beyond their own communities, especially in terms of how it affects them. As learners, they are at once listless and energetic, curious and bored, maddeningly obtuse and refreshingly insightful. They are keen to get ‘out there’ in the real world and want to learn in different contexts, and in different ways.

Adolescent learners are going through a rapid growth and extensive maturation phase and are not yet independent. They are learning to understand themselves. Their learning outcomes can be greatly affected by their physical, social and emotional needs, and these must be addressed directly in teaching and learning programs.

Adolescents will often challenge authority and strongly test the boundaries of adult conventions, practices and values. At this stage of their development they are trying to establish new relationships when their life is characterised by storm, crisis and harmony! Friendships really matter at this stage of learning, and when these become fractured, they cause fear, sadness, anger and anxiety. These emotions ‘fill up’ mental space and inhibit their capacity to learn.

Adolescent learners are also likely to run into different sets of relationship issues with adults as they test boundaries and question authority. If there is to be any conflict that strains family relationships, this is the time when it is most likely to occur. The conflict is not necessarily restricted to parents—it is likely to occur with other authority figures, such as teachers, police and sports coaches.

Adolescents are passionate about the things they are interested in, and they have a tendency to become preoccupied with fashion, pop culture, and electronic and online games. For many, life outside school, which incorporates their interests in pop and media culture, digital learning technologies, music and fashion, is infinitely more exciting than life at school. They leave these interests outside when they enter school and therefore learning tends to be something that is disconnected from their personal experience.

Whereas teachers may be hesitant about using electronic (digital) learning technologies, adolescents are seemingly at ease experimenting with and manipulating these tools. This may seem to be just a surface interest, but adolescent learners often demonstrate a remarkable capacity to be innovative. They also appear to be fearless about experimenting with the latest technology. It is easy to dismiss their fascination with computer games, popular culture and fashion as superficial, or as part of an attachment to the latest fad. It is, however, often the challenge of mastering ‘new forms’ or a new ‘game’ that provides a motivating factor for learning. Adolescent learners respond positively to meeting these types of challenges.



Adolescent learners' self-image is greatly influenced by their level of acceptance within their peer group. Their attachment to peers is extremely powerful, and many are part of the sub-culture of groups and gangs. They afford their schools and their teachers much less importance and respect! Whilst they seem to disguise it from time to time, they seek acceptance from adults and consequently, as learners, they prefer to be able to negotiate their learning with their teachers, through extension work, independent study, research investigations, open investigations and group research.

This particular generation of students is being prepared for an uncertain future, and for jobs that have yet to be invented. The diversity of social contexts within which they are located and the challenges they face today are far greater than those faced by earlier generations of students. They face changes in family structures, changes in the types of employment that they can access and rapid changes in learning technologies. Even the nature of learning has become more complex. The challenge is to empower them to become effective, independent learners, through self-directed and self-managed learning. 'Education is life—not a preparation for life. Adolescents should be viewed as real human beings that have serious questions and concerns. Their dignity must be respected' (Beane 1990, p. 49).

Studies of adolescent learners in Australian schools (Hill 1993) reveal that students want to be engaged in interactive and collaborative approaches to their work. They want their teachers to use student-centred teaching, learning and assessment practices, and a broader range of teaching styles and strategies than traditional teacher talk, note-making exercises from the board, handouts and questions and answer exercises. They enjoy being actively involved in all learning tasks and feel they need opportunities to take on work within and beyond their school context. In other words, they want to be:

Active resources for learning, rather than passive recipients of knowledge. They believe that their knowledge, views and concerns about educational and social issues are not always recognised as being a valuable curriculum resource, and that they bring a range of diverse skills that can contribute to the learning process—as researchers, producers, peer tutors, junior sports coaches, etc. (Cumming 1994).

GENERAL LEARNING PRINCIPLES

The characteristics of adolescent learners are not always addressed in the middle-years context. Powerful learning principles can also be ignored or overlooked at this 'in-between' phase of schooling. Many sets of principles that facilitate learning have been offered in the past. Various curriculum and syllabus documents have been developed by State and Territory departments of education, such as the Curriculum Framework for Western Australian schools and the Curriculum and Standards Framework for Victorian schools. These documents address learning principles that have a strong emphasis on outcomes-focused learning, and summarise contemporary understandings about effective learning.

LEARNING PRINCIPLES
A supportive learning environment —where students feel valued and challenged, and where they are able to experiment safely and work collaboratively with others.
Opportunities to learn —where students encounter and are engaged by their learning, and where they have opportunities to observe, practise, develop and apply new skills and understandings.
Connection and challenge —where learning links to students' existing knowledge and skills, and stretches them beyond what they know and can do.
Action and reflection —where students experience learning as an active process and use language as a tool for learning. They also get opportunities to reflect on and make sense of the action.
Motivation and purpose —where learning experiences are focused on achieving clear, relevant outcomes that make sense to students.
Inclusivity and difference —where students engage with experiences that respect and reflect differences between learners.
Independence and collaboration —where students work together (as well as individually) to ensure a personal grasp of concepts.

(Curriculum Framework, WA 1998)

PRINCIPLES FOR ADOLESCENT LEARNERS

The principles described above apply to students from the early years to the post-compulsory years of schooling. They are clearly important. Because adolescent learners have their own unique needs, they require a focus that applies to them specifically.

Stepping Out has a set of principles that it calls the 5Ms. The 5Ms align with, and incorporate, the learning and teaching principles from the Curriculum Framework (Curriculum Council, WA 1998). They reflect the things that really count, and if the aim is to improve learning in the middle years, then they need to be taken seriously.



THE 5MS

Making them feel good—Adolescent learners learn more effectively when they feel good about themselves and when they know that others like and value them. Teachers have a huge influence on students' self-esteem. Their perceptions, expectations and the quality of their interactions impact on each student's sense of well-being, and can make a real difference to learning outcomes.

Minding the connections—Learning is enhanced when connections are made to:

- ✱ developmental levels;
- ✱ existing skills, knowledge and experiences;
- ✱ family, language, cultural and socio-economic experiences;
- ✱ individual learning styles;
- ✱ peers in the classroom;
- ✱ learning in primary school;
- ✱ learning in other learning areas;
- ✱ school community members.

Making it sing!—Content specific to each learning area is better learned through exciting and motivating processes where learning is contextualised, relevant, and where there is a strong sense of challenge.

Moving them forwards—All students need support to make progress with their learning. They require different support (scaffolding) at different stages of their learning, to enable them to achieve their target outcomes.

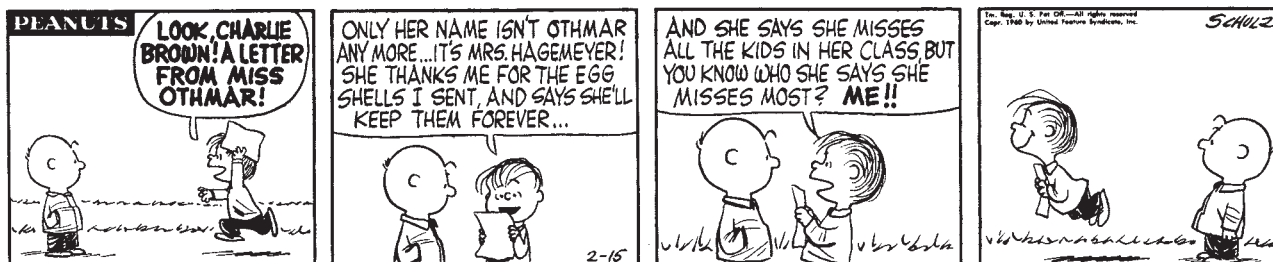
Making sure they're learning—It is important to know where students are on learning outcomes, to ensure that current teaching and learning practices provide opportunities for outcomes to be achieved. Students' progress should be monitored by collecting information about processes, products and performances over a period of time and in a range of different contexts. If they're not making progress, then something needs to change!

MAKING THEM FEEL GOOD



Teachers' interactions and expectations

Students always remember the teachers who made them feel that they were a valuable member of the class. 'Good teachers are those you can talk to—who are understanding and show respect for people with different ideas ... who are interested in us as individuals' (SA Field Study 1994).



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Research has demonstrated consistently that teachers' expectations, attitudes and opinions have a significant influence on students' success at school. This phenomenon, called the 'self-fulfilling prophecy' (Rosenthal 1968), suggests that students become 'what they are expected to become'. When teachers believe that particular students can't achieve, those students' performance can be influenced in negative ways. When teachers believe that particular students can achieve, they tend to:

- ✱ interact and react warmly with them;
- ✱ provide more feedback about their performance;
- ✱ encourage their efforts more;
- ✱ teach them more difficult material;
- ✱ give them more opportunities to respond and question.

Students work harder for teachers who notice their efforts. They will (quite happily) provide work of a higher standard for the teacher who expects it, and work of a much lower standard for the teacher who does not expect it. It can be an interesting exercise to compare the work of one or two 'target' students as they work in different classes, with teachers from various learning areas. Some students' work will differ enormously from class to class! As a result of this type of analysis, some schools have negotiated a 'minimum standards' requirement across the school. When high standards are expected, and explicit, ongoing and encouraging feedback is provided, students feel that the extra effort they have put into their work has been noticed and valued. This makes them feel good about themselves.

The learning environment

In the rush to cover course content and to fit into the tightly organised pattern of operating in a secondary school, it is easy to overlook the importance of a supportive learning environment. During adolescence, however, students start to question the values, beliefs, practices and conventions that they come in contact with. This is expected behaviour for this age group, but it can sometimes get them into situations of conflict.

Adolescent learners need opportunities to express themselves in a 'safe' place, free from harassment, sarcasm and remarks that denigrate their input. They need to be able to 'have a go' at a wide range of things, secure in the knowledge that while errors might be painful, lessons can always be learnt from them. They need to work with people who let them know that they are liked, trusted and that their input is valued. They also need to work in an environment that is conducive to forming relationships with teachers and peers—one that helps them move safely through this particular phase of their development.

A child's life is like a piece of paper, on which every passer-by leaves a mark.

(Ancient Chinese Proverb)

TRY THIS

Making them feel good

- ☀ Remember students' names and use their names when addressing them. Take the opportunity to 'check off' the class attendance roll while greeting each student as they enter the classroom. Notice when things aren't going well for specific students. Encourage them to make contact when the work gets difficult.
- ☀ Keep a mental tally or written record of positive feedback given to students in each lesson. Ensure that no students are overlooked within the course of a week. Always start off with positive feedback, followed by constructive suggestions for improvement, where appropriate.
- ☀ Negotiate criteria for work standards with students so that they understand your high expectations of them and those they have for themselves. Outline expectations and provide marking keys, so that they know 'what is in your head'.
- ☀ Reward students' risk-taking or 'having a go' behaviour with positive comments, gestures and marks, even if the answer itself is not correct.
- ☀ Find a variety of avenues for publication of students' work: Internet, competitions, displays, student/professional journals and magazines.

MINDING THE CONNECTIONS





Learning programs for adolescents require teachers to connect to, and challenge, what students already know and can do. This involves connecting to, recruiting, building on and stretching what students know. These processes are critical elements of any learning program and need to be made at a variety of levels.

Connecting to developmental levels

The implications for developmental learning theory are that teachers need to know what stage of development their students are at, so that appropriate learning strategies and activities can be put in place to help them make progress towards the next stage of development.

In primary schools, different levels of achievement between students can be expected. By middle school, these differences can also be expected, but are often magnified and accentuated when a number of primary school students arrive on the one site. Gaps in ability tend to widen as students move through their schooling. Those who have mastered the basic tools of learning can apply them to learn new concepts as the curriculum becomes more demanding, but those who are still struggling to come to grips with the basic skills face the prospect of falling further behind their peers. Barber (1999) suggests that a ‘significant number of “lost boys”, who fail to learn to read and write well by age eleven, will never recover educationally.’

What seems like small differences in achievement in the early years can be accentuated when students reach the secondary context. The developmental diversity of this age group makes it difficult to organise an educational program that adequately meets the needs of all. Compared to the breakthroughs and developmental leaps associated with early learners, progress in achievement tends to be more subtle in the adolescent years. It is therefore more difficult in the middle years of schooling to observe whether students are making progress. Consequently, we find an increasing array of labels (such as specific learning difficulties, ADD, dyslexia, cultural, gendered and socio-economic groups) are used to try to explain why some students find it difficult to learn in the middle years of schooling.

Adolescent learners develop and learn in different ways. What they learn, how they learn, the rate at which they learn and the order in which they learn, is shaped by the social contexts within which they interact. Typically, they go through different stages as they develop in an area of learning, and the characteristics they demonstrate at each stage can be different from that at every other stage. It is unrealistic to expect students to be successful at tasks that require a level of cognitive ability not yet attained. If they are not ready to take on the learning, they can be set up to fail.

Connecting to and extending existing knowledge, skills and experience

All students have existing knowledge, skills, understandings and experiences. These need to be identified, linked to, and/or recruited as a curriculum resource. Once teachers have

identified what students know about a concept or topic and what skills or experiences they can contribute to the curriculum, they can plan programs that bridge the gap (lessen the distance) between what is already known and what is to be learned.

Many strategies can be used at the start of a unit of work, concept or topic lesson to identify what students already know. These strategies enable students to use and hear learning-area-specific vocabulary. Their knowledge is reinforced and extended as they talk, listen and piggyback ideas off each other. Journal writing or concept maps provide a wealth of information about what students know. Anticipation or prediction activities are useful to implement at the start of a new topic, because they encourage students to think about what a topic might cover. Their initial predictions can be referred to, compared and contrasted and/or amended at different stages of the unit of work. Similarly, simple strategies such as a quick quiz, when repeated at different stages of a unit of work, make it clear that scores increase as knowledge about a topic increases. The comparisons enable everyone to see how much learning has occurred!

New learning occurs when thinking is challenged and extended. Adolescent learners need to be stretched (with assistance) from the edge of what they can do independently, to the next point of their learning. As they are stretched, they start to build up new knowledge, understandings and skills. Simple strategies, such as three level guides, directed silent reading, and student-generated questions, can be used to move students along from surface levels of reading and research, to more advanced levels of thinking, research and application. (Many of these strategies are outlined in *Success for All: Selecting appropriate learning strategies*.)

Connecting to family, language, cultural and socio-economic experiences

The experiences students bring with them to school are often referred to as background experiences, because they are mistakenly seen as not being related to the business of schooling. In fact, these experiences are central to adolescent learners' identities, and they do not disappear whilst they are at school. They represent a wide range of cultural, family, language and socio-economic experiences. Learning programs need to not only link to these experiences, they also need to recruit them in such a way that they are put into the foreground of all learning activities.

Students from different cultures have different world views, diverse knowledge, experiences and skills that are rich and useful curriculum resources. When white Anglo-Saxon practices, texts and values are consistently promoted, students from minority language and cultural backgrounds can feel marginalised, and more importantly, devalued. 'When all the things we bring to the learning situation—our language, previous learning, family and cultural background, and our experiences—are the pegs on which we hang new information. If we can't attach new information to what we know already, we can't learn it ... it's as simple as that' (Lingo video, 1992).



Connecting to learning across learning areas

Students' learning outcomes improve when they are able to make links across different learning areas. Teachers have to help them make these links, but they can only do this if they work collaboratively, sharing ideas and seeing themselves as part of a team responsible for the development of all the students in the school.

It may be easy for some schools to become more collaborative about the way in which they work. However, for many teachers and for many schools, the issues require a lot of patience and effort and are not easy to address. Improving how schools work is something valuable to target, but it tends to happen over time. Whilst the efforts of individuals, departments and key stakeholders are essential to achieving such reform, it is not likely to happen immediately. In the meantime, teachers have to work within their existing school culture and organisation to avoid fragmentation, duplication and overlap, and to effect improvement in learning.

Many schools have tried different ways of organising the learning environment to cater for the needs of adolescent learners. They have clustered students in various primary/secondary configurations, set up sub-schools and teaching/learning teams (thus creating communities of learners), reduced the number of teachers that students encounter, made the timetable more flexible by ensuring larger, uninterrupted blocks of time for learning, and integrated the curriculum.

Some schools continue to examine consistently their current practice to identify how their organisational structures and timetabling processes impact on students' learning. They collect data to inform the planning and implementing of strategies that minimise barriers to learning. They use this type of analysis to identify options and possibilities for engaging students in their own learning and for giving them responsibility for making decisions about their own learning programs.

Murphy (1997) suggests a range of solutions for finding an hour per week to do some collaborative planning. Permission from a range of sources may be needed for some suggestions.

- ✱ Release students one day per week, at an earlier time.
- ✱ Start school 30 minutes later than the regular starting time one day a week—but have teachers arrive 30 minutes earlier than the usual starting time.
- ✱ Timetable students to attend art, music, physical education, and have a group of teachers meet at this time, whilst specialist teachers work with their students.
- ✱ Hire a small group of relief teachers one day per fortnight. These teachers enable five teachers to meet at a time, for one-hour periods, over the course of a day.
- ✱ Limit learning-area meetings to one afternoon per month, and use the other weekly meetings as planning meetings.

Connecting to different learning styles

All students have preferred learning and working styles. They might share certain approaches, but they generally retain preferences that are uniquely their own. It is easy

to forget that students learn in different ways, and to plan assignments and go about teaching as if every student were the same. Kinaesthetic or tactile learners, who make up the vast majority of the drop-out rate in secondary schools, cannot sit still for long periods of time and need to move and touch things in order to effectively demonstrate their learning. They are unlikely to do well in tests and programs that reinforce a narrow range of learning styles. Individual differences therefore are important and need to be recognised and respected when planning learning programs. Students' different learning styles need to be linked and recruited into all aspects of the curriculum. This enables them to continue to develop their strengths. They also need to continue to build up their skills in other areas, to find out what it is like to work in different ways, and to learn to accommodate other people's learning styles.

Students can be challenged and stretched when they are expected to demonstrate their learning in different ways (i.e. through drama, art, graphs, diagrams, music, dance etc.). They learn to accommodate and appreciate other students' ways of working when they participate in collaborative small-group work. Some do not necessarily work well in groups, and therefore consideration needs to be given to those who work best alone. Group activities that start with 10–15 minutes of individual thinking/planning time (or that build in individual reflection time at various stages of the learning program) can provide successful learning opportunities for all students.

Connecting to other students

Adolescent learners learn about the world and generate, test out, refine and extend their ideas through talk. They learn best when they are able to clarify their thinking by bouncing ideas off each other. Consequently, they benefit from working with their peers, in pair work, or in small-group work. Group activities provide ideal opportunities for the linking and recruiting of ideas to happen. When students share their expertise and skills with their peers, they become part of a community of learners.

Working with others, and in teams, is now a common key competency required for all school leavers. The skills of collaboration and co-operation can be developed and refined through participation in small and large group activities.

Connecting to learning in primary schools

The National Literacy Plan strategy highlights the importance of linking to and recruiting the ideas, perceptions and information of primary teachers who have already taught the same students. Much is to be gained when the strengths and knowledge of primary pedagogy and secondary learning-area-specific expertise is shared, including issues related to duplication and overlap, as reported by Rudduck, Chaplain & Wallace (1996).

This year's work is not too difficult—it's more or less the same as last year's ...

I've been asked to draw around six leaves (yet) I did photosynthesis in my last school and I'm interested in what effect different light might have on its rate.

(Students in their first year of secondary school)



Connecting to others in the school community

Student, teacher, family and community partnerships provide powerful links that enhance learning. Learning opportunities are enhanced when a school community links to, recruits and extends the expertise, skills, support, cultural experiences, resources, facilities, business acumen and knowledge of its members. Partnerships need to be meaningful, non-tokenistic and proactive, with benefits for all participants.

According to Cumming (1999), schools are no longer seen as the primary producers, deliverers and assessors of knowledge and skills. There is an increasing recognition that students need a broader education that will enable them to participate in, and also contribute to, society. Community-based learning is learning that takes place in the community, beyond the confines of the classroom and the school. It involves individuals, other than teachers, as part of the learning process. Students remain at the centre of the learning process, while maintaining connections to, and support from, teachers, parents and other community members.

The emphasis is on co-operative planning, implementation and evaluation of meaningful and productive work that has a strong educational focus, and clearly articulated outcomes. Students are able to participate in activities that are relevant and rigorous, rather than simulated, and the results of their work is able to be exhibited, presented and acknowledged in community settings.

TRY THIS

Minding the connections

- ✱ Include culturally appropriate resources in programs to reflect the cultural make-up of your classes.
- ✱ Expose students to reading, viewing and listening to the types of texts, topics and themes with which they are familiar and in which they take an interest. Provide plenty of opportunities for students to talk and write about this knowledge or to display these skills.
- ✱ Accommodate different learning styles by:
 - encouraging team teaching within a subject department or school (so that students are exposed to a range of teaching styles);
 - utilising small-group work, such as jigsaw activities, which allow students to utilise their strengths when contributing to group tasks;
 - taking an area of curriculum and developing thematic units that accommodate students' various learning styles; and
 - providing a balanced range of activities that incorporate elements of individual, small-group or whole-class learning.
- ✱ If you are not working in a middle-school environment, plan programs with other learning-area departments to reinforce common content, concepts and processes.
- ✱ Make regular use of incursions and excursions to reinforce connections with the non-school community.

MAKING IT SING!



When was the last time you heard someone claim that school education is routinely exciting, engaging and stimulating for students, that it provides the kind of rush that comes from theatre or music or competitive sport, that it regularly takes students so close to the edge of their experience that they get stage fright? When did school last seem slightly dangerous, a place that would give you a nervous thrill like the thrill you get from taking risks and going beyond your limits. In the iconography of contemporary life, school is the grey cardigan, sensible shoes, making sure you have a hanky, going to bed early, wearing clean underwear in case you get hit by a bus, and chewing each mouthful 32 times. It is the part of Western tradition that assumes that what you enjoy cannot be good for you, and what is good for you cannot be fun ... Schooling is ... the grey cardigan and the sensible shoes compared with the sparkle and sequins of popular culture. (Wilson 1999, p. 3)

Balancing content and processes

The emphasis on ‘making it sing’ means more than simply making learning fun. It also means more than simply covering content. It means designing learning experiences that balance the demands between process and content outcomes.

It is easy to fall into the content trap. ‘Covering’ a body of content does not necessarily mean that students have learned the content! Content is important, but it should not drive what we do. It ceases to become relevant after a period of time. What is important is that students develop skills that will enable them to process any body of content, at any stage of their life.



Students need time to process and absorb or internalise content. They need time to listen, read, think, talk, plan, write and time to reflect on and represent their learning. Learning is best demonstrated when they can apply their learning in another context. So processes matter—because they impact on the effectiveness and on the quality of the learning—but they require time. Striking a balance between the need for teachers to ‘deliver’ content, and for students to process information, continues to be an ongoing issue in the middle-years context.

As part of a solution to this issue, some schools have conducted a learning-area or school audit of what is taught at each year level. They determined what content was mandated and was therefore non-negotiable, and they identified what content could be compacted or removed. They examined what was happening across the school, to ensure that content was not being repeated, and in doing so, determined that responsibility for teaching a particular concept could be shared between teachers from different learning areas. (This exercise could be extended to include feeder primary schools.)

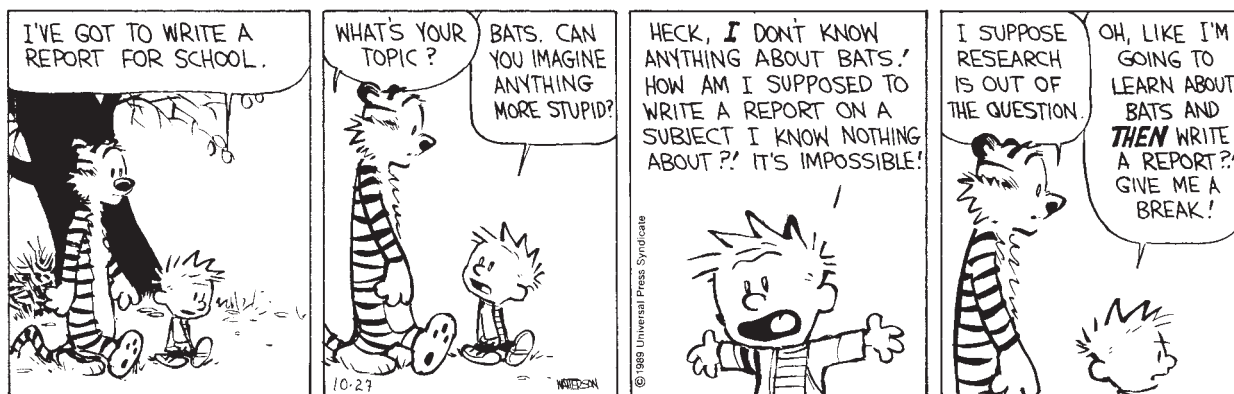
Some schools have trialled team teaching as an option for teaching a topic, concept, theme or unit of work. Others developed integrated learning programs with teachers from different learning areas. They started small and trialled their efforts. Successful programs were shared within and across schools in the same district, and students’ work samples are now used as exemplary models for others.

Contextualising the learning

When learning is contextualised, and relevant, it becomes meaningful. Adolescent learners like to know why and how information learned at school will be useful to them. When they know why the information is being taught, how it fits into the bigger world, and how it links to their own life, they are more likely to take the learning on board. Learning needs to be relevant for work (and future work), relevant to them and to their family, and relevant to the wider world around them (Hargreaves 1998). Adolescent learners love to learn real things. They want to be part of life in the real world. They like to be ‘out there’ doing things that they deem to be important, or things that link to their own experiences. The more direct or ‘hands on’ the experience, the better. If the ‘real thing’ is not an option, then indirect, vicarious or simulated experiences also allow them to feel that they are close to the action. These kinds of experiences provide a context within which learning can occur, as well as a shared experience that can be used as a stimulus for language and knowledge extension and enrichment.

When learning takes place in contexts outside the classroom (in the workplace, a church, museum or shopping centre) students are able to observe ways of behaving, ways of speaking and conventions that are particular to certain situations. They quickly learn to adapt their own language and behaviour according to purpose and audience. This ‘on site’ learning can be more meaningful than learning conducted in an isolated classroom, away from the real action.

Many students need to explore, discuss, mind-map, brainstorm or research a topic before they are able to write about it effectively. These types of before activities prepare students for the work that is to follow. They provide background information and content that students can write about.



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Students are more likely to write, perform, and design well, if they see the processes involved in writing, designing, organising and performing modelled, and if they encounter examples of good writing, designing, organising and performing. When they encounter high quality products of those processes, they can see what it is they are aiming for. Time spent on before and during activities such as these is not wasted, because this type of careful preparation ensures that their (after) learning outcomes are improved.

Keeping it relevant, engaging and motivational

Adolescent learners relish autonomy. They become energised when the goals for learning are self-determined or negotiated; when the research topics to be investigated are of interest and of use to them (now and/or in the future); when they are given real problems to solve, and when they are able to jointly negotiate both the nature of the learning task and the assessment regime.

Students enjoy planning and working independently. They also enjoy working collaboratively with others. They thrive on being able to be active and self-directed in their approaches to learning tasks.

When reflection time is built into all learning activities, their learning is even more enhanced. Teachers reinforce the message that they have trust in their students' ability when they recognise that there are many paths to learning and when they are prepared to act as facilitators for learning, rather than always being the 'one who knows'.

Adolescent learners like to be part of what is current or topical. Classroom programs that utilise media, television, CD-ROMs, videos, and other forms of digital and learning technologies are more likely to engage students' interest. When the learning program incorporates, links to, recruits or extends on current issues, human interest stories or politics, students are able to build up knowledge about the one topic from a range of



sources. Topical news broadcasts, feature articles, films, comic strips, or the newspaper can become rich and motivating sources of topic for discussion, debate or research. Students will often listen, talk, read, write and think critically, without being aware that they are learning, because they become so engrossed in the task or topic at hand. When teachers know their students well, they are able to tap into what is of interest at the time and use this interest as the basis for learning. Beane (1991) suggests that the middle school is where the curriculum should focus on widely shared concerns of early adolescents and the larger world, rather than ‘increasing specialisation and differentiation among separate subjects’.

Rapid changes in technology mean that students can locate information from across the world, via fax, email, chat rooms, bulletin boards etc. How much better to be able to ask students in other countries or contexts direct questions about their life; to be able to make contact with a real nuclear scientist, or renowned explorer by fax or email. The world becomes a smaller place when access is only minutes away!

Adolescent learners enjoy working collaboratively in small-group activities. Debating, in particular, is an excellent strategy for engaging students in purposeful, relevant and motivational learning. It requires research work, planning and preparation, time-keeping skills, formal language, a requirement to match recognised conventions, and also enables them to practise speaking at length on any given topic, in public.

Similarly, collaborative activities, such as writing to the community paper about a local issue, the creation of board games, rewriting a chapter of a learning-area-specific book in ‘student friendly’ terms, setting up worm farms, a herb garden or a school environmental centre, developing a PowerPoint or multimedia presentation advertising the school, rewriting a chapter of a maths text for younger students, designing a local shopping centre or a solar car, writing and presenting a play on a health issue, writing a restaurant review after visiting the nearby Thai restaurant, designing a school web page, designing a playground for the local kindergarten, making up learning-area-specific lyrics to a well-known melody, creating quizzes and competitions, setting up a school radio station, developing a group picture book on a learning-area-specific topic, or constructing a newspaper for a particular audience, are all student-centred activities that provide a motivational stimulus for learning. Teachers become valuable ‘resource persons, coaches, leaders and guides, as well as experts and authorities, when they generate a broad range of stimulating and contextualised learning environments’ (Schools Council 1990).

Teachers use their professional judgement when planning learning programs. They must decide if and/or when a traditional approach might be more appropriate for a particular group of students, or for teaching a particular type of skill. They must also decide whether other approaches might provide variety, suit the needs of a group of students, or achieve particular learning outcomes. Some teachers use integrated programs that allow students to demonstrate outcomes across a range of curriculum areas. They find these minimise the risk of overlapping between different learning areas. Variations of such programs include having teachers from different learning areas planning units of work collaboratively around a concept, but teaching their learning-area-specific component in

their own learning area. Alternatively, they can involve learning teams or teachers from different learning areas collaboratively planning, implementing and assessing cross-curriculum integrated programs or tasks.

Most teachers agree that the curriculum should not be integrated simply for the sake of integrating, and that it is better to go this way when integrating learning-areas content is more likely to ensure that students will achieve particular learning outcomes. Better outcomes are obtained if concepts are used (energy and change, cultural understandings, working mathematically, adaptation), rather than themes (water, dinosaurs, war, humour, poverty) or interesting (but random) activities. Integrated approaches are also more effective when they are tackled for part of a day or week, rather than for longer periods of time.

It is important not to integrate too many learning areas within the one program, and to know that some learning areas do not always integrate naturally with others (i.e. LOTE and Mathematics). ‘Forced fits’ are rarely successful! When open-ended learning tasks are incorporated within integrated programs, students are able to enter and exit tasks at different points and demonstrate their learning in various ways.

Some of the issues related to curriculum integration can be minimised by dedicating explicit teaching time for the skills and content specific to each learning area and identifying measurable target learning outcomes. Students need to be made aware of the essential elements of each discipline that make up the integrated program. When it comes to assessment, teachers have found that it is best to use learning-area-specific progress maps (such as outcome or level statements) or assessment tools that they have developed themselves. These usually incorporate key outcomes from each of the target learning areas. Other outcomes demonstrated by students can be noted for future teaching and learning programs.

Other teachers have tried negotiating an integrated curriculum process. This requires students to reflect on questions they have about themselves and the world, to share and prioritise their questions at the small- or whole-group level, and to vote on the selection and order of topics/themes to be addressed. Teachers add supplementary questions to extend and address gaps in the theme/topic, and students then identify the types of tasks that would enable them to answer their questions. Teachers or teaching teams co-ordinate the sequencing, resourcing and timetabling of the integrated curriculum and build in regular conferences or debriefing sessions with individual or small groups of students. According to Beane (1991), this shift in focus from teacher to student redefines the role of the teacher from ‘gatekeeper of knowledge’ to facilitator and guide. ‘The spin-offs from student participation in curriculum are many, and schools are only beginning to understand the immense resource that is made available when students’ energy and interest is used constructively for their own and one another’s benefit’ (Brennan & Sachs 1998, p. 16).



Setting horizons and providing explicit feedback

Adolescent learners need to plan and strive for well-defined and achievable outcomes. They need to be able to clearly articulate these at the beginning and end of each unit of work, or lesson, so that they know what targets or outcomes they are trying to reach.

They also need to know how they will reach the target outcomes. Setting targets or establishing a purpose is similar to deciding on a destination. Unless students know where they are going, why they are going and how they are going to get there, the journey is likely to be somewhat aimless. The destination and the journey have to be worthwhile, just as any trip has to have been worth the effort of getting there. It is essential that target outcomes and purposes for activities or programs are articulated before and (summarised) after each lesson or program of work.

Students also need to have ongoing and constructive feedback to keep them informed about their progress towards target learning outcomes. This lets them know how they are going. The feedback should explicitly highlight what has been done well, and highlight what might be done to ensure that further progress is made.

Adolescents are sophisticated learners. They are more likely to commit to programs that allow them some autonomy. They enjoy planning, organising, implementing and evaluating pathways of learning that have been negotiated with their teachers. Student-centred approaches favour asking students to identify aspects of their work that they are pleased with, as well as aspects they feel they need help with, and then negotiating follow-up strategies collaboratively. The degree of negotiation might range from a single task within a program, to complete freedom of choice, depending on students' needs, abilities and interests, and depending on what feels comfortable for the teacher. Students' self-esteem is raised when teachers indicate that they are confident in the students' ability to manage aspects of their own learning.

Whilst it may seem a paradox, adolescent learners need both the challenge of working under pressure to achieve high standards and time to reflect on their learning, so that new and difficult concepts can be refined and internalised. It is also at this stage in their development that adolescents become more self-aware as learners and need to be challenged to 'think about their thinking'.

TRY THIS

Making it sing!

- ✱ Challenge students to establish their own goals for learning in a particular unit of work.
- ✱ 'Clue' students in to the 'secrets' of achieving learning outcomes. Involve them in negotiating criteria and strategies for success.
- ✱ Incorporate a range of appropriate learning technologies to support students' outcomes.
- ✱ Maintain 'openers' and 'closures' for each lesson that highlight the outcomes of that particular unit of work.
- ✱ Give students an element of choice in the mediums through which they may wish to present their work (e.g. multi-media, role-play, diorama).
- ✱ Provide opportunities for both collaborative and independent approaches to learning when planning a program of work.
- ✱ Incorporate plenty of problem-solving and critical-thinking approaches. For example, place the student in the role of the teacher wherever possible—instead of asking students to answer questions when reading, viewing or listening to a text, ask them to study the text and make up a set of questions that need to be asked of that text.

MOVING THEM FORWARDS



The middle years of schooling is often regarded as being rather 'aimless', because it falls between the phases of schooling that are considered to really matter. As an antidote to this, it is important that students recognise that they are making progress with their learning. The key issue is to support their learning without losing sight of the necessity to develop independent learners.



Supporting learning

All students require support to move from one level to the next (from what they know to what they need to know next). They need to be challenged and stretched from the edge of what they can do independently—to the next stage of their learning. The zone between what the learner has currently achieved and what they can potentially achieve (with assistance) is called the ‘zone of proximal development’ (Vygotsky 1966).

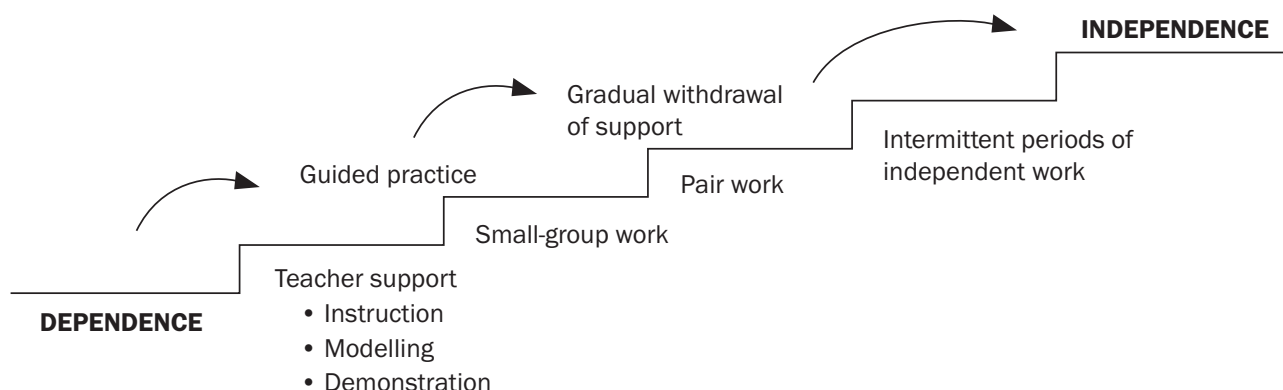
The behaviours that students demonstrate at each stage inform decisions about the selection of strategies that will best support them to make further progress towards target outcomes or attainment levels. Strategies for adolescent students need to be appropriate for their developmental level.

Even students who demonstrate high learning outcomes need to be supported. Those, for instance, who demonstrate outstanding computer skills still require support to continue to make progress, whereas those just starting to experiment with a computer keyboard will need support of a different kind.

Students, adults or teachers can provide support at the different points that lead to the mastery of a concept or skill. It is not necessary to provide the same support at the whole-class level unless all students in the class are learning a new skill at the same time.

Adolescent learners need the support of scaffolding strategies to stretch to the next phase of their learning. The use of trainer wheels on a bicycle is an example of scaffolding. Trainer wheels are used until the cyclist practises riding the bicycle independently, becoming more confident as he/she experiences success. When the wheels are removed, it is a sign that learning has taken place, and is a mark of progress.

Scaffolding needs to happen recursively with each new major concept or task that students are asked to complete.



When selecting scaffolding strategies, it is important to determine:

- ✱ who needs support (because it is frustrating for students to have to complete scaffolding activities if they do not really need them);
- ✱ what kind of support would be most appropriate; and
- ✱ how long the support is needed.

Support or scaffolding strategies can be put in place for as long as they are required, but need to be removed or varied once they are no longer appropriate. The gradual release of scaffolding places the final responsibility for learning on the student.

Types of scaffolding can vary, but generally include strategies such as:

Immersion	Models or examples are provided, so that students become familiar with the text or item and can identify common patterns, structures or features.
Explicit teaching and feedback	The teacher is explicit about the steps involved in a process and provides ongoing, feedback as students 'approximate' the task.
Modelling and demonstrating	The teacher demonstrates and 'talks through' a process, so that students can 'hear the thinking' that others go through as they tackle a particular task.
Guided reading or viewing	The teacher uses strategies such as focus questions at <i>before</i> , <i>during</i> and <i>after</i> stages of the reading task, or note-making frameworks etc., to help students 'navigate' and understand the content and structure of print and non-print texts.
Guided writing	The teacher supports individuals, pairs or groups of students as they tentatively compose a piece of writing. Strategies such as explicit teaching, peer evaluation, writing frameworks etc. are used at the point of need.
Joint construction	The teacher and students share ideas and jointly construct a piece of work (i.e. writing, note-making, graphs, diagramming etc.), using the overhead projector, computer or blackboard.

When teachers know where their students are at (in relation to target learning outcomes), and when they understand the purpose of particular strategies and know how they work, they are able to select strategies that help students make progress from one level of learning to another.

Introducing strategies in the classroom

Teachers need to be familiar with a wide range of strategies and practices that they can draw on to cater for the diversity associated with adolescent abilities and interests. Strategies aren't something that can be taught once, and then can be assumed to have been learned. They need to be explicitly explained and modelled several times before students can apply them independently. Students need to know why they are using a strategy, and how, when and where to apply it. They also need to have multiple



opportunities to practise and develop strategies so that they become internalised and can be used throughout their life. In a strategies-rich classroom, it is useful to teach one or two strategies and to build up the repertoire slowly. Strategies can be explicitly taught and modelled in both small- and large-group instruction, and in one-to-one teaching situations. Explicit explanations, modelling, on-going guidance and explicit feedback should continue as students practise using the strategies.

Instructions should include explanations about when and where to apply particular strategies, as well as the benefits associated with using various strategies. Students can be prompted (through questioning techniques) to think about additional or possible ways to extend and expand their use of strategies. The ways in which different students apply strategies to the same content can be highlighted and individual students can explain why (and how) they used a particular strategy to complete a piece of work.

The aim is to make students aware of the ways in which different strategies can help them learn more effectively and for them to be able to self-select and apply them confidently in different contexts and for different purposes.

Selecting appropriate strategies

Great care needs to be taken when selecting strategies, because the inappropriate selection of strategies can detract from learning experiences. The ‘grab bag’ approach to selecting strategies is not effective. Each strategy has a particular purpose: some support learning; some provide organisational structures; others facilitate comprehension.

Each strategy suits different kinds of tasks and achieves different purposes. Students do not learn skills and concepts in the same way, and therefore some strategies support the teaching of skills; some support the teaching of concepts.

Some strategies are flexible and can be used equally well at before, during and after stages of a lesson or unit of work. When selecting learning strategies, it is always valuable to plan from the after stage first. This means identifying target learning outcomes first, because this information drives decisions about the kinds of strategies that will be put in place to help students achieve those outcomes.

Spoon-feeding versus independence

Teachers frequently make the majority of decisions about tasks to be completed in class, selecting strategies, activities and evaluation methods. This can mean that valuable opportunities are lost where students could use thinking skills to determine which writing framework or note-making structure might be more appropriate; practise the skills involved in selecting appropriate strategies for particular tasks; and develop the skills of time management and the skills required to be independent, self-regulating learners. When teachers make all the decisions about what is to happen in the classroom, students are also denied valuable opportunities to make confident, informed choices about the purpose and appropriateness of different strategies for particular activities. They can get used to being ‘spoon-fed’, and quickly become dependent learners.

On the other hand, some students simply do not have the developmental, organisational or self-management skills required to complete their work independently. They cannot be left to take responsibility for managing their learning, because they still need help.

There is a fine line, then, between knowing who to support, when to support them, how to support them and when to wean them off the support. The only way that teachers can effectively gauge how students are progressing with their learning is to monitor their processes, products and performances over a period of time, in a range of different contexts, and to alter the teaching/learning program accordingly.

TRY THIS

Moving them forwards

- ✱ Jointly negotiate explicit marking keys before commencing tasks.
- ✱ Provide appropriate scaffolding strategies at the point of need. Some ideas include:
 - *Organisational support*
Writing and note-making frameworks (these provide organisational structures).
 - *Sharing and expanding ideas*
Envoy, rotating papers, small-group work, jigsaw and card-cluster activities.
 - *Finding out where they are*
Brainstorms, call outs, card clusters, anticipation guides, match-making and prediction activities.
 - *Providing examples and guiding learning*
Productive processes such as immersion, guided reading, guided writing, joint construction, three-level guides, think sheets, frameworks, directed silent reading, focus questions and previewing a text.
 - *Peer support*
Small-group work, guided writing, text reconstruction, pair work, group evaluation and dictogloss.
- ✱ Ensure there is plenty of time for self-monitoring in the learning process. For example, incorporate a self-reflection sheet such as WW-HH-W (What did I do? Why did I do it? How did I go about it? How well have I completed this task? What could I do to improve?).
- ✱ Provide plenty of approaches for students to practise, develop and refine their skills.
- ✱ Encourage peer tutoring.
- ✱ Employ a productive approach to learning—include plenty of immersion, modelling, guided learning and joint construction of texts to achieve independent learning.
- ✱ ‘Clue’ students into the purpose for a particular task. Try to ensure there are ‘authentic’ as well as philosophical purposes for acquiring these skills and understandings.
- ✱ Employ a BDA (Before, During and After) framework for planning (see example on page 43).
- ✱ Provide explicit feedback, feedback and more feedback.



Before, During and After

Task: Viewing the Video: Jakarta Punya Cerita

1. Before

Before you watch the film, write down as many facts as you can about Jakarta:



2. During

The film is about the unlikely friendship between a young girl called Dewi and a boy called Danang. As you watch the film, write down how their lives and backgrounds are different:

Dewi

e.g. goes to school every day

- ten years old
- does ballet
- father is a police officer
- can speak English
- roller blades in Grandfather's house
- can play piano

Danang

e.g. doesn't go to school – works as a car "jockey"

- homeless
- has problems
- little money
- can speak English
- traditional Betawi

3. After

Jakarta has seen a lot of development over the last 20–30 years. What have been some of the problems of this development?

There are lots of people and slums. Some people don't have homes.
A few people are rich.

Cars can't go through the city without 3 people in them. Danang works as a car jockey and rides in cars so there are 3 people in them. The city is very polluted and there is rubbish everywhere. Police and other people take bribes.

An example BDA framework.

MAKING SURE THEY'RE LEARNING



Assessment

If the prime responsibility of teachers 'is not to teach, but to ensure that students learn' (Dimmock 1993), then the prime purpose of assessment is to ensure that learning has taken place. Teachers need to know what their students know and can do, in relation to target learning outcomes. They are then able to put in place a learning program that will enable students to make further progress. A further purpose of assessment is to be able to report on student competence and achievement.

Over the past ten years, with the increased focus on the importance of assessment and the advent of resources such as First Steps, the National Statements and Profiles, National Literacy Benchmarks, The Early Years, Cambourne's Frameworks, the ESL Bandscales and Scales, there has been a stronger emphasis on integrating assessment, learning and teaching. The middle years of schooling have not been so amenable to these developments.

As students make the transition from upper primary to lower secondary school, the stark differences experienced in curriculum, pedagogy and organisation carry over into the assessment regime they face. Part of the transition experience is an increase in the seriousness with which the community regards the business of schooling. The process of sifting and sorting students for further phases of education and for life beyond schools starts in earnest in early secondary school. As a consequence, the assessment policies and practices of most middle schools, and the formality and weight put on the reliability of assessments, reflect this increase in seriousness.

Adolescent learners are faced with a diet of frequent, content-focused testing within each learning area; the advent of formal 'exams' in senior schools; and a much stronger emphasis on formal expository writing. The purpose of the assessment process shifts to



a preoccupation with the allocation of grades or levels. This information often starts to count towards the ‘external’ purpose of assessment, to meet requirements for access to learning areas in senior secondary years, or for certification.

There is much more of a feeling in the middle-years context that assessment is something that is ‘done’ to students. The assessment tasks that students face are not always relevant, and the literacy demands of some assessment tasks often, unwittingly, set some students up to fail.

The principles that apply for learning and teaching and the learning emphases for adolescents need to also apply directly to assessment. The Curriculum Framework (1998, pp. 37–9) provides the following principles of assessment for Western Australian schools:

Valid	Assessment should provide valid information on the actual ideas, processes, products and values expected of students.
Educative	Assessment should make a positive contribution to student learning.
Explicit	Assessment criteria should be explicit so that the basis for judgements is clear and public.
Fair	Assessment should be demonstrably fair to all students and not discriminate on grounds that are irrelevant to the achievement of outcomes.
Comprehensive	Judgements on student progress should be based on multiple kinds and sources of evidence.

Improving the assessment regime

The regime typically encountered by adolescents in the middle years tends to be formal and does not always match well with their learning characteristics, or with the teaching and learning emphases required for this group of learners. Some ways of improving the assessment regime are described below.

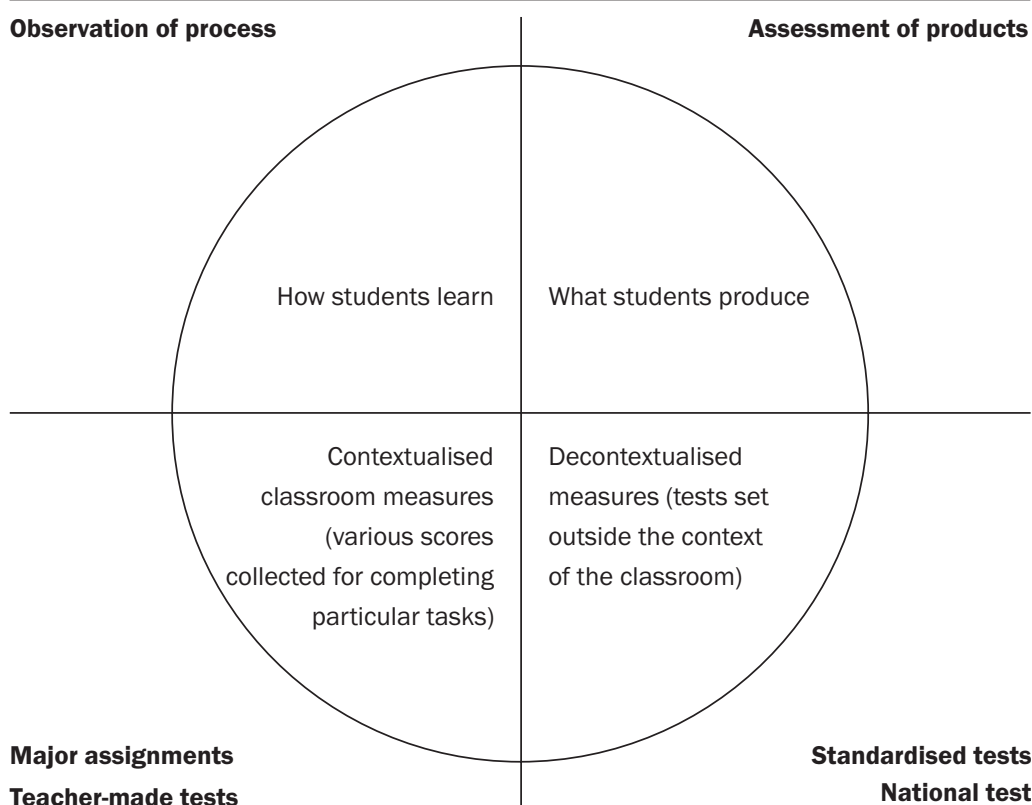
Improving the variety and range of assessments

If learning experiences are to be varied and challenging, so too must the assessment! An expanded range of broad, well-designed assessment tasks should provide opportunities for observation and assessment of performance, and the collection of hard and soft data for individual and group work. These should reflect the spread of needs and interests of students in each classroom.

Every teacher knows a great deal about their students’ learning. They gain rich information about behaviour, performance, strengths and weaknesses through ‘kid-watching’ (Goodman 1985) as they observe students working on tasks. Multiple kinds and sources of evidence can be collected that help them make judgements about students’ achievement. Judgements about how well students have demonstrated particular learning outcomes need to be based on evaluations of both processes and products, over a period

of time and in a range of different contexts. ‘On-balance’ judgements should take into account the relative weight of the evidence collected.

METHODS OF LITERACY EVALUATION



Adapted from *Evaluating Literacy – A Perspective for Change* by Robert J. Anthony, Terry D. Johnson, Norma I. Mickelson, and Alison Preece. Copyright © 1991 by Heinemann Educational Books, Inc. Published by Heinemann, Portsmouth, NH. Used by permission of the publisher.

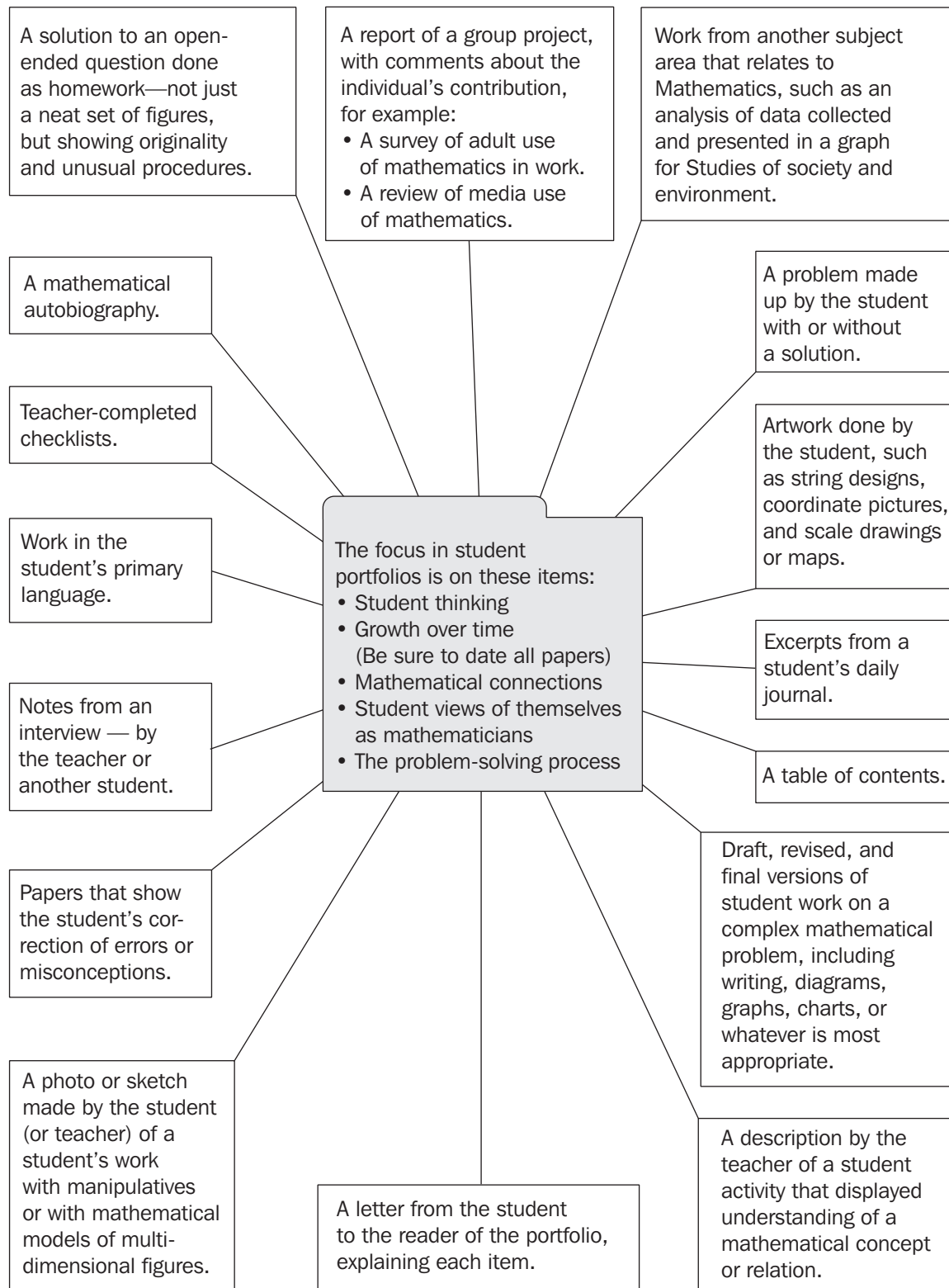
Constructing purposeful assessment

Adolescents are less accepting of the ritual of formal assessment. As a consequence, the assessment regime needs to be ongoing, and students’ learning outcomes need to be monitored in contexts that are perceived to be ‘life like’. There are multiple kinds and sources of evidence that can be used to make judgements on student achievement. The range of assessment methods teachers may use includes: student portfolios, peer assessment, student/teacher conferences, performance assessment, tests, projects, reports and assignments, open-ended assessment tasks, marking keys, progress maps, direct observation, and checklists.

Student portfolios are a collection of students’ work that connect separate items to form clearer and fuller pictures of each student as a learner. They are a valid and reliable source of evidence for making judgements about student achievement. They show students’ ability to apply their skills in a range of situations. Portfolios can be used to demonstrate evidence that incremental steps of progress are being made. They can be used in one learning area, or can include work across a range of learning areas.



INSIDE A PORTFOLIO



Source: Stenmark 1991, p. 337.

Different types of portfolios serve different purposes:

- ✱ Working portfolios contain sketches, notes, half-finished drafts and completed work. These provide an interactive context for ongoing instruction and feedback.
- ✱ Documentary portfolios contain collections of students' work assembled specifically for assessment. They contain final products of student work as well as evidence of the processes that students use to develop those products.
- ✱ Show portfolios contain selections of materials designed to reflect the best of student work. These can be used for certification, as well as classroom assessment.

Portfolio assessment is a process that provides visible evidence that students are making progress. Portfolios are particularly useful for students who need a longer time to move from one level to the next, because fine-grained evidence of achievement, including teacher observations, checklists, student drafts, journal writing examples, self- and peer-evaluation sheets, audio and video tapes of student work etc., can be included. The criteria for portfolio assessment should alter as tasks, demands and student understandings change. Purpose statements and 'road maps' or guides can lead the reader through the portfolio. Captions or statements attached to each document are also helpful, because these can describe what the document is, why it has been included, and what learning outcomes it demonstrates. They also require summaries or final reflective statements, to summarise documents in the portfolio and to articulate what has been learned.

Some of the issues related to portfolio assessment can be determined by developing a whole-school portfolio policy or statement. Some of the issues that would need to be clarified at the whole-school level would include determining:

- ✱ the purpose for implementing portfolio assessment;
- ✱ which teacher/s (or which learning area/s) will trial the use of portfolios—and over what period of time;
- ✱ how parents will be notified of the move towards portfolio assessment;
- ✱ the purpose of the portfolios;
- ✱ the range of samples within the portfolios;
- ✱ logistics related to storage;
- ✱ whether the portfolios will remain at school and be handed to students' new teacher/s each year—or whether they will be sent home at the end of each year;
- ✱ the target audience for portfolios;
- ✱ the balance between student self-selection of samples and teacher-nominated pieces;
- ✱ ways in which portfolios would be reported on;
- ✱ times when portfolios would be sent home for parental feedback;
- ✱ the importance of planning for organisational time so that students can sort, select and incorporate samples in their portfolio; and
- ✱ ways in which students who require additional support to build up their portfolio can be assisted.

Portfolios serve different purposes as students move towards becoming independent learners. Examples of such purposes are outlined in the following table.



YEAR GROUP	PURPOSE OF PORTFOLIO	AUDIENCE FOR PORTFOLIO
Years 5, 6 and 7	<ul style="list-style-type: none"> ✱ To demonstrate the learning process ✱ To develop skills of reflection and self-evaluation ✱ To encourage goal setting ✱ A means of communicating with parents ✱ To demonstrate achievement 	<p>Students</p> <p>Parents</p>
Year 8	<ul style="list-style-type: none"> ✱ To demonstrate the learning process ✱ To develop skills of reflection and self-evaluation ✱ To encourage goal setting ✱ A means of communicating with parents ✱ To demonstrate achievement 	<p>Students</p> <p>Parents</p>
Year 9	<ul style="list-style-type: none"> ✱ To demonstrate the learning process ✱ To develop skills of reflection and self-evaluation, including realistically evaluating own strengths and interests in terms of future subject and study path choices ✱ To encourage goal setting with longer term goals becoming more significant ✱ A means of communicating with parents ✱ A means of collecting documentation that will be useful in career/education placing ✱ To demonstrate achievement 	<p>Employers</p> <p>Further study</p> <p>Institutions</p> <p>Career advisers</p> <p>Students</p> <p>Parents</p>
Years 10, 11 and 12	<ul style="list-style-type: none"> ✱ A means of collecting best samples of work produced in each learning area ✱ A means of collecting documentation that will be useful in career planning and in interviews ✱ To set goals, both short and long term ✱ To facilitate reflection and self-evaluation ✱ Communication with parents ✱ A means of demonstrating achievement 	<p>Employers</p> <p>Further study</p> <p>Institutions</p> <p>Career advisers</p> <p>Students</p> <p>Parents</p>

The changing nature of the portfolio.

Teachers need to know what their students know and can do, in relation to target learning outcomes. They are then able to put in place a learning program that incorporates strategies that will enable students to make further progress.

Peer assessment encourages students to make decisions about their peers' performance, based on explicit, jointly negotiated or predetermined criteria.

Student/teacher conferences involve students and teachers in joint negotiations about performance and follow-up action.

Performance assessment focuses on students' performances or products that are used to demonstrate the degree to which students can apply and demonstrate their learning.

Tests measure a sample of student performance at a particular point in time, under standardised conditions. It is important to keep in mind that traditional testing methods are useful, but that they can be narrow in scope and do not always allow students to demonstrate a wide range of skills. They also do not always allow for different learning styles or unexpected responses.

Projects, reports and assignments encourage students to engage in in-class and/or out-of-class research activities.

Open-ended assessment tasks provide different entry points and different points of assessment integrated within the task. Teaching can be targeted at the point of need, as students can work at their own rate, and at their own level of ability. Open-ended tasks are problem-solving tasks. They provide opportunities for students to demonstrate their skills and knowledge, to utilise their different learning styles and to demonstrate different learning outcomes. They also provide opportunities for developing and refining creative thinking and problem-solving skills. Assessment criteria for open-ended tasks needs to cater for a range of levels. The criteria does not always have to be fixed in advance. Students will often demonstrate higher levels of understandings or outcomes that were not envisaged as being part of the task. These can be recorded for future reference.

Students perform better when they know and understand the criteria that will be used for assessment and evaluation. When goals and assessments are known in advance, the results reflect what students know and can do, as opposed to reflecting how well students anticipated what would be contained in the test.

Marking keys help teachers to:

- ✱ set clear guidelines;
- ✱ assess content objectives and student outcomes;
- ✱ provide detailed feedback; and
- ✱ assist students to improve on previous work.

Marking keys help students to:

- ✱ stay on task;
- ✱ know what the teacher wants; and
- ✱ improve on previous work.

Examples of marking keys are on pages 51 and 52.



MARKING KEY FOR INTERVIEWING

TOPIC: _____ DATE: _____

NAME OF INTERVIEWER: _____

NAME OF INTERVIEWEE: _____

A MATTER—4 MARKS

1. Good evidence of research displayed. _____
2. Effective open-ended questions constructed. _____
3. Questions display a good understanding of issues/topic. _____
4. Evidence of active listening. Construction of questions arising from comments made by interviewee. _____

B MANNER—4 MARKS

1. Confident manner. _____
2. Speaks clearly and audibly. _____
3. Gives appropriate body messages to interviewee. _____
4. Pace of delivery is appropriate. _____

C METHOD (STRUCTURE)—2 MARKS

1. Interview contained a clear introduction. _____
2. Questions asked in a logical order. _____

TOTAL: _____

A MATTER—4 MARKS

1. Sufficient evidence of research displayed. _____
2. Demonstrates a good understanding of topic/issues. _____
3. Ideas well supported, with appropriate examples and details. _____
4. Reasons effectively answered the questions asked. _____

B MANNER—4 MARKS

1. Answers questions confidently. _____
2. Speaks clearly and audibly. _____
3. Gives appropriate body messages to interviewee. _____
4. Pace of delivery is appropriate. _____

C METHOD (STRUCTURE)—2 MARKS

1. Answers ordered in a logical fashion. _____
2. Answers kept to the point, with the most important ideas addressed. _____

TOTAL: _____

ADJUDICATOR: _____

MARKING KEY FOR DEBATING IN SCIENCE

YEAR: _____

CLASS: _____

TOPIC: _____

DATE: _____

NAMES: _____

	AFFIRMATIVE									NEGATIVE								
	1 ST			2 ND			3 RD			1 ST			2 ND			3 RD		
	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
MATTER—8 MARKS 1. The arguments used would appeal to the average, reasonable person. 2. A thorough understanding of the topic was displayed. 3. Arguments were well developed and supported with appropriate examples. 4. 1st speakers: Topic was clearly defined. Other speakers: Opposition's arguments were effectively refuted.																		
MANNER—8 MARKS 1. Speaker was clearly heard. 2. Good eye contact with audience was maintained (palm cards were unobtrusive). 3. Pace of delivery was effective. 4. Speaker's manner was confident and persuasive.																		
METHOD (STRUCTURE)—4 MARKS 1. Speech was clearly organised into a beginning, a well-developed middle and an end. 2. Good use was made of time allocation. 3. Showed evidence of the roles of different speakers (bonus mark).																		
INDIVIDUAL'S TOTAL (20)																		
TOTAL TEAM POINTS (60)																		



Students follow unique patterns of growth in any area of learning. Although these patterns are not age related, generalisations can be drawn from them and milestones can be observed and recorded on a **progress map**. Continuums of development, outcome statement levels and ESL Bandscales are all examples of progress maps. Most progress maps describe behaviours at various stages and incorporate a combination of descriptions of student learning and student work samples.

Some progress maps, such as outcome statements, reflect 'big picture' or global descriptions intended for systemic, summative judgements. Others, such as the First Steps developmental continuum, use fine-grained descriptions, which can be useful for diagnostic purposes. Some students take a long time to move across large, significant outcome levels, and therefore teachers might prefer to use finer-grained information to indicate that small, incremental steps of progress are being made towards outcome levels.

Spelling: Developmental Continuum / Individual Student Profile

Indicators For Spelling Developmental Continuum

Teachers can identify a child's phase of development by observing that the child is exhibiting all the key indicators of a phase. It should be noted however, that most children will also display indicators from other phases.

<p>Phase 2: Semi-Phonetic Spelling In this phase children show developing understanding of sound-symbol relationships. Their spelling attempts show some evidence of sound-symbol correspondence.</p>	<p>Phase 3: Phonetic Spelling In this phase writers are able to provide an almost perfect match between the sound and the letters. Letters are chosen on the basis of sound without regard for conventional letter patterns. Words are meaningful.</p>	<p>Phase 4: Transitional Spelling (from sounds to structures) In this phase writers are moving away from heavy reliance on the phonetic strategy towards the use of visual and meaning-based strategies. They may still have difficulty recognising if a word is spelled correctly but will be able to proof their known bank of words.</p>
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LEVEL 4 Speaking and Listening

Level 3 outcomes:

3.1 Interacts for specific purposes with people in the classroom and school community using a small range of text types.

3.2 Recognises that certain types of spoken texts are associated with particular contexts and purposes.

3.3 Usually uses linguistic structures and features of spoken language appropriately for expressing and interpreting ideas and information.

3.4 Reflects on own approach to communication and the ways in which others interact.

Texts

At level 4, a student:

4.1 Interacts confidently with others in a variety of situations to develop and present familiar ideas, events and information.

Evident when students, for example:

- Present a strong point of view to friends in a group, offering some considered reasons or arguments.
- Listen attentively and respond constructively to other points of view in group and class discussions.
- Rehearse and tell a story to peers or younger children, using approaches that attempt to engage listeners.
- Prepare and present to the class a detailed account on a known topic, showing attention to quality of content, organisation and method of presentation.
- Prepare and present accurate summaries of decisions reached in group activities (the decisions the group was in favour of and the reasons for them).
- Prepare a short set of questions for an interview seeking information about an issue or topic.
- Offer explanations or lodge complaints which include one or two reasoned arguments.
- Listen and respond to short presentations or arguments that offer alternative viewpoints on a familiar issue (challenge or comment on a point made).
- Identify the main idea and supporting details of a spoken report and summarise it for others (presentations by peers or guest speakers on environmental issues, a current affairs report).

Contextual understanding

At level 4, a student:

4.2 Considers aspects of context, purpose and audience when speaking and listening in familiar situations.

Evident when students, for example:

- Select a suitable text type according to purpose for speaking.
- Recognise and discuss ways that physical conventions are used and understood differently in different socio-cultural contexts (that acceptable distance from others varies according to cultural factors; that eye contact may be regarded as aggressive, insolent or desirable according to context).
- Discuss situations where slang and colloquial language might be considered suitable or unsuitable (at a formal school event or in the news on radio or television).
- Consider when an audience is most likely to expect standard Australian English and discuss reasons.
- Recognise and discuss some indicators of socio-cultural bias or prejudice in spoken texts (a speaker's use of discriminatory language).
- Consider the needs of a familiar audience when preparing a spoken presentation (predict likely questions and prepare answers).

Reading

Students read a wide range of texts with purpose, understanding and critical awareness.

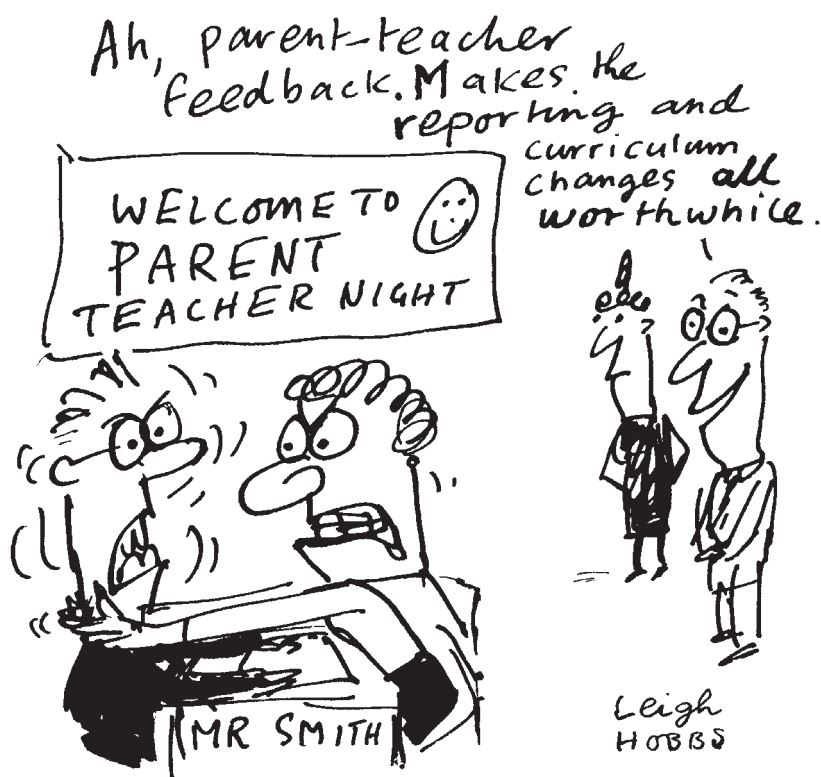
The student:

R	1	Responds to texts by demonstrating attending behaviours, recognising common elements and using strategies to access content in printed texts.
R	2	Engages in reading-like behaviour and demonstrates understanding that written symbols and illustrations convey information.
R	3	Uses basic strategies to locate, select and read a range of simple texts; recalls and discusses significant ideas from texts; and understands that people write about real and imagined experiences.
R	4	Integrates a range of strategies to interpret and discuss relationships between ideas, information and events in written texts; identifies and uses language structures; and recognises and discusses the use of symbols and stereotypes to make meaning.
R	5	Understands how language structures work to shape meaning; explains possible reasons for varying interpretations; and justifies own interpretation of ideas, information and events in texts.
R	6	Discusses and compares texts to examine issues, ideas and effects; pays attention to synthesising information from different sources to construct reasoned responses; and recognises that texts are constructed for particular audiences and purposes.
R	7	Draws on a repertoire of strategies, including knowledge of sociocultural contexts, to maintain understanding while reading, comparing and evaluating different texts containing complex issues.
R	8	Reads critically and discusses a wide range of complex texts, selects substantial evidence to justify own interpretations of those texts and identifies ways in which text structure can influence a reader's reactions.
R	9	Reads critically and reflects on all kinds of texts; lucidly conveys ideas about texts in a compelling way; and relates specific issues and ideas in texts to wider social issues and to personal experience.

Examples of progress maps.

Direct observation is useful when students are actively engaged in a performance, production, presentation or process. Observational information can be recorded on informal running records or a retrieval chart or against a predetermined checklist of criteria.

Checklists make it easy for teachers to identify whether or not students are able to demonstrate particular learning outcomes. They can be prepared in advance, and should identify a clear set of criteria that both teacher and students can refer to. The criteria can be jointly negotiated. Each time a targeted skill is observed, the appropriate criteria is marked. Space should be allocated for writing informal comments alongside students' names. It is important to be unobtrusive whilst observing students and/or small groups as they work, and to allow time between observations to make notes and synthesise the information. The checklists should be kept, as they are a valuable resource for informing learning programs, when talking to parents, and when writing reports on individual students.



The following checklists provide an opportunity to note students' co-operative learning skills, as well as their skills and understanding in a particular learning area.



CHECKLIST FOR THE OBSERVATION OF SMALL-GROUP WORK

Names of group members	Group processes			Subject understandings		
	Ask to clarify/ obtain further info.	Explain individual feelings/ideas	Interrupt/ argue politely	Knows how energy is transferred in an energy interaction	Can explain how factors affecting friction can influence design	Can explain at a particle level, interactions of energy in energy transfer systems
Matt S.	✓✓	✓✓✓	✓✓✓✓	✓✓✓		✓✓
Sarah		✓✓	✓✓	✓✓	✓	✓✓
Phuong	✓	✓✓✓	✓	✓✓	✓	✓✓
John	✓	✓✓✓	✓✓	✓✓	✓	✓✓

SMALL-GROUP OBSERVATION IN SCIENCE

TOPIC: _____ CLASS: _____

YEAR: _____ DATE: _____

TASK: Vocabulary in Context

The students were able to:	George	Heidi	Lin	Scott	Wendy	Maria	Xiangyi	Eddie
1. Scan the text effectively	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
2. Read around the words in order to find clues for their meaning	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
3. Identify and transfer words to the Vocabulary in Context sheet	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
4. Transfer the meaning into their own words	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
5. Justify their interpretation of the meaning	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

Discriminating tools that provide diagnostic information

Often the things missing are the techniques and tools to assist with ‘kid watching’. A range is provided in the following table.

Techniques and tools	Examples					
1. Student evaluation —a valid and valuable source of information that takes into account students’ perspectives on a task or process, what they understand and what confuses them. May take the form of a checklist, oral reflection, reflective journal writing or a conference log recording a student/ teacher interview.	<i>‘I can’t understand this book; it’s too hard ...’</i> <i>‘I know how to write topic sentences but I still don’t know how to develop and support my ideas.’</i>					
2. Peer evaluation —students can be trained to evaluate their peers effectively against specific criteria.	<i>‘The ideas in your essay are clearly organised but your essay ends too suddenly.’</i>					
3. Teacher jottings —about students’ learning behaviour and understandings.	<i>‘Trevor seems to have difficulty answering inferential questions.’</i>					
4. ‘On balance’ judgements —a weighing up of students’ products and processes (completed over time and in a variety of contexts). Students’ outcomes are measured against a continuum or sequence of outcomes.	A sequence of student outcomes:	Level One _____ _____ _____	Level Two _____ _____ _____	Level Three _____ _____ _____	Level Four _____ _____ _____	Level Five _____ _____ _____
5. Criteria checklists —a planned observation record of achievement of specific criteria. The teacher records observed student outcomes.	Criteria to be observed: 1. _____ 2. _____ 3. _____ 4. _____		May ✓ ✓ × ✓	Joe ✓ ✓ ✓ ✓	Tom × × × ✓	Bev ✓ ✓ ✓ ✓
6. Anecdotal information —incidental information that the teacher mentally notes, for example, noting the quality of the questions students ask. Contributes to a balanced picture of achievement.	<i>‘Vivian takes an awfully long time to find what she’s looking for in the library. I must ask her what strategies she uses for accessing information.’</i>					
7. Parent input —information that is observed in settings outside of school. Parents complete response sheets or provide anecdotal reference in homework diary.	<i>Joseph had a lot of trouble with that assignment. He said he didn’t know where to start.’</i>					
8. Portfolio —a collection of meaningful pieces of information that shows student achievement of processes and products over time. Contains relevant information using all of the above strategies for collecting information. Is referred to occasionally in order to make ‘on balance’ judgements.	<i>‘When viewing this semester’s work samples, self-evaluation sheets, teacher jottings and criteria checklists, it’s easy to see that Chris has significantly developed his skills in organising and developing ideas in writing.’</i>					



Involving the learner

Adolescents are conceptually more sophisticated and are beginning to move towards becoming mature learners. If they are given opportunities to jointly negotiate clear criteria in advance and know what they are supposed to be learning, they do not have to guess what is in the teacher's head. Students can be encouraged to take ownership and control of their learning through self- and peer-assessment activities. Useful tools that involve the learner include self-evaluation sheets, marking keys, reflective journal writing, portfolio assessment and peer assessment.

Central to the task of improving assessment is the collection of baseline data, through the use of potent assessment tools (both qualitative and quantitative) that provide a rich source of diagnostic information. These can be used for a variety of purposes. Data collected at the school level provides a broad picture of the range of ability across the school. Data collected in the classroom provides an in-depth picture of what is happening in every classroom and in every learning area. The analysis of such data identifies strengths and weaknesses and indicates where strategies need to be put in place to ensure improvement. As problem areas are targeted, further data collections will indicate whether or not these various strategies are working. Ongoing assessment and monitoring processes enable teachers to continue to gather and compare information about the level of students' understandings and their learning skills, and provides accurate information for evaluation purposes.

TRY THIS

Making sure they're learning

- ✱ Use learning tools such as journals and portfolios to gain an on-going profile of what students are/are not learning.
- ✱ Use 'stick-its' to jot down comments whilst observing students working. Attach these to their work—always write comments in positive terms.
- ✱ Display the appropriate progress maps in the classroom for reference when discussing students' progress. Induct students into the progress map employed.
- ✱ Compile a 'bank' of checklists/matrixes that can be used to gather information about students' processes and products.
- ✱ Train students in peer- and self-assessment practices and give them plenty of opportunities to practise them.

SUMMARY

This chapter has described adolescence as a period between childhood and maturity—a time when teenagers live in the netherworld of being a delightful child one moment and a mature adult the next. It has described the characteristics that make adolescent learners different to other students at other stages of learning. It has outlined different learning principles and highlighted a specific set of learning emphases (the 5Ms) that have particular significance for adolescent learners. This group need to feel good about themselves as learners. They need to work in a safe environment where they can learn from their mistakes. The quality of teachers' expectations and interactions has a huge impact on students' self-esteem, the quality of their work and their school achievement.

The chapter has described the importance of linking to, recruiting, building on and extending students' existing knowledge. It emphasised the fact that adolescent learners love to be actively engaged in a purposeful, motivating and relevant curriculum, and that they all need varying degrees of support to make progress with their learning. It has highlighted the fact that if learning experiences are to be varied and challenging, so too must be the assessment regime!



Literacy for adolescents means that nothing should be taken for granted. Yet it is often the case in middle and secondary schools that nearly everything related to literacy learning is taken for granted. It cannot be assumed that all students come to secondary school being able to write and read competently and that they share the same passion for subject matter as their teachers. In the secondary context, students face greater

exposure to informational texts and these texts can have readability levels beyond that of many students. It can be quite common to find students in the one class working with a specified textbook, even though it might be unsuitable for a number of them.

LITERACY IS THE KEY

Schools have always played a crucial role in determining life opportunities and providing access to language and literacy practices that are considered to be important in society. Those people who have the ability to use language appropriately in a range of contexts and for a variety of purposes, are said to have acquired ‘cultural capital’, which allows them access to a greater number of life choices.

School literacy means being able to engage effectively in the language practices reinforced and valued in the school context. It also means being able to make meaning of what students encounter in the various learning areas. Language and literacy are linked, and are an integral part of this making and sharing of learning-area-specific meaning. Teachers and learners use language in the social context of the classroom to make and negotiate meaning, and therefore literacy and language underpins all school learning. Students demonstrate their learning, as well as their command of a number of learning-area languages, through the literacy skills of listening, speaking, reading, writing, viewing and critical thinking. Literacy skills are therefore a tool for learning, as well as an indicator of success at school.

CURRICULUM STANDARDS: LITERACY REQUIREMENTS

Most school systems have established achievement standards to measure student progress in each learning or learning area. The standards or outcomes are contained in syllabuses or courses, in curriculum framework statements or progress maps published by curriculum accrediting agencies or state education departments. References to literacy are often threaded through the descriptions in each of the learning areas and accompanied by statements that literacy skills need to be developed across the curriculum. Terms such as ‘read and write ... in ...’ or ‘communicate effectively in ...’ are part of the descriptions of standards in all learning areas.

There are also specific descriptions of literacy requirements for adolescent learners emerging in the form of national- or state-level benchmarks. These are by no means without contention. Debates continue over the definition of literacy, the richness or breadth of the descriptions inherent in the benchmarks, the process through which they are being developed and the uses to which they can be put.

Most of the development has concentrated on the early primary years of schooling. Whether there are detailed, specific literacy requirements for adolescents or not, what is contained directly or indirectly in prescribed ‘standards’ or ‘outcomes’ emphasises the increasing sophistication required of students in the production of and response to texts. Typically, the requirements make reference to the need for adolescent students to be able to:



- ✱ employ a variety of techniques or strategies;
- ✱ use technical terms appropriately;
- ✱ exhibit control over the use of conventions;
- ✱ choose from a variety of devices to shape text for different audiences;
- ✱ demonstrate critical awareness of how texts are constructed; and
- ✱ access curriculum literacies.

The common theme is for adolescents to be well on the way towards achieving literacy-related outcomes expected of mature learners.

THE CHANGING NATURE OF LITERACY

Literacy is not static. It can look different across workplaces, homes and across schools, because different cultures and contexts require, reinforce and promote literacies that are valued in their community.

From a single literacy to multiliteracies

Our understandings about what it means to be literate change as society changes. In the past, it was possible to participate effectively in society using only functional literacy skills (such as correct paragraphing, spelling, sentence structure and grammar). These skills are still vitally important today, but effective participation in society today also requires knowledge of how to understand and apply a range of literacies, including critical, creative, technological, visual, cultural and multiliteracies.

New technologies have rapidly changed our understandings of literacy and the ways we use language. Adolescent learners are becoming more proficient at handling, locating, analysing, extracting, storing and using increasing amounts of information. They are having to understand and apply a much wider range of literacy skills than their earlier counterparts, for a wider variety of purposes. As new methods of communication emerge, they will continue to develop new ways of accessing, using and combining information into different types of texts.

In the future, adolescents will have to learn to become readers, writers and users of new computer-based media and multimedia genres that combine visuals, sound and words in non-linear patterns with graphics, images and video. They will be required to think, design texts and solve problems in new ways, as they ‘use, browse and co-author the text’ (Snyder 1996, p. 73). Students are already familiar with the Web and email, digital cameras, CD-ROMs, laptop computers and multimedia texts and they are able to ‘surf across television channels, amble along electronic mailboxes; browse through the Internet, or “club” around with bulletin board pals’ (Luke 1995, p. 17).

The New London Group (1996) suggests that a multiplicity of literacies (or multiliteracies) will be used in the future. This term incorporates cultural, as well as visual, audio, spatial, behavioural and multimodal methods of communication that will result from rapid technological advances, at a global level.



As we create new ways of communicating with one another, we develop new genres of written language that need to be read in new ways. We gain the possibility of combining the written word with graphic animation, sound and video in new multimedia genres. The lives of this generation and the next will be profoundly changed by these new computer-based media, genres or texts. (Lemke 1994)

Technology is moving forwards at a rapid rate, and has had a profound impact on the way teachers and schools operate. In some classrooms, there is already a widening gulf between teachers' and students' experiences with technology. Some teachers feel threatened by the fact that they do not have the same expertise as their students, and claim that they are faced with 'aliens in the classroom'. As learning technologies become common-place, it is likely that teachers without some degree of expertise will feel like the 'aliens in the classroom' (Bigum & Green 1993a).

As with any tool for learning, students need exposure to, and opportunities to practise, using different technologies. They need to be able to decide whether or not the technology will help them achieve their purpose, whether or not it is appropriate for their needs and whether or not it will be available at the time when it is needed. A key skill of learning is being able to select the most appropriate technology to fulfil a particular task. Initially, it might be useful to suggest two to three options for presenting work, until students are able to confidently make appropriate choices.

It is important to remember that new technologies support learning and teaching. Teachers will be required to learn and teach the different features as well as the ways different technologies can be used, but they will still draw on their pedagogical beliefs to inform their decisions. 'Computers must be placed within a sound framework of what we believe education to be and how we believe it should be done' (Spencer 2000).

Already many students are experienced and confident users of new genres created by new technologies. The notion of a community of learners becomes a reality when students and teachers share and pool their expertise and knowledge.

From functional to critical literacy

It is imperative that students gain mastery over language. They must be able to communicate effectively with others, using universally accepted conventions. Functional literacy is therefore not an option. It is non-negotiable. However, as adolescents move towards adulthood, they will need much more than the basic learning tools to enable them to make progress outside school. Today's curriculum has to work not only in the present but for the future and therefore teachers and schools cannot concentrate solely on functional literacy. They cannot forget about computer, visual, critical, cultural and all the other multiliteracies that students are already starting to face now and will increasingly face in the future.

Much of the information that adolescents access from texts, the Internet and television is unmediated. As students engage with these new forms of literacy, they will also need to be equipped with skills that they can use to analyse the validity and source of information.



Critical literacy approaches recognise that meaning is not fixed in, or by, texts, and that it is possible to have multiple, optional and contradictory interpretations of the one text. They also recognise that texts, as ‘versions of reality’, carry values associated with power, gender and race, and that they shape the way in which students construct their world.

It is becoming increasingly important that students know how texts work, how they situate and manipulate readers and how they position them to read or interpret situations in particular ways. The types of questions they need to ask include:

- ✱ Who is the author of this text?
- ✱ Why was it written?
- ✱ What is its message?
- ✱ What version of reality does this present?
- ✱ Whose interests are served by this message?
- ✱ Whose interests are not served by this message?
- ✱ Is anyone likely to be marginalised by this text?
- ✱ What are the gaps and silences?
- ✱ Does the message reflect my thinking? What is missing? What needs to be added?

Without the tools to carry out this type of critical analysis, students are unable to determine the values that are implicit (or explicit) in texts, and are left vulnerable to manipulation.

There is a fine line, then, in balancing the need to teach the fundamental basics of language (functional literacy), with the need to attend to the other literacies that also need to be mastered. All of these literacies are important, because they reflect the reality of the world today, as well as the world of tomorrow.

The hectic and rapid changes occurring in society today are not going to disappear, and our understandings about literacy will continue to evolve as society changes. It is difficult to predict the kinds of literacies that will be valued in the future, but there is no doubt that language and literacy will continue to be a key requirement for successful participation in future society. Those who cannot master the use of language will be disempowered.

Getting the balance right between functional literacy and multiliteracies is therefore important. And getting the balance right will continue to be an ongoing challenge for teachers and schools. Literacy is the lynchpin that gives adolescents the confidence to move into upper school, or out into the adult world.

FOCUSING ON SUPPORT AT THE SCHOOL LEVEL

Mastering school literacies means mastering curriculum literacies. In each learning area, literacy involves learning to use its specialised language, its distinctive vocabulary, as well as its symbolic, graphic, pictorial and diagrammatic representations. Teachers and learners use language to make and negotiate meaning of learning-area-specific content in the social context of the classroom. Together they use language to read, write and talk about learning-area-specific content. What students read and write about, what they say,

and how they say it, is unique to the particular context of the learning area. Literacy is therefore not something added on, or treated separately within a learning area. It is the vehicle for communicating and understanding learning-area-specific content.

Attending to literacy and mastering learning-area content are therefore two sides of the same coin. Students need support to be able to understand and effectively use the specific language of different learning areas. When students' literacy skills are improved they process information more effectively, they have greater understandings about learning-area-specific content, and their learning outcomes are improved.

ESTABLISHING A WHOLE-SCHOOL APPROACH

A whole-school approach to literacy ensures that the breadth of achievement within the school is recognised, and that consistency and continuity is demonstrated in teaching, learning and assessment practices across all classrooms. A whole-school literacy policy enables all teachers to come to common understandings about literacy, and to articulate a set of values about literacy that all teachers support.

As part of the literacy policy, many schools implement a whole-school literacy audit. Teachers collect, collate and analyse qualitative/quantitative data about students' literacy levels from all learning areas and various sources across the school. They seek out data where gaps in information are detected. Schools may decide to conduct a whole-school testing program, to provide baseline information about students' skills.

Debates about issues related to the use of teacher judgements or test results can be avoided if the best aspects of both approaches are implemented. Teacher judgements, based on detailed knowledge of the students over time and over a variety of situations, clearly have more validity than a one-off test, which is probably only partially relevant. But these take time, can be hard to collate, and may lack a common standard.

The ongoing collection and analysis of data highlights areas that need to be addressed. Teachers can be informed of the findings of the whole-school audit and can vote for a whole-school literacy priority that will be addressed by all teachers, in all learning areas.

Once a literacy priority has been determined, learning areas need to collaboratively develop an action plan that targets the area of need. The plan would need to identify the amount of support that team members might need to tackle the literacy priority. It would also need to include target outcomes, related strategies, resource/role allocations, timelines and a set of criteria for determining success.

The literacy leader and/or members of the literacy committee have an important role to play in a whole-school approach. They have the expertise to discuss, explain and model ways in which particular literacy strategies can be incorporated within learning-area-specific content, as well as strategies that will effectively target the whole-school literacy priority. This can be done at the classroom, learning-area or whole-school level. When teachers share common understandings about students' needs and about the effectiveness of particular literacy and learning strategies, they are able to work together to effect improvement.



CLASS BREAKDOWN

Year	Teacher/ No. of students	Low scores		Total	High scores		Total
		Reading	Writing		Reading	Writing	
		TORCH Stanine 3 ↓	TAWÉ Less than 15/30		TORCH Stanine 8/9	TAWÉ Less than 27–30	
A Team							
7	A 1 31	1	5		20	0	
7	A 2 31	1	6		18	3	
7	A 3 31	5	7		8	1	
8	A 4 27	5	2		7	7	
8	A 5 30	3	2		15	5	
8	A 6 29	1	4		12	0	
	179	16	26	42	80	16	96
B Team							
8	B 1 31	-	2		8	1	
8	B 2 28	1	4		7	0	
7	B 3 27	2	12		10	1	
7	B 4 31	2	5		14	0	
8	B 5 29	2	4		18	2	
8	B 6 22	2	4		8	1	
	168	9	31	40	65	5	70
C Team							
8	C 1 30	2	2		13	3	
8	C 2 30	4	2		8	1	
7	C 3 30	7	5		11	2	
7	C 4 30	6	6		7	0	
7	C 5 30	2	8		15	1	
ESU	C 6 8	5	8		0	0	
	158	26	31	57	54	7	61
D Team							
8	D 1 29	3	5		9	1	
8	D 2 28	1	10		11	1	
7	D 3 32	7	11		7	2	
7	D 4 31	6	10		7	0	
7	D 5 29	6	9		9	2	
STAR	D 6 9	5	9		0	0	
	158	28	54	82	43	6	49
E Team							
9	E 1 29	3	0		10	6	
9	E 2 28	4	2		11	9	
9	E 3 32	2	1		16	18	
9	E 4 31	8	2		8	10	
9	E 5 29	3	1		13	9	
	147	20	6	26	58	52	110
F Team							
9	F 1 31	3	1		7	4	
9	F 2 31	4	0		11	3	
9	F 3 31	3	3		3	4	
9	F 4 30	2	5		10	4	
	123	12	9	21	31	15	46

Notes:

The TAWÉ (Test of Ability in Written Expression) test is an informal, criterion-based test. Students are asked to write a narrative based on a stimulus picture. The test assesses aspects of writing such as grammar, use of conventions and structure. The degree of ability

within each aspect is rated on a scale of 0–2.

The TORCH test is a formal, standardised test of reading comprehension ability based on the student completing a cloze procedure retelling of a graded text.

WHOLE-SCHOOL LITERACY FOCUS:**STUDENTS WILL DEVELOP ACTIVE AND ATTENTIVE LISTENING SKILLS.**

Today you will receive (personally or through your Literacy and Learning Committee member) the data collection pro forma for monitoring listening skills in your classroom.

The pro forma has been divided into the three categories that teachers identified earlier in the term as being of concern:

- *listening for instructions;*
- *listening manners (individually, in small groups, and in the classroom);*
- *listening for main ideas (supporting details, translating information etc.).*

Please select two students (one lower ability/one average ability) from your class. (Student 1=lower ability. Student 2=average ability).

The pro forma is double sided (one page per student).

Write the number (i.e. 1 or 2—see code above) and the student's name in the space allocated at the top of one of the two pages, and complete the other relevant details in the top section of the page.

Reflect on any checklists/anecdotal information of listening behaviour (etc.) that you have collected over the past weeks; in-class observations you have made; outcome levels you might have previously placed them on; and then read the outcome pointers on the pro forma.

After reflection, please use your professional judgement to tick off the appropriate pointers achieved by the student for each category.

On the right-hand side (in the margin) please write your 'on balance' judgement (a summary) of the student's level for each category (i.e. three levels should be recorded in the margin).

Your completed pro forma can then be handed to your Team Literacy and Learning Committee member, who will photocopy all team pro formas. Originals will be returned. Committee members will collate, analyse, record and report back the whole-school picture at a team meeting. We hope to be able to collect all pro formas by Monday/ Tuesday afternoon. *We are grateful for your co-operation...*

Example of monitoring process. (Source: Ballajura Community College 1997)

Literacy teachers and/or members of the Literacy Committee are also well placed to be able to collaboratively develop a set of criteria that can be used as a monitoring tool for the literacy priority, and to co-ordinate the collection and analysis of data. The ongoing assessment and monitoring of data indicates when the combined efforts of all teachers are making a difference.



SUPPORTING LEARNING

Teachers are responsible for attending to the learning needs of all students. This is not an easy task when there can be wide gaps of ability within each classroom. It is not practical to attempt to provide a different learning program for every student in every class, but it is also not beneficial to simply ‘teach to the middle of the class’ and hope for the best!

The needs of adolescent learners can be met through combinations of whole-class teaching, small-group work and individual tuition. New topics, concepts or skills can be introduced at the whole-class level, and individuals or small groups can then work on activities related to the whole-class activity. The teacher is freed up to work on the skills of one or a number of individuals/groups. At the end of the lesson/topic/program, sharing of understandings, reflections or summaries can be carried out at the whole-class level.

While some students will manage to make progress with their learning with a modicum of assistance, others will need more targeted support. Maintaining consistent, quality support can be difficult in the middle- and secondary-school context because of frequent changes of teachers and learning areas. Despite the best efforts of teachers and schools, a significant number of students continue to fall through the net.

The majority of schools provide support at a variety of levels.

Support through the withdrawal of students

Some schools use withdrawal classes. Students at educational risk are withdrawn from class to work (individually, or within a small group), with a support teacher. Research tends not to recommend withdrawal models, because of the ‘modelling’ benefits that occur in the mainstream classroom and because of the negative labelling that is often attached to withdrawal. English as a Second Language (ESL) and English as a Second Dialect (ESD) students, in particular, need to be exposed to constant modelling of the target language. ESD is a non-standard dialect of English learned and spoken at home. It is systematically different to Standard English, the dialect of instruction used in schools and textbooks.

Withdrawal groups are most effective when they are conducted for short periods of time, for specific purposes, and when learning progress is carefully monitored. There is a danger that gaps in learning will widen if withdrawal activities are unrelated to the regular curriculum, and therefore the reason for withdrawal (i.e. to improve learning outcomes) can be defeated. ‘Let me get this straight. We’re behind the rest of the class and we’re going to catch up to them by going slower than they are?’ (Bart Simpson 1996)

Common sense, however, needs to be applied to each situation. Little is gained if these learners remain in the mainstream classroom and their needs are ignored. Nor is anything gained if they consistently receive little or no explicit literacy instruction across classes. Some students will no doubt pick up literacy skills through osmosis, or learn them ‘on the job’. A significant majority, however, will continue to fall through the net.

The aim of any intervention program is to improve learning outcomes. Withdrawal programs are not all ineffective. Gifted and talented students are often withdrawn so that they can work with students who share similar abilities and interests. Students at educational risk also benefit from participating in short-term special projects that enable them to work with their peers, and which enhance their self-esteem. There is no joy in continually failing in the mainstream classroom!

CRITERIA FOR WITHDRAWAL CLASSES PROGRAMS

- Short timeframe
- Targeted outcomes or goals
- Ongoing monitoring of progress throughout the program, with pathways modified according to need
- Adequate resources, funding, time texts, materials etc.
- Students wanting to be involved
- Parental permission
- Sanctioning from the rest of school staff—or students' mainstream teachers
- Journal writing incorporated
- Utilise learning technologies (digital and video recorders, PowerPoint presentations, email, the Internet etc.)
- Link to the content being introduced in the mainstream classroom
- Identify concepts, skills and understandings to be mastered
- Ensure that the program is interesting enough for other students to be envious (this tends to raise students' self-esteem)
- Back into the mainstream classroom after the learning program

Programs that enable students at educational risk to engage in carefully planned, rewarding language experience activities can be extremely beneficial. They need, however, to be short, motivational and targeted. Specific outcomes and a set of criteria should be determined in advance and data needs to be collected at regular intervals, so that progress can be monitored closely. Ongoing, explicit feedback is very important and extremely potent. It helps students understand what they have done well, and what they need to do next, in order to make further progress. When students can demonstrate that they have achieved the target outcome/s, they can move on.



The literacy support/team teacher model

In some schools, students at educational risk move from class to class. A literacy support teacher might occasionally support the mainstream teacher. Variations of team teaching might occur, and the support teacher might take a whole class, small group or individual through aspects of literacy while the regular teacher focuses on the content.

Alternatively, the support teacher might take the class while the regular teacher moves around, teaching at the point of need. They plan the learning program together. They are a team.

Generally speaking, little explicit teaching of literacy occurs once the support of the literacy teacher is removed, because mainstream teachers may not have the knowledge and training to support students who are encountering difficulty. This means that the number of students at risk status is likely to increase. A worse case scenario happens when an at-risk student moves across classrooms, with no teacher having the skills to cater for his or her learning needs.

Too often, mainstream teachers remain disempowered because they lack the skills or confidence to know what to do.

The English department/literacy teacher support model

Many secondary-school support models promote a model of literacy support where one or two literacy or ESL teachers, or members of the English department, take on the responsibility of monitoring literacy across the school. The roles of these teachers are vital, because they are able to support other teachers to identify literacy demands and can suggest appropriate strategies. However, it is difficult for one or two people (or several members of one learning area) to be stretched adequately across the school so that every student at educational risk, ESL/ESD or gifted and talented students, or, for that matter, every teacher needing assistance gets the help they need. English teachers, too, have a large amount of content that they are expected to 'cover', like all other teachers, and it can be unrealistic to add the monumental task of supporting all other teachers with the task of monitoring student literacy in all learning areas.

It is also unrealistic to expect that skills learned in one forty- or fifty-minute English period will be automatically transferred to other learning areas, because each learning area uses language differently, and for different purposes. A focus in one area of the curriculum does not necessarily support the successful and independent application of literacy skills across all learning areas.

When schools rely exclusively on the literacy support teacher or English department model, mainstream classroom teachers also get a very clear message that literacy is something that 'others' do, that it is hard, that it is something only 'experts' can take on board, that it is not their responsibility to teach literacy, and that literacy is something that can be 'fixed' in fifty minutes. They become dependent on other people to improve their students' literacy skills. Many believe that if the literacy support teacher is working

with their students then their students' literacy problems are being adequately catered for and little else needs to be done. With training, though, all teachers could develop the skills required to support students' learning. The skills are not difficult to learn.

The sharing of responsibility model

Literacy skills need to be worked at consistently. Spasmodic campaigns for literacy improvement tend to be ineffective in the long term. What is needed is a sustained and consistent approach to literacy. Many schools have found that sharing responsibility for literacy amongst teachers (at the learning-area, year-group or whole-school level) makes the task of literacy improvement much easier. Whilst the work completed in each learning area might be different, common aspects of literacy (spelling/grammar, paragraphing, writing, written and oral genres, note-making skills and research processes) can be taught explicitly, reinforced and monitored by teachers in different learning areas. When teachers work towards common goals for literacy improvement, students' literacy skills tend to improve in all learning areas.

Whole-school or learning-area models for literacy improvement have many benefits. Firstly, energy is harnessed towards the one direction and funding can be put aside for resources linked to improvement. Students get plenty of opportunities to practise, develop, refine and consolidate their literacy skills in the context of different-learning-area content, by the teachers who know the language of their learning area better than anyone else. This does not necessarily mean that all teachers need to become literacy teachers, rather than learning-area teachers. It does mean, though, that they need to become familiar with a wide range of strategies that can be used to help them support students as they tackle the literacy demands of the learning area. Some examples of these strategies include:

- ✱ *card clusters*, to organise single ideas into categories (i.e. climatic regions, fashion trends, animal species, relationships between arithmetic, algebra and geometry etc.);
- ✱ *dictogloss*, to consolidate the main ideas of a lesson or topic;
- ✱ *writing and note-making frameworks*, to provide organisational support;
- ✱ *summarising sheets*, to collect key words and phrases; and
- ✱ *structured overviews*, for planning purposes.



CARD CLUSTER

Implementation

Instructions

- One idea per card
- A single word or phrase
- Students write clearly (large)

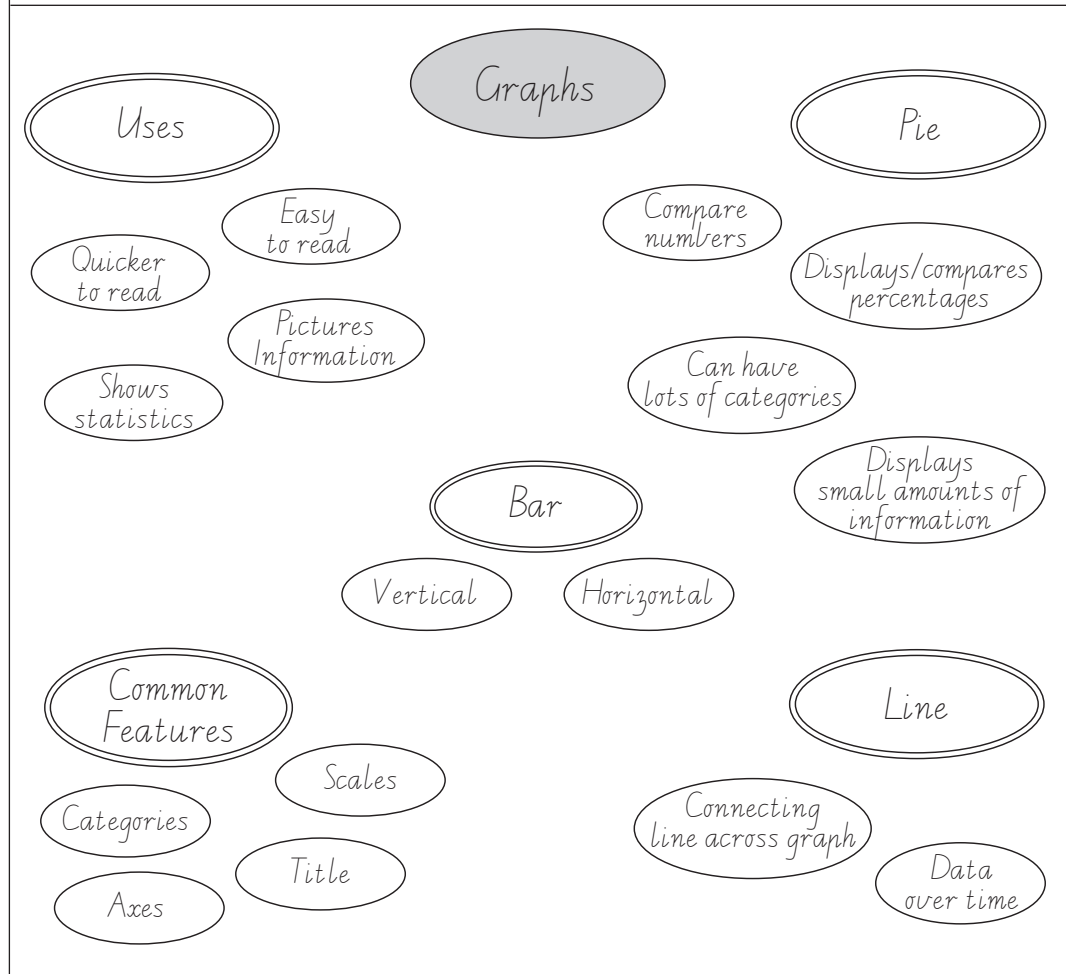
Hints

- Students should be clear about the meaning of each cluster heading
- Do not over cluster

Options

- Limited-unlimited number of cards
- Individual/group response

Example



DICTOGLOSS

Mathematics: Cartesian Graphs

Student 1:

Topic: Cartesian plane

1. Definition

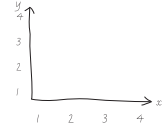
- Grid system
- Invented by French mathematician Descartes in 1616
- Also called a number plane

2. Advantages

- Used to locate single points on a grid exactly
- Better than other systems limited to a square of map, e.g. street directory

3. Features

- Horizontal (x) and vertical (y) axes
- Number lines increase along axes
- Coordinates (two numbers) = position of any point on a plane
- Rule = x always listed before y (x, y)
- Plotting points



Student 2:

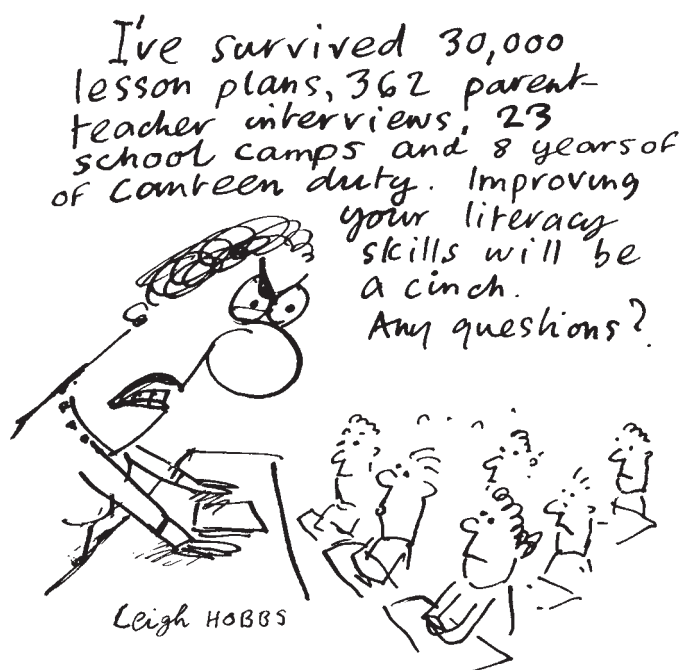
A cartesian plane is a grid system invented by a French mathematician in 1619. It is used to find single points on a grid. Has two axis called horizontal X and vertical Y. They are number lines. The numbers increase with the arrows. Coordinates are positions of any point on the plane. X is always first. The dot points on a plane are called plotting points. The points are called a graph.



The volunteer or peer tutor model

Some schools find volunteer or peer tutor programs to be a beneficial and supportive component of their school literacy improvement strategy. Students' self-esteem is markedly raised because of the nurturing nature of the support and encouragement that they receive during such programs. The aim of the program is negated if volunteer and student do not get on well, so care needs to be taken to ensure that close matching occurs. All stakeholders benefit when a training program is provided by key teachers at the school. Volunteers or peer-tutors need to be provided with a range of short activities that reinforce learning-area-specific content or target specific literacy skills. They also need to have opportunities to participate in regular forums where they can discuss issues, share ideas and receive support.

FOCUSING ON LITERACY AT THE CLASSROOM LEVEL



Mastering a learning area means mastering its specific literacy. In Mathematics, for instance, students are required to comprehend and compose a range of written and oral genres that use mathematical language, tables, graphs, symbols and formulae. Teachers need to be aware of the demands that these tasks place on students. They also explicitly need to teach, model and/or demonstrate the specific vocabulary and the language features and structures of genres that are commonly used in their learning area. Students demonstrate their understandings of learning-area-specific content through language.

When time is spent improving students' literacy skills, they are able to demonstrate their understandings more effectively. Improving literacy skills means improving learning outcomes. Attending to literacy and mastering learning-area-specific content are therefore two sides of the same coin. Literacy is the vehicle for communicating and understanding learning-area-specific content.

When teachers are familiar with a range of strategies, they are able to put in place those that help students make further progress towards target learning outcomes. Some things can be done in the short term, and at the classroom level, to implement a strategy for improving literacy. The following section outlines the importance of:

- ✱ awareness;
- ✱ planning;
- ✱ action; and
- ✱ reflection.

AWARENESS

The most crucial thing that teachers can do is to be aware of what adolescent learners face in the middle-school context. This means observing students closely as they go about their work and noting where the problem areas lie. It might mean selecting an aspect of literacy (listening, speaking, writing, reading or critical thinking) and looking closely for literacy demands embedded in related oral, writing and reading activities, tasks, texts and practices.

A teacher's day is often so busy that 'stopping to look' isn't something that is planned for. It can be interesting to make time to observe what is actually happening—to look closer, for example, at the quantity and quality of talk that takes place. Who does all the talking? What is talked about? What opportunities do students get to talk things through? Is interactive small-group work encouraged? Are key instructions or key words written on the board to help ESL or ESD students? What happens to spelling errors in students' work? Are they circled by the teacher, and then largely ignored by students? Do students ever get time to go back over two or three assignments, note feedback and set goals for improvement? Sometimes students do not realise that they repeat the same spelling errors frequently, or that teachers from different learning areas have written similar feedback about their work.

It may be useful to reflect on whether students get opportunities to read a portion of text silently before being asked to read it orally. If not, they are having to sight-read material. Are they expected to remember lengthy instructions, without having key actions listed on the board? Are some tasks too difficult for them to master—would it help if tasks were broken down into smaller, more manageable components?

Without this kind of analysis at the classroom, learning-area, year-group and/or whole-school level, teachers will continue to be oblivious to the literacy demands they place on students. Sometimes informal observations do not provide accurate information about an aspect of literacy or learning. It might be necessary to collect baseline data to identify problem areas. This can be done through the use of survey forms, questionnaires, checklists, retrieval charts or video recordings.



It is important to be aware that the majority of adolescent learners prefer to fade into the background (to 'melt' into the crowd). They do not relish undue attention, particularly if the fact they are struggling is highlighted. They are particularly resistant to being given work that 'looks like' primary school work or being treated like grown-up primary school children. They therefore need developmentally appropriate strategies or strategies that have been modified for them. 'One size fits all' approaches such as guided or shared reading (where aspects of texts are highlighted and discussed) need to be used with discrimination and in different ways. Sometimes it is more discreet to offer support at the small-group level, so that individual students do not feel conspicuous. Some of these learners are already forming adult relationships and are physically mature.

PLANNING

Once problem areas have been determined (through observation or analysis of data) and targets for improvement have been set, then careful planning needs to take place to ensure that all students will be able to reach those targets. If necessary, break down tasks into manageable units.

Opportunities need to be incorporated for specific literacy skills to be reinforced at various points of the learning journey (such as paragraph writing, note-making frameworks and difficult vocabulary). It is important to build in these moments, because the explicit teaching of literacy skills takes time and literacy skills need to be taught and reinforced *many* times before they become internalised.

They are not something that can be taught once, and then left to chance. If the final outcome of a program of work, for example, involves writing a persuasive argument, time will need to be allocated for teacher and class to discuss the conventions and structure of the genre, and to jointly negotiate a writing framework for the persuasive argument genre. Students will need to be provided with opportunities to practise, develop and refine the skills required to write a powerful, persuasive argument. These opportunities need to be combined with ongoing tuition, support and explicit feedback.

Literacy demands increase in number and in complexity as students move through their schooling. This is another reason why literacy skills need to be taught explicitly in upper primary and lower secondary schools and then continually reinforced each year. The skills then become tools for learning that can be applied independently. When students have a range of strategies under their belt, they are able to concentrate on the complex concepts and tasks that have to be tackled in later years.

ACTION

Analysis without active response leads nowhere. Once problem areas have been determined and new target outcomes have been set, strategies need to be put in place to support movement towards the target/s. The selection of support strategies requires careful consideration, because incorrect selection can hinder the learning process.

Students, as well as teachers, need to build up their own repertoire of strategies that they can 'dip into' for various purposes. This means that they need to be given opportunities

to learn about the purpose of different strategies; to practise implementing them, and to reflect on their effectiveness. They will become more adept at selecting appropriate strategies for tasks if they are regularly given opportunities to select from a range.

Problem areas need to be tackled. Learning goals (or target outcomes) need to be identified, and strategies, such as explicit teaching, coaching, modelling and explicit feedback, put in place to ensure that students make progress towards the target outcomes. It is important to continue to observe students as they work on tasks over a period of time and in a range of contexts. It can be helpful to use a set of criteria, checklist or retrieval chart whilst making observational notes, as a reminder of the focus. This process is called monitoring. It means keeping a close watch on what is being learned. It is an ongoing process and it informs the teaching/learning program. The teacher selects, modifies or changes strategies accordingly. See examples of monitoring tools on pages 77 and 78.

Performance improves with practice. Tennis players get better at tennis by practising. Saxophonists play more proficiently when they have plenty of practice. It's the same with language. Students become more proficient users of learning-area-specific language when they hear it, see it, speak it and write it. They have to be exposed to it. They have to be able to 'approximate' it. And they have to be given opportunities to refine it, before they can apply it confidently. Teachers who model a range of ways of using language will find that students start to use the language of the learning area naturally without realising they are doing so. These include:

- ✱ informal talk;
- ✱ class discussions;
- ✱ highlighting and explaining key words encountered in texts;
- ✱ encouraging the use of glossaries; and
- ✱ journal writing.

Adolescent learners need to be able to practise using language in order to get better at using language. Students use language to demonstrate their understandings. It is important that time is provided for them to engage in these processes. (ESL students need to be able to use their first language to internalise new concepts.) They need to be able to think things through, to talk and write (in order to clarify ideas), to explore concepts and to explain their thinking. They need to do these things independently as well as in collaboration with others. As they do so, they enrich and extend their vocabulary, as well as their proficiency with language.

REFLECTION

Without reflection, learning is likely to plateau or slow down. Reflective thinkers question and assess all aspects of their learning. They identify what they did well, what they might need to do next, and then think about things they might do to improve the learning next time. This type of thinking enables them to be active, independent and self-directed in their approaches to learning tasks. It prevents them from repeating behaviours and ensures that they make progress with their learning.



Visual Arts Topic: 'The Way We Are' Student:

Arts Criticism and Aesthetics

Level 2	Level 3	Level 4	Level 5	Level 6
Recognises and names techniques and mediums used, e.g. 'painting', 'collage' Responds to artworks giving reasons for preferences	Uses words to describe qualities in patterns, designs and decorative surfaces, e.g. 'symmetrical', 'balanced' Identifies the ways geometric shapes (squares, cones etc.) are used as the basis for 2D and 3D artworks Recognises and names variations in colour used in artworks, e.g. 'cool', 'warm' Provides personal observations on, and opinions of, artwork	Describes texture, linear colour and tonal qualities found in different media and techniques used in painting, drawing and printmaking Describes how artists have used the art elements in their work, e.g. form, balance and colour	Describes images, colours, forms, techniques and media used. Offers opinion of meanings intended Analyses artworks; how visual elements have been used to convey meaning Appreciates the different effects created in artworks, e.g. colour combinations, textures Analyses and interprets selected artworks, with supporting examples	Analyses comparative reviews focusing on the main issues, techniques and influences of a group of selected artwork Compares commentaries about artists/artworks published in different forums

Writing Linguistic Structures and Features

Level 2	Level 3	Level 4	Level 5	Level 6
Attempts to use correct format as outlined by the teacher Links ideas using conjunctions, e.g. 'and', 'but', 'therefore'	Selects language that enhances the meaning, e.g. technical terms such as: genre, tension, rhythm, climax, balance, form Attempts to use supporting detailed examples Controls and varies sentence length and beginnings	Selects vocabulary for precise meaning Shows evidence of paragraph structure with introductory sentences	Uses paragraphs in sequence Shows evidence of drafting and editing to achieve an intended meaning	Selects and structures information to influence the reader response Shows evidence, through drafts, of experimenting with ways of sequencing information

Mathematical Observational Checklist: Measurement

Students use direct and indirect measurement and estimation skills to describe, compare, evaluate, plan and construct.

Subject understandings

Student	Understands the necessity of selecting the same unit when comparing two things	Chooses suitable and uniform units	Shows common sense in the choice of units for the task	Uses a unit consistently and carefully to measure and compare	Reads scales to the nearest gradation	Expresses measurements of capacity to the nearest mL	Makes informal statements about how confident they are about their estimations

Speaking and Listening: Linguistic Features and Structures

Student	Uses appropriate technical language to describe choices of units to measure	Speaks confidently with peers/teacher	Uses the language of a mathematics report when describing findings	Contributes to, and processes ideas and information from, peers/teacher	Recognises the different verbal/non-verbal demands of speaking in a small group compared with the whole class	Gives relevant supporting detail when reporting back findings





As students become more proficient at this type of thinking, they develop higher level metacognitive or thinking skills that enable them to monitor and regulate their own learning. These skills include elements of analysis, problem solving and evaluation. Strategies such as journal writing, three level questions (which probe for evidence, or require inferences to be made) provide opportunities for students to practise using higher level thinking processes (see example below). ESL students will use their first or preferred language when reflecting.

Teachers also benefit from engaging in reflective practices. They can reflect on the quality and quantity of students' learning. They can use reflective thinking processes to inform their practice and to determine the effectiveness of particular strategies on students' learning outcomes.

If reflection reveals that students are making little or no progress, then it will be necessary to change tactics. This might mean modifying or changing the learning program. For some students, it might mean modifying the learning program many times until they start to make progress. For others, the repertoire of strategies might need to be extended and built up, and readability of texts might be re-examined. Some skills may need to be explicitly taught, and re-taught again, so that students can focus for a longer period of time on a specific skill. Reflection is an important aspect of learning, and it needs to be built into the teaching/learning program.

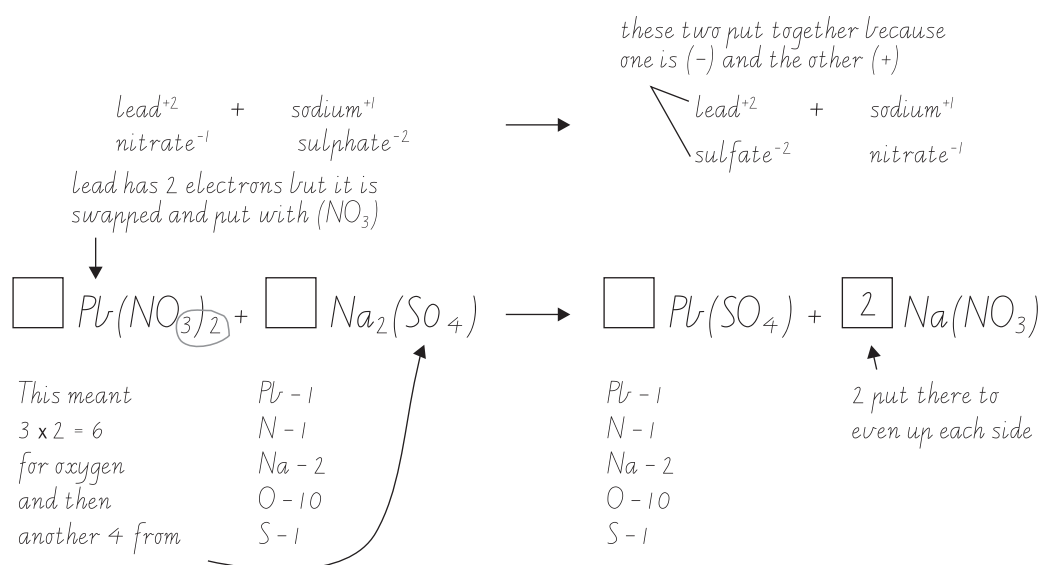
Three level questions	
Literal (Right there)	<ol style="list-style-type: none"> 1. <i>How many main gods were there?</i> 2. <i>Which phrase or sentence gives the main idea of this story?</i> 3. <i>In what ways are gods alike?</i> 4. <i>How long did the mummification take for important people?</i>
Inferential (Think and share it)	<ol style="list-style-type: none"> 1. <i>Which clues lead you to believe that poor people could not become rich?</i> 2. <i>Who had more power - a god or a pharaoh?</i> 3. <i>The story does not say so, but does it make you think that the afterworld was important?</i>
Evaluative (Bring your own)	<ol style="list-style-type: none"> 1. <i>Has the author given enough evidence to show that ancient Egyptians believed the stories of the afterworld to be true?</i> 2. <i>If you were a priest in ancient Egypt, what would you do to help a permanently injured person?</i>

Example of three level questions.

Example of Journal Writing in Science

Lately in Science we have been working on evening out equations from elements off the Periodic Table. Also learning new ones such as e.g. (SO₄), nitrate, hydroxide etc. Balancing equations helps to work out formulas to help make solutions even before and after the compounds are swapped.

First when balancing the equations you need to work out whether or not the element has a positive or a negative amount of electrons. This helps with what the outcome will be, meaning the two negative charges won't combine the positive with the negative from the opposite compound. Next, the chemical formula is written down swapping over each element's electrons to the other element in the same compound. After you add up each side individual elements to make it easier, numbers are put in front of the separate compounds which times the chemical formula by the number to get both sides (before swapping and after) the same.



I understand how this is done and can do it. I also find it a really easy way to even the sides.

Example of journal writing in Science.



Before

What do I already know?

- *Black gets hotter than white*
- *Silver gives glare*
- *Heat moves along*
- *Shade lowers heat*
- *Experiment for house design*
- *Make house more energy efficient*

During

What do I have to find out?

- *How much hotter is black than white and other colours - like red (roof tiles)?*
- *Does shiny stuff get more or less hot than stuff that is not shiny?*

After

How will I present my information?

- *Write scientific report*
- *Results in table - draw line graph*
- *Conclusion - why is one hotter?*
 - *conduction, convection, radiation*
 - *kinetic theory - particles move*
- *Evaluation - improvements*
 - *other experiments*

Examples of journal writing in Science.

IMPROVING SUPPORT FOR TEACHERS



The challenge of improving learning for adolescents is emerging as a key issue for schools and school systems. Sustaining improvement is a vexing problem. Many fine schools achieve success consistently, sometimes in the most trying circumstances. It often proves difficult to replicate that progress elsewhere, just as it proves difficult to be sure that students who struggled to learn in the past are finally on the road to continuing success.

There is no easily applied formula or guarantee of an instant solution. Improving learning for adolescents in middle and secondary schools requires a consistent, well-resourced, long-term effort. The key messages emphasised throughout this text, and which seem to form the basis for lasting improvements in learning, can be summarised in a series of seven reminders.



REMINDER ONE: THE IMPORTANCE OF CONTEXT

There is something special and different about the school context for adolescent learning. It needs to be attended to. It needs to be understood, analysed and worked with, and those elements that can be changed, need to be changed. Effective leadership and a supportive culture are important ingredients for success.

REMINDER TWO: EMPHASISE THE APPROPRIATE LEARNING PRINCIPLES

Adolescent learners are different. They need to be responded to in ways that reflect those differences. The responses need to be based on learning principles that are:

- ✱ grounded in research and well-tested observation;
- ✱ powerful enough to sustain lasting, long-term improvement; and
- ✱ linked to practical, 'do-able' activities at the school and classroom level.

REMINDER THREE: FOCUS ON LITERACY IN LEARNING AREAS

Literacy is the key to improving learning in the middle school. There is a need to move on from the generalised notions of language across the curriculum to focus on:

- ✱ the demands of the learning-area outcomes;
- ✱ responding to those demands specifically, explicitly, consistently and practically; and
- ✱ functional literacy and the literacies required for the new millennium.

REMINDER FOUR: USE PRACTICAL STRATEGIES

Strategies for effective learning in the middle school incorporate literacy and learning-area emphases. For learning to be purposeful, and for the secondary achievement 'dip' to be arrested, the strategies teachers adopt cannot be chosen randomly or carelessly.

Strategies need to be selected by:

- ✱ careful planning based on students' needs (for motivation, challenge and support that enables them to tackle the literacy demands of learning areas); and
- ✱ discriminating precisely the match between strategies and the likelihood that they will assist progress towards particular outcomes or objectives (some strategies, for example, promote reading, whilst others target writing objectives).

REMINDER FIVE: WORK ON A VARIETY OF FRONTS

Improving learning for adolescent students requires a continuing effort over time, and in a variety of areas. Individual teachers contribute a lot to the improvement effort. Their

task is made so much easier if the organisation, culture and support within the school is ‘in sync’ with what they are trying to achieve.

REMINDER SIX: EXPAND THE REPERTOIRE

Strong pressures have acted in concert to narrow the instructional response to the needs of adolescent learners. To improve learning, the repertoire of responses needs to be expanded to include consideration of a variety of:

- ✱ school organisational arrangements;
- ✱ within-school support models for literacy; and
- ✱ learning, teaching and assessment strategies.

An extended repertoire will enable students to acquire literacy and learning skills within learning-area content. Improved skills will result in:

- ✱ more effective processing of information;
- ✱ greater understanding of learning-area content; and
- ✱ better learning outcomes.

REMINDER SEVEN: PROVIDE ONGOING, EXPLICIT FEEDBACK

Adolescent learners, in particular, are very concerned with having a sense of ‘fair play’ about their learning. They like to receive clear, open and explicit feedback. When they know what they can do well, what they need to work on next and how they need to go about improving in that area, students are able to focus their energies in the right direction. Feedback can be provided in a variety of forms, such as marking keys and scoring matrixes, anecdotal records, student–teacher interviews, peer evaluation and teacher or peer response to students’ self-reflection.

A final reminder

The middle years of schooling should be so busy, so demanding, so active, so adventurous, and so spectacular that young adolescents should barely have time for brooding, introspection or watching Australian soap operas. They should learn not only about the academic curriculum, but also about how to relate to and work with others. They should learn that education and learning are not separate from life, but integral to it. As they get older they should see learning, work and leisure being woven into a single plait in which the three separate strands are identifiable but also united, to give strength, pattern and purpose... (Barber, 1999)

We should make their heads spin...



REFERENCES

- Anthony, R., Johnson, T., Mickelson, N. & Preece, A. 1991, *Evaluating Literacy—A Perspective for Change*, Rigby Heinemann, Port Melbourne.
- Barber, M. 1999, Taking the Tide at the Flood of Transforming Education in the Middle Years, Plenary Address, The Middle Years of Schooling Conference, Melbourne.
- Beane, J. 1990, *A Middle School Curriculum from Rhetoric to Reality*, NMSA, p. 49.
- Beane, J. 1991, 'The Middle School: The Natural Home of the Integrated Curriculum', *Educational Leadership*, October, vol. 49, no. 2, pp. 9–13.
- Beane, J. & Brodhagen, B. 1995, Negotiating an Integrated Curriculum Unit of Study, *What Does the Middle School Curriculum Look Like?* The Middle Years Kit, videoconference at the ATC/NSN Middle Years Development School, Adelaide, April.
- Bigum, C. & Green, B 1993a, 'Aliens in the Classroom', *Australian Journal of Education*, vol. 37, no. 2, pp. 119–41.
- Brennan, M. & Sachs, J. 1998, *Curriculum, Classroom Materials for the Middle Years*, Australian Curriculum Studies Association, Canberra.
- Chapman, A. 1996, 'Current Trends in Language, Literacy and Classroom Mathematics', *Literacy and Learning in Mathematics: Curriculum Support in Mathematics*, Education Department of Western Australia.
- Cumming, J. 1994, 'Educating Young Adolescents—an ASCA discussion paper', *Curriculum Perspectives*, newsletter edition, November, pp. 36–9.
- Cumming, J. 1999, 'Into the Community', an edited extract published in *Education Quarterly*, Issue Four, Summer, Curriculum Corporation, Melbourne, from *The Guide to Effective Community Based Learning*, Australian College of Education, Deakin West, ACT.
- Cumming, J., Wyatt-Smith, C., Ryan, J. & Doig, S. 1998, *The Literacy–Curriculum Interface. The Literacy Demands of the Curriculum in Post-compulsory Schooling*, Executive Summary, Department of Employment, Education, Training and Youth Affairs, Griffith University, ACT.
- Curriculum Corporation 1996, *Oodles of Noodles: Integrated Units Collection*, Carlton.
- Curriculum Framework 1998, Curriculum Council, Western Australia.
- Dimmock, C. 1993, in Benda, D. 1993, 'Flexibility is the Key', *West Australian*, 30 March, p. 7.
- Education Department of Western Australia 1999, *Focusing on Outcomes: Curriculum, Assessment and Reporting*, Case Study 12, p. 85.
- Education Department of Western Australia 2001, *Success for All: Selecting appropriate learning strategies*
- First Steps Project, Education Department of Western Australia.
- Fullan, M. & Hargreaves, A. 1991, *Working Together for your School*, Australian Council for Education Administration, Inc., Paperbacks, Victoria, pp. 52–3.
- Gill, M. 1998, 'Who Set the Benchmarks? Analysing the National Literacy Agenda', *English in Australia*, no. 121.
- Ginsburg, H. 1989, *Children's Arithmetic: How They Learn it and How You Teach It*, Pro. Ed., Austin.

- Goodman, Y. 1985, 'Kid Watching: Observing Children in the Classroom', in Jagger, A. & Smith-Bourke, M. 1985, *Observing the Language Learner*, International Reading Association, Newark, DE.
- Green, B. & Bigum, C. 1993, 'Aliens in the Classroom', *Australian Journal of Education*, vol. 37, no. 2, pp. 119–41.
- Hargreaves, A. 1998, 'Middle Schooling "Communicate clear messages"', *West Australian*, Monday, 19 October 1998, reporter: K. Ashworth.
- Heinemann 1996, *Outcomes: Science Books 1–4*, Port Melbourne.
- Heinemann 1998, *Outcomes: Studies of Society and Environment*, Port Melbourne.
- Hill, P. 1993, *School and Teacher Effectiveness in Victoria: Key Findings of the Victorian Quality Schools Project*, University of Melbourne, Melbourne.
- Kiddey, P. 2000, 'So What's Different About Learning in the Middle and Secondary School Context?', *Journal of the Australian Literacy Educators' Association*, vol. 8, no. 1, Melbourne.
- Kirkpatrick, D. 1995, *The Transition from Primary to Secondary School: Self Regulated Learning and Achievement Motivation*, PhD thesis, Edith Cowan University, Western Australia.
- Kress, G. 1996, 'A Pedagogy of Multiliteracies. Designing Social Futures', *Harvard Educational Review*, vol. 66, no. 1, pp. 60–91.
- Kress, G. 1999, in Wyatt-Smith, C. & Cumming, J. 1999, 'Examining the Literacy Demands of the Enacted Curriculum', *Literacy Learning: Secondary Thoughts*, vol. 7, no. 2.
- Lemke, J. 1995, *Textual Politics: Discourse and Social Dynamics*, Taylor and Francis, London.
- Lemke, J. 1999, in Wyatt-Smith, C. & Cumming, J. 1999, 'Examining the Literacy Demands of the Enacted Curriculum', *Literacy Learning: Secondary Thoughts*, vol. 7, no. 2.
- Lountain, K. & Dumbleton, M. 1999, 'On Home Territory', *Education Quarterly*, Issue 4, Summer.
- Lountain, K. & Dumbleton, M. 1999, 'Unlocking Literacy', *Education Quarterly*, Issue 4, Summer.
- Luke, A. 1995, 'Multimedia: Multiliteracies', *Education Australia*, Issue 30.
- Morgan, P. 1993, 'The Time Has Come', *National Schools (Australia) Network Issues Paper*, no. 1.
- Murphy, C. 1997, 'Finding Time for Faculties to Study Together', *Journal of Staff Development*, Summer.
- New London Group 1996, 'A Pedagogy of Multiliteracies. Designing Social Futures'. *Harvard Educational Review*, vol. 66, no. 1, pp. 60–91.
- Pressley, M. 2000, 'Comprehensive Instruction in Elementary School: A Quarter Century of Research Progress', in *Reading for Meaning: Fostering Comprehension in the Middle Grades*, Teachers College Press, IRA, Newark, DE.
- Project of National Significance 1996, *National MSA Newsletter*, Australian Curriculum Studies Association.
- Rosenholtz, S. 1989, *Teachers' Workplace: The Social Organisation of Schools*, Longman, New York.
- Rosenthal, R. & Jacobsen, L. 1968, *Pygmalion in the Classroom; Teacher Expectation and Pupils Intellectual Development*, Holt, Rhinehart and Winston, New York.
- Rudduck, J., Chaplain, R. & Wallace, C. 1996, *School Improvement: What Can Pupils Tell Us?*, Fulton, London.
- SA Field Study 1994, reported in *Curriculum Perspectives*, vol. 15, no. 2, June 1995.
- Sawyer, W. 1999, 'Testing the Benchmarks, Literacy and Year 7', *English in Australia*, no. 124.



- Schools Council Report 1990, *State Board of Education*, Victoria, p. 24, in Schools Council document, p. 87.
- Snyder, I. 1996, 'Integrating Computers into the Literacy Curriculum: More Difficult Than We First Imagined', *Australian Journal of Language and Literacy*, vol. 19, no. 4, pp. 330–44.
- South Australian Film Corporation, *Lingo Video*, Film and Video distribution, 3 Butler Drive, Westside Commercial Centre, Tapleys Hill Road, Heydon, South Australia, 5014.
- Spencer, P. 2000, 'Don't Be Seduced', *Education Quarterly*, Winter, pp. 5–6.
- Spender, D. 1995, *Nattering on the Net. Women, Power and Cyberspace*, Spinifex Press North Melbourne.
- Stenmark, J. 1991, *Mathematics Assessment. Myths, Models, Good Questions, and Practical Suggestions*, National Council of Teachers of Mathematics, Virginia.
- Students, SA Field Study 1994, Project of National Significance 1996, *National Middle School Association Newsletter*.
- Vygotsky, L. S. 1966, *Thought and Language* (A. Kozulin, trans.), MIT Press, Cambridge, MA.
- Westwood, P. 1995, 'Teachers' Beliefs and Expectations Concerning Students with Learning Difficulties', *Australian Journal of Remedial Education*, vol. 27, no. 2, pp. 19–21.
- Wilson, B. 1999, 'Schooling: what matters?', *Education Quarterly*, Summer, p. 3.
- Wyatt-Smith, C. & Cumming, J. 1999, 'Examining the Literacy Demands of the Enacted Curriculum', *Literacy Learning: Secondary Thoughts*, vol. 7, no. 2.