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ASSESS and ASSIST: Capacity building for ALL teachers of students – with and without learning difficulties

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Abstract: Following a brief discussion of the fundamental importance of monitoring *growth*, this paper draws from emerging findings from evidence-based research and 'state-of-the art' practice in assessment and reporting of students' developmental and learning progress – whether or not students experience learning difficulties. The monitoring of individual progress over time requires both diagnostic and developmental assessments of such progress on well-constructed scales (or 'maps') that are qualitatively described. The use of such 'maps' enables early detection of potential 'risk factors', and the monitoring of both individuals and groups across the years of schooling. Such 'maps' and their reporting products constitute major aids in: (a) the integration of assessment into the teaching and learning cycle, (b) assisting children and adolescents to take 'ownership' of their learning and achievement progress, and (c) communicating with parents and other interested stakeholders. The paper concludes by arguing that since teachers are the most valuable resource available to any school, there is a crucial need for capacity building in teacher professionalism in terms of *what teachers should know* and *be able to do*. These include: (1) *knowledge* gained from quality assessment, and (2) *teaching practices* that are demonstrably effective in assisting ALL students to *grow*, informed by findings from evidence-based research.

Introductory comments

In the context of schooling – especially during the early and middle years – the word *assessment* invariably invokes mixed reactions (Rowe, 2006a). On the one hand, for many educators who fail to understand the essential interdependence of assessment and pedagogy (see Westwood, 2000, 2001, 2005), the term *assessment* conjures negative notions of *testing*, *labelling* and *categorisation* that are claimed to have potentially deleterious effects on children's self-esteem and their on-going engagement in learning. On the other hand, it is important to note that teachers *assess* students continuously and intuitively by observation, interaction, questioning, directing, evaluating and supporting students in the process of teaching and learning (Rowe & Hill, 1996). In this regard, Nuttall (1986, p. 1) has made the commonsense observation that:

> In one guise, assessment of educational achievement is an integral part of teaching, though most assessment is carried out informally – through questions and answers in class, through observation of students at work – rather than through the formal and means of tests and examinations.

Further, Nitko (1995) coined the term '"formative continuous assessment" that "...provides a teacher and the students with information that guides learning from day-to-day" (p. 326). Nitko also made a useful distinction between formative and summative assessment as follows:

> What distinguishes formative from summative techniques, however, is not their formal or informal nature. Rather the distinction lies in the purposes for which the results are used: formative continuous assessments focus on monitoring and guiding student progress through the curriculum. Formative continuous assessments primarily serve purposes such as: (a) identifying a student's learning problems on a daily and timely basis; and (b) giving feedback to a student about his or her learning (Nitko, 1995, p. 328).

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Torrence and Pryor (1995) made a similar distinction between what they termed *divergent* and *convergent* teacher assessment. More recently, in making 'the case for formative assessment', a recent OECD report asserts:

> Formative assessment refers to frequent, interactive assessments of student progress and understanding to identify learning needs and adjust teaching appropriately (OECD, 2005, p.21).

As experienced teachers consistently affirm, this formative, analytical and intuitive assessment constitutes one of the most powerful influences on the promotion of students' educational growth and development (Black & William, 1998; OECD, 2005; Rowe, 2005, 2007a; Rowe & Hill, 1996). Moreover, each of these methods of assessment provides an opportunity to observe students' learning behaviours that can be used both diagnostically and developmentally as indicators of learning progress, and provide invaluable information for intervention purposes – especially for students experiencing learning difficulties. However, each indicator (on its own), provides only a small part of the overall picture of learning and development (Rowe, 2002). At this point, a brief discussion of the fundamental notion of *growth* in monitoring students' learning development is helpful.

The fundamental notion of *growth*[2]

No concept is more central to the concerns of both parents and teachers than the concept of *growth*. As parents and educators we use many different terms to describe physical, cognitive, affective and behavioural growth, including *development*, *learning*, *progress* and *improvement*. However it is described, the concept of individual *growth* lies at the heart of teachers' professional work. It underpins our efforts to assist learners to move from where they are to where they could be: to develop higher levels of literacy competence, broader behavioural and social skills, more advanced problem solving skills, and greater respect for the rights of others.

Closely linked to the concept of individual *growth* is our fundamental belief that all children and adolescents are capable of progressing beyond their current levels of development and attainment – including those with developmental and learning difficulties. As educators we understand that students of the same age are at different stages in their learning and development, and are progressing at different rates. Nonetheless, we share a belief that every student is on a path of *learning development*. The challenge is to understand each learner's current level of progress and to provide opportunities likely to facilitate further *growth*, and to minimise the influence of factors that may impede such *growth*– particularly during the early and middle years of schooling.

A professional commitment to supporting *growth* requires a deep understanding of *growth* itself. What is the nature of *progress* in an area of learning? What are typical paths and sequences of child development? What does it mean to *grow* and *improve*? What can be watched for as indicators of progress, and what needs to be done to maximise progress? Teachers who are focused on supporting and monitoring the long-term *growth* of individuals have well-developed understandings of how learning in an area typically advances and of common obstacles to progress – tacit understandings grounded in everyday observations and experience that may also be informed by theory and research.[3]

The assessment and monitoring of developmental progress

Parents are familiar with the percentile growth charts for height and weight that are often used by developmental paediatricians, as illustrated in Figure 1 below – in this case for weight. An important feature of Figure 1 is that *progress* is measured against calibrated scales that are universally defined (i.e., weight in pounds and/or kilograms in this case), based on normative

[2] Adapted from Masters, Meiers and Rowe (2003).

[3] For a longitudinal, essentially qualitative study of factors affecting children's educational progress during the early years of schooling, see: Hill *et al.* (1998, 2002).

data obtained from population and/or large numbers of children and adolescents. Whereas the mapping of growth in learning has yet to achieve such precision, major advances in educational measurement and reporting are encouraging (see: Embretson & Hershberger, 1999; Masters, 1999, 2004a,b; Masters & Keeves, 1999; Masters & Forster, 1996a,b; Wilson, 2005).

Figure 1. A percentile 'growth' chart for weight (females), by age

Monitoring individual learners and their progress over time requires assessments of children's' progress on similar well-constructed, common, empirical scales (or quantitative 'maps') that are qualitatively described. The use of such 'maps' enables the monitoring of both individuals and groups across the years of schooling (and sometimes beyond). Such 'maps' and their reporting products (see Figure 2) provide deeper understandings of learning progress than can be obtained from 'cross-sectional snap-shots' that merely assess the achievements of students at different ages and/or times. Moreover, the 'maps' are a major aid in monitoring students' progress, as well as communicating with parents and other teachers.

By tracking the same individuals across a number of years it is possible to identify similarities in learners' patterns of learning and achievement. Assessments of these kind show that, in most areas of school learning, it is possible to identify typical patterns of learning progress, due in part to natural learning sequences (the fact that some learning inevitably builds onto and requires earlier learning), but also due to common conventions for sequencing teaching and learning experiences.

The fact that most students make progress through an area of learning in much the same way makes group teaching possible. However, not all students learn in precisely the same way, and some appear to be markedly different in the way they learn. An understanding of typical patterns of learning facilitates the identification and appreciation of individuals who learn in uniquely different ways, including those experiencing learning difficulties.

Based on the notion of *developmental assessment*, a 'map' of typical progress through an area of learning provides a useful framework for measuring, describing and monitoring growth over time at the individual and group levels, as illustrated in Figure 2.

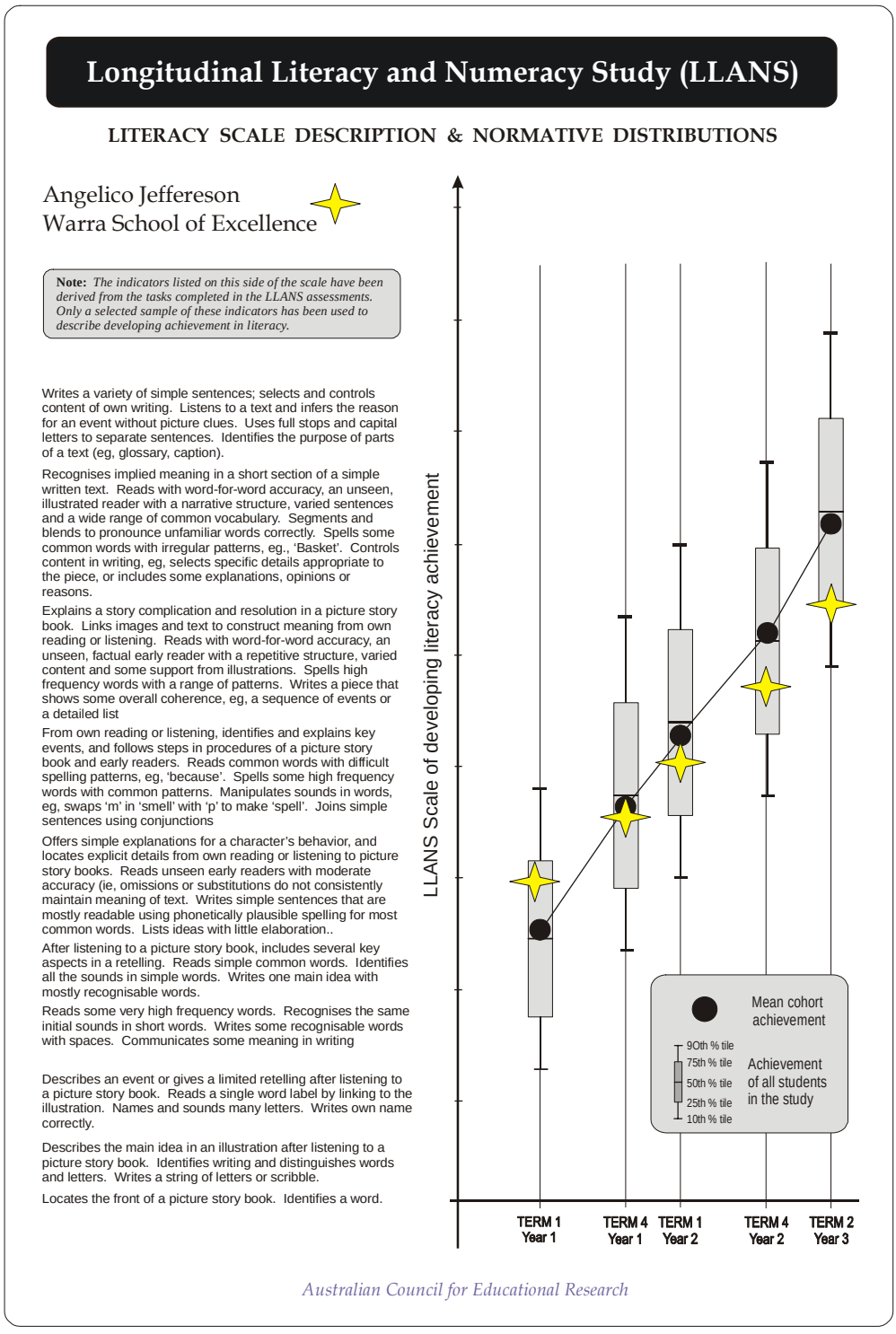

Figure 2. A growth map of achievement progress in literacy showing individual and norm-referenced growth against descriptions of domain-referenced criteria

Such 'maps' make explicit what is meant by *growth* (or *progress*) and introduces the possibility of plotting and studying the growth trajectories for both individuals and groups of learners. For example, Figure 2 illustrates the progress 'map' of literacy learning during the

early years of school – developed as part of ACER's *Longitudinal Literacy and Numeracy Study* (LLANS).[4]

Using modern measurement theory (or more particularly, *Rasch measurement*),[5] the map describes how the literacy skills of participating children typically developed over their first few years of school.[6] Growth in literacy is described on the left of each map, from early skills at the bottom to more advanced competencies at the top. Moreover, the summary descriptions are valuable in that they provide a 'window' that 'opens-up' to more detailed information about what students have achieved (as documented in portfolio records, student diaries, class/school-based assessments, and so on), as well as providing useful pointers to what has yet to be learnt and achieved. Similarly, this information is valuable for reporting learning and achievement progress to relevant stake-holders, namely: students, parents, teachers, schools and system authorities.

The literacy achievement progress of children in the LLANS study on five occasions is shown on the right of Figure 2. For example, the map shows that: (a) on average, children's literacy skills developed steadily during their first three years of school; and (b) the achievement progress of *Angelico Jefferson* indicates less-than-expected progress during the second and third years of school.

Above all, the administration of the developmental and diagnostic LLANS assessment instruments provides opportunities for both students and teachers to not only use the constituent tasks for the *assessment **of** learning*, but also for *assessment **as*** and ***for** learning*. In terms of *assessment **as** learning*, feedback from teachers using the LLANS instruments continues to be strongly positive to the extent that they as teachers, together with their students, 'learn a great deal' (see Meiers, Khoo *et al.*, 2006). Likewise, the diagnostic nature of the items provide teachers and parents with valuable information in terms of *assessment **for** learning* by highlighting strategic pedagogical interventions for individuals and groups at any given point throughout the achievement distribution and across time. At this point, it is helpful to highlight key distinctions between two major but contrasting approaches to assessment.

Two contrasting approaches to assessment

Common to most methods of assessment is an emphasis on first specifying what students are expected to do and then checking to see whether they can. This emphasis has led to two major but contrasting approaches to assessment.

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[4] For specific details of this on-going study, see: Meiers (1999a,b, 2000); Meiers and Forster (1999); Meiers, Khoo *et al*. (2006); Meiers and Rowe (2002); Stephanou, Meiers and Forster (2000). Note also, the LLANS assessment instruments were used by Louden *et al.* (2005a,b).

[5] See: Embretson and Hershberger (1999); Masters (1982, 1999, 2004a,b); Masters and Keeves (1999); Masters and Wright (1997); Rowe (2002, 2005a); Stephanou (2000); Wilson (2005); Wright and Mok (2000). Note that the 'unit of measurement' for the constructed scale shown in Figure 2 is expressed in *logits*. The *logit* is a unit of measurement derived from the natural logarithm of the odds of an event, where the odds of that event is defined as the ratio of the probability that the event will occur to the probability that the event will not occur. A logit scale is used in educational assessment because it has interval scale properties. That is, if the difficulty of an assessment task (e.g., Task A) is 1.0 logit greater than the difficulty of Task B, then the odds of a student responding correctly to Task B are 2.7 times the odds of the same student responding correctly to Task A, regardless of whether this student has high or low ability. Similarly, if the ability of Student A is 1.0 logit greater than the ability of Student B, then the odds of Student A responding correctly to a task are 2.7 times the odds of Student B responding correctly to the same task, regardless of task difficulty.

[6] Note that the initial sample of 1000 children in their first year of formal schooling was drawn from a national, randomly-selected sample of 100 government Catholic and independent schools. The LLANS project is currently in its ninth year, involving assessments of students' developing achievement progress in Literacy and Numeracy throughout the early and middle years of schooling.

The first approach is what can be referred to as the 'can-do', 'checklist' or 'outcomes-based' model that continues to be strongly influenced by the behavioural objectives, mastery learning and criterion-referenced testing movements of the 1960's and 1970's (e.g. Glaser, 1963; Popham, 1978). Characteristic of this first approach is the development of broadly-specified lists of observable, mostly decontextualised statements of student outcomes. For example, one of the desired outcomes for *Standard 1.0* for Reading of the current *Victorian Essential Learning Standards* (VELS), states (*inter alia*): *"At Level 1, students match print and spoken text in their immediate environment…"*. While this approach constitutes a start towards more explicit specifications of the kinds of knowledge, skills and understandings we might wish to see students to develop during the early (and later) years of schooling, it is highly unlikely that "...meaningful 'can/cannot do' judgements can be made about broad outcomes of this kind" (Masters, 1994, p. 6). In fact, Noss, Goldstein & Hoyles (1989) have warned: "Notions of decontextualised 'can-do' statements must be strictly meaningless in any criterion-referenced sense" (p. 115).

Even with more explicit specifications of outcome statements and the delineation of contexts, Jessup (1991), Masters (1994, 2004a,b), Noss *et al.* (1989), Nuttall and Goldstein (1986), Wolf (1991), among others, have long since warned that the key difficulties confronting the checklist or 'can do' model is that: (1) the outcome statements are subject to wide variability in interpretation, (2) are often too loosely defined to ensure comparability, and (3) are unlikely to provide reliable bases for monitoring student performance standards over time. Further, since the outcome statements of the VELS kind have not been empirically verified, and are not calibrated on a common developmental scale, their utility in terms of monitoring achievement *growth* is severely limited. A particular concern is that since such statements are not sufficiently 'fine-grained', they: (a) lack diagnostic utility, and (b) provide minimal guidance for subsequent pedagogical intervention and assistance by teachers – whether or not students experience learning difficulties.

Similar limitations apply to most standardised age/grade/stage-appropriate assessment tools. For example, the six *Observation Survey* (OS) assessment tasks of Clay's (2002) *early literacy achievement* constitute 'stand-alone', age/grade-appropriate assessments that lack recent *concurrent validity* estimates.[7] Moreover, the most recent norms are based on a limited sample of only 796 New Zealand school children (aged 5-7 years).[8] More importantly, the OS tasks have yet to be calibrated onto a common scale capable of being linked to the State/Territory monitoring programs for Literacy (and Reading in particular) that begin for students during their fourth year of formal schooling (i.e., Grade 3 in some jurisdictions and Year 4 in others).

In the context of prevailing national policy agendas for the assessment of students' developmental and learning progress in Years K-2 (or Years 1-3) and Years 3, 5, 7 and 9 (or, Year 4, 6, 8 and 10), it is vital that the OS tasks not be discarded, or superseded by current attempts to develop alternative assessment instruments for children during the pre-school, beginning and early years of schooling.[9] If such attempts were to be successful, the 'prognosis' for the on-going use of the OS (and the 'survival' of *Reading Recovery* in Australia) would be problematic. Given the established utility of the *Observation Survey* and its wide usage throughout Australia (and internationally), this would be tantamount to an unjustified and expensive 'throwing-out-the-baby-with-the-bath-water' situation.

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[7] For validity and reliability definitions and estimates for the OS tasks, see Clay (2002, pp. 159-162).

[8] See Clay (2002, Appendix 1, p. 148).

[9] One such attempt is the recent development of the *Australian Early Development Index* (AEDI). However, consistent with the warnings of its developers, the AEDI is strictly a population/ epidemiological screening instrument for the assessment of community-based cohorts of children at the time of school entry (see CCCH & TICHR, 2005). As such, and despite widespread discussions concerning its potential for developmental screening at the individual child level at school entry, the AEDI 'can/cannot do' or present/absent' items related to its five domains do not have pedagogical utility for teachers.

The second approach to assessment, and characteristic of the LLANS example illustrated in Figure 2 above, is what Griffin (1989) and Masters (1994; Masters & Forster, 1995a,b; Masters *et al*., 1990) refer to as developmental "achievement maps" [10]. Masters (1994, p. 9) notes:

> This approach, like the first, seeks to provide a more explicit identification of outcomes and a framework against which the progress of an individual, a school, or an entire education system can be mapped and followed. But this approach is built not around the notion of an outcomes checklist, but around the concept of *growth*...Student progress is conceptualised and measured on a growth continuum, not as the achievement of another outcome on a checklist.

As shown in Figure 2, locations along this 'growth continuum' are illustrated by descriptive indicators of stages or 'levels' of increasing competence typically displayed by students at those locations. However, unlike the 'can/cannot do', checklist model which describes students' performances *deterministically*, the 'levels' of performance along the growth continuum are described and reported *probabilistically*. That is, rather than attempting to make unequivocal 'can/cannot do' judgements, this 'growth model' approach to the assessment of learning ans achievement progress aims to provide *estimates* of a student's current and developing 'levels' of performance and,

> ...provides an accompanying description of the kinds of understandings and skills typically displayed by students at that level. To estimate a student's current level of achievement, a wide variety of assessment instruments can be used (Masters, 1994, p. 11).

The Australian Council *for* Educational Research (ACER) has developed several 'growth model' assessment instruments, the most notable of which include: the *Developmental Assessment Resource for Teachers* (DART English) by Forster, Mendelovits and Masters (1994). More recently, in collaboration with the New Zealand Council *for* Educational Research (NZCER), ACER has developed the widely acclaimed *Progressive Achievement Tests* in: (a) *Reading*: Comprehension and Vocabulary (PAT-R; ACER, 2005a), and (b) *Mathematics* (PAT-Maths; ACER, 2005b). [For recent applications of the PAT-R and PAT-Maths instruments in the context of monitoring the progress of students with learning difficulties, see: Rowe, Stephanou & Hoad, 2007; and Rowe, Stephanou & Urbach, 2006].

A key feature of the PAT instruments, for example, is that because all test forms are calibrated on a common developmental logit scale from school entry to Year 9/10, they are particularly useful for teachers in: (a) monitoring students' learning and achievement progress, (b) diagnosing specific student learning strengths and weaknesses, and (c) providing teachers with pointers for pedagogical intervention, whether for remediation and/or extension purposes. Figures 3 and 4 following illustrates student achievement profiles on the PAT-Reading Comprehension and PAT-Maths scales, showing normative achievement *growth* distributions, percentiles and stanines from school entry to Year 9 (or year 10). Note that the PAT manuals (ACER, 2005a,b) provide the relevant qualitative descriptors of typical *growth*.

The utility of progress 'maps'

The LLANS and PAT examples provided in Figures 2, 3 and 4 respectively, illustrate three important advantages of monitoring learners' achievement progress over time. First, the focus is on understanding learning as it is experienced by the learners. Through such approaches an attempt is made to understand the nature of *growth* within an area of learning across the years of school, and provides vital information for teachers in assisting students' learning and achievement progress. The use of 'progress maps' of learning to monitor and study progress stands in contrast to more traditional curriculum-based approaches that impose a list of learning objectives (or outcomes) that students are expected to learn, followed by assessments to determine the extent to which these objectives have been achieved.

[10] There are many local and international examples that could be cited here, but for recent examples, see: Rowe (2007a); Rowe and Stephanou (2003, 2006); Schwartz (2005).

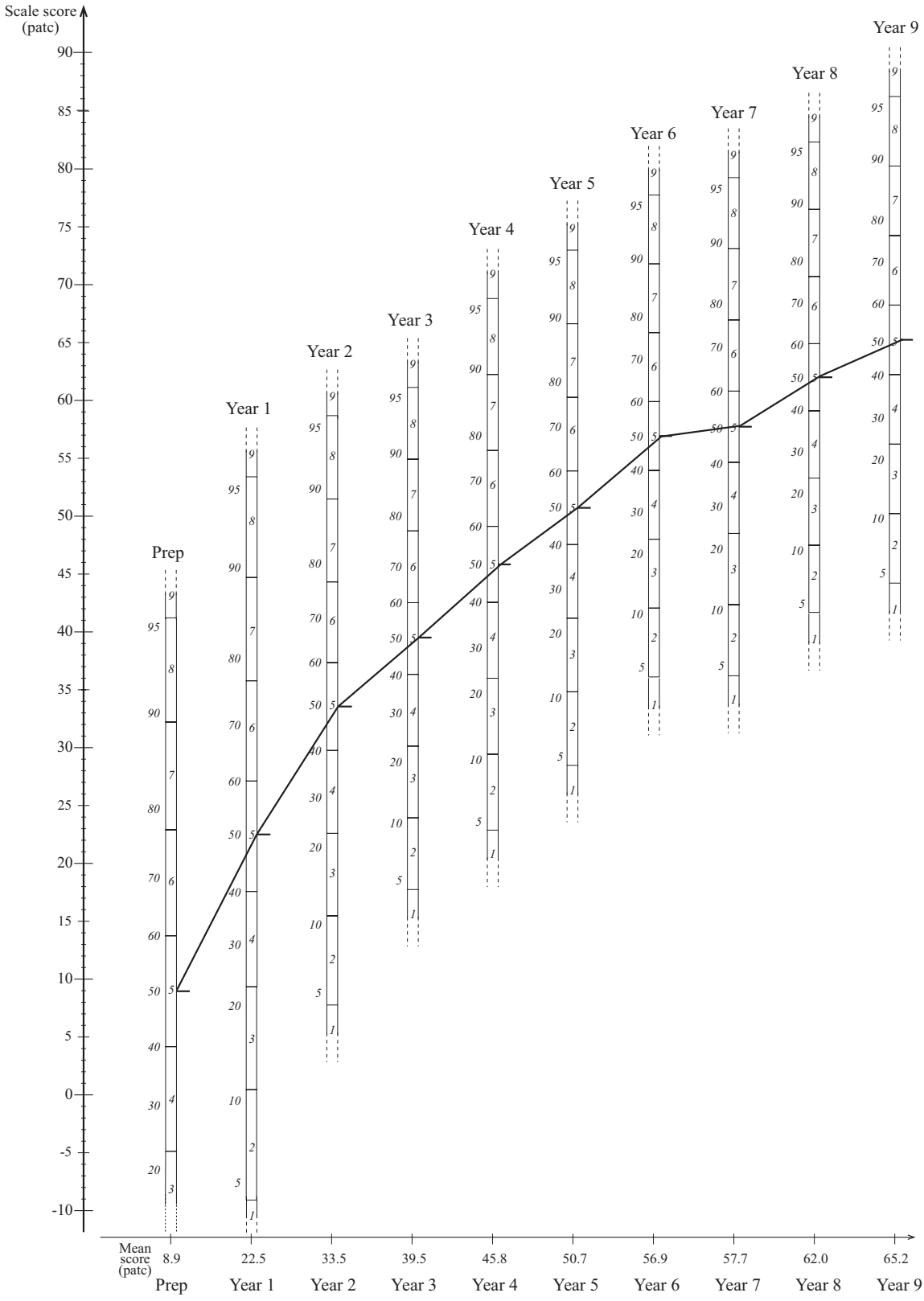

Figure 3. Student achievement profiles on the PAT-Reading Comprehension scale showing normative achievement 'growth' distributions, percentiles and stanines from school entry to Year 9 (or year 10)

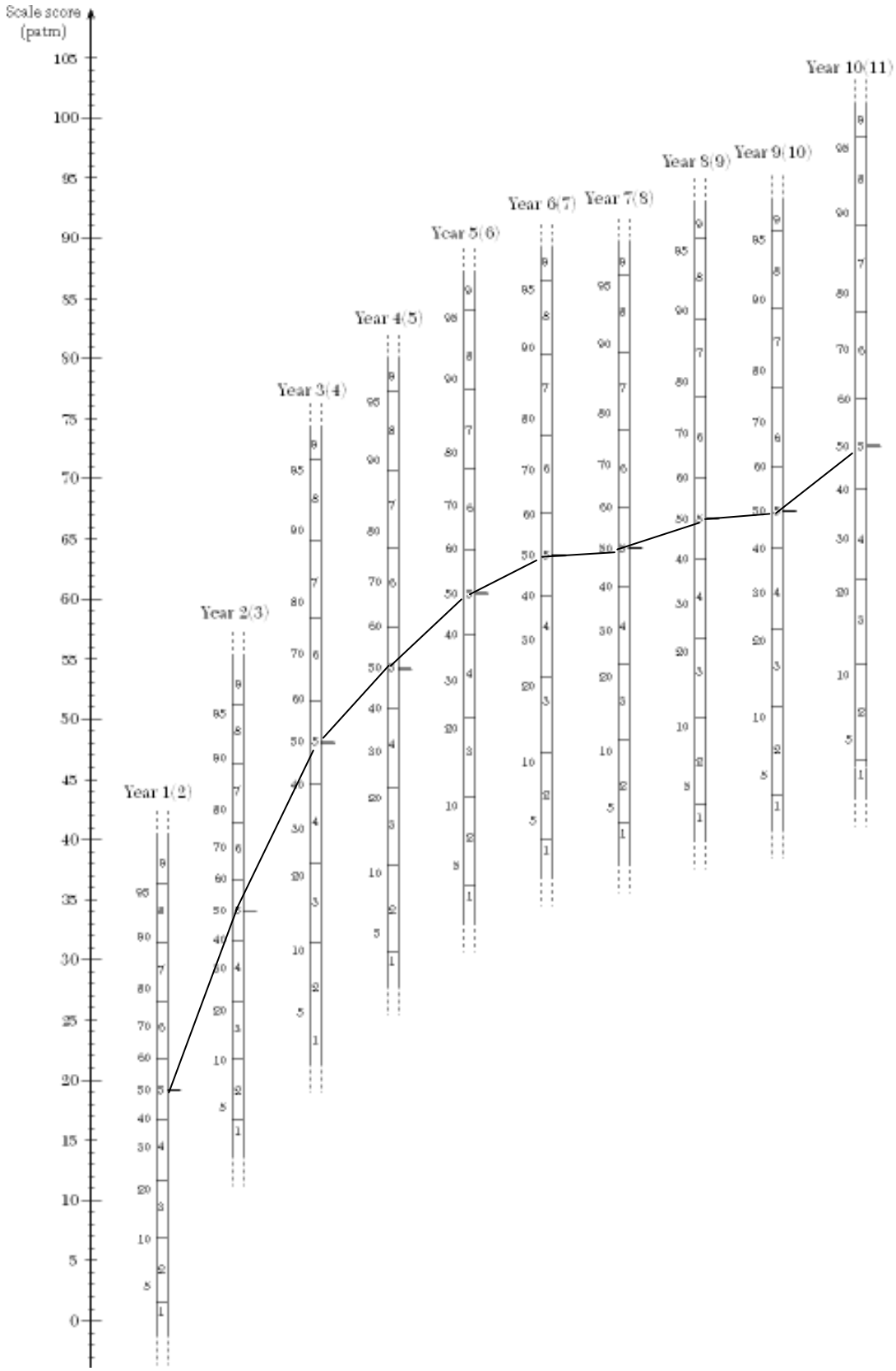

Figure 4. Student achievement profiles on the PAT-Maths scale showing normative achievement 'growth' distributions, percentiles and stanines from school entry to Year 9 (or year 10)

Second, empirically-based 'maps' of learning provide a basis not only for charting individual and group progress, but also for studying influences on children's learning trajectories – similar to those reported by Hill *et al.* (1998, 2002) from qualitative perspectives, and those reported by Meiers, Khoo *et al.* (2006) from both quantitative and qualitative perspectives. The potential of such 'maps' lies in the opportunity they provide to identify and understand the nature of factors associated with successful learning and rapid progress, as well as those that work to impede student growth. Third, such 'maps' provide a valuable framework for: (a) actively engaging students in the monitoring of their own learning progress; (b) reporting to parents; and (c) communicating with other teachers in the same school or with those in different schools, regardless of their location. Typical of the comments made by parents upon receipt of their child's achievement progress as illustrated in Figure 2 are:

> This report of my child's progress at school is great! For the first time, I have both descriptions and the evidence of what my child has achieved, what is currently being achieved, and what has yet to be learnt and achieved. With the teacher's guidance, I now know how best to help my child at home. Before, I had no real idea of what was expected or how to help.

Similarly, teachers continue to make positive comments about the utility of these progress 'maps'. Typical of such comments include:

> Using these maps, I can monitor the learning progress of each child in the class, as well as the whole class – against the norms for their age and grade levels. I can also identify what I need to do to help those children who are not progressing as well as they could and should.

Clearly, these advantages point to important implications for how educational progress is measured, monitored and reported over time. In contrast, when evidence about a student's achievement is reduced to a yes/no decision, or to a 'can/cannot do' judgement concerning a year-level performance standard, or to the 'progression points' between the standards, including the provision of mere judgmental gradings of the A-E variety, for example, valuable information about that student's learning and achievement progress is lost.[11] Rather, the improvement of students' school learning and its reporting depends on an understanding of the variation in students' levels of development and achievement; a willingness to monitor, map and report individual growth in an area of learning across their years at school; and a commitment to tailoring teaching and learning strategies/activities to students' current levels of achievement regardless of their age/grade levels, and whether or not they experience learning difficulties (see Westwood, 2006).

Finally, and perhaps most importantly, developmental achievement 'maps' of the kind advocated and illustrated here, together with their reporting products, constitute major aids in: (a) the integration of assessment into the teaching and learning cycle (see Westwood, 2000, 2001, 2005), (b) assisting children and adolescents to take 'ownership' of their learning and achievement progress, and (c) communicating with parents and other interested stakeholders. By every criteria of *educational effectiveness*, this is basic commonsense. Regretfully, such commonsense is not so common.

The imperative of building capacity in teacher professionalism

Three major principles underlie the imperative of building capacity in teacher professionalism. First, young Australians are the most valuable resource for our nation's social and economic prosperity. Second, the key to such prosperity at both the individual and national level is the provision of quality schooling (see Ingvarson & Rowe, 2007). Third, because teachers are the

[11] In contrast to 'progress maps', letter grades (A, B, C, D, E) are an inadequate basis for monitoring and reporting growth across the years of school. That is, a student who achieves the same grade (e.g., a grade of 'D') year after year can appear to be making no progress at all; nor are such grades able to describe and communicate **what** a student has actually achieved or is capable of achieving. Moreover, due to contextual variations in teachers' expectations and subsequent judgments of student performance, an 'A' grading in one context could well be equivalent to a 'D' grading in another.

most valuable resource available to schools, it is vital that teachers be equipped with evidence-based teaching and assessment practices that are demonstrably effective in monitoring and meeting the developmental and learning needs of all students for whom they have responsibility – regardless of students' ethnic and socioeconomic backgrounds, and whether or not they experience learning difficulties (e.g., Hoad, Munro *et al*., 2007; Rowe KS, Pollard & Rowe, 2003, 2004, 2005, 2006).

Nowhere are these three principles more important than for teaching and learning in literacy and numeracy, since being both literate and numerate are foundational, not only for school-based learning, but also for students' psychosocial wellbeing, further education and training, occupational success, as well as for productive and fulfilling participation in social and economic activity (DeWatt, Berkman *et al*., 2004; Hinshaw, 1992; Rowe & Rowe, 1999, 2000; Sanson, Prior, Smart, 1996).. Moreover, the rapidly changing nature of global communication systems, including computer-based technologies, demand competence in increasingly complex multiliteracies, of which high levels of literacy and numeracy skill are essential (see Rowe, 2005a,b, 2006b).

Equipping young people to engage productively in the knowledge economy and in society more broadly is fundamental to both individual and national prosperity. This objective depends primarily on two factors: (a) students' ability to read, write and undertake mathematical computation; and (b) the provision of quality teaching and by teachers who have acquired during their pre-service teacher education and subsequent in-service professional learning, evidence-based teaching and assessment practices that are effective in monitoring and meeting the developmental and learning needs of all students. Our young people and their teachers require no less. Indeed, there is a strong body of evidence indicating that many cases of learning difficulty and related under-achievement can be attributed to inappropriate or insufficient teaching, rather than to deficiencies intrinsic to students such as cognitive, affective and behavioural difficulties, as well as their socioeconomic, socio-cultural backgrounds and contexts (see: Farkota, 2005; Rowe, 2006b, 2007a-c; Westwood, 2000, 2001, 2005, 2006; Wheldall, 2006; Wheldall & Beaman, 1999). Clearly, the ultimate success of *ASSESS* and *ASSIST* rests on the imperative of building capacity in teacher professionalism in terms of quality assessment methods and evidenced-based pedagogical practices.

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