Tertiary Education Commission
Te Amorangi Mātauranga Matua

Embedding Literacy and Numeracy: Theoretical Framework and Guidelines

Version 1.1: October 2008

NZ SKILLS STRATEGY

Contents

Overview

Improving adults' literacy and numeracy skills is a key action within the New Zealand Skills Strategy. Over the next three years, the Tertiary Education Commission (TEC) will be helping to build the tertiary sector's capability to provide education and training opportunities that embed literacy and numeracy into vocational and other curriculum.

> Research confirms that improving workforce literacy, language and numeracy skills works best if the learning is in a context that is relevant to the learner, eg. existing workplace training. The Literacy, Language and Numeracy Action Plan proposes a significant increase in the amount of explicit literacy and numeracy teaching and assessment that is embedded into vocational training.
>
> To achieve the scale of high quality learning opportunities required we need to ensure a whole system approach which makes literacy and numeracy a sustainable part of core business.
>
> Providers will be encouraged to make changes in organisational infrastructure, leadership, teaching, resources, curriculum, training arrangements, course design and assessment that will be necessary to deliver the outcomes sought from this Plan.
>
> (Tertiary Education Commission, 2008a, pp. 6, 10, 13.)

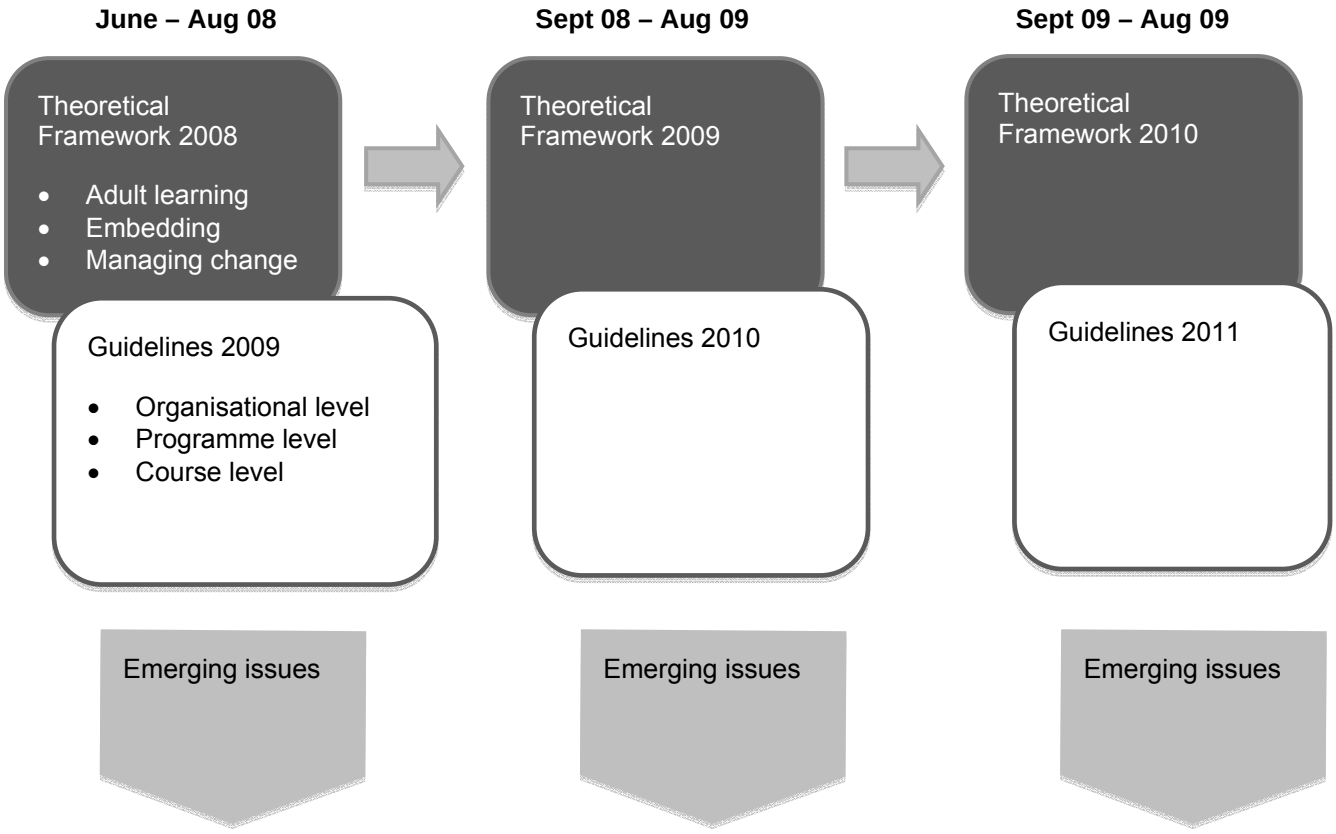
This document comprises two sections: a theoretical framework and a set of programme guidelines. Each will be refined and elaborated as the capability and capacity of the sector to provide embedded literacy and numeracy increase. This approach recognises that the current situation will change from 2008 and, consequently, the theoretical framework and guidelines will evolve to reflect this. The intention throughout is to keep the focus clearly on improving literacy and numeracy outcomes for a significant number of adults in New Zealand.

The first section outlines the framework that supports the development of theoretical understandings so that they can be used as a basis for making principled decisions about embedding literacy and numeracy in vocational training. Ongoing development of the framework will take account of emerging evidence about effective embedded provision.

The second section provides guidelines for embedding literacy and numeracy into vocational training. The guidelines will assist providers to systematically apply understandings about effective practice to locally adapted provision. As well as responding to changes in the theoretical framework, the guidelines will be elaborated on through the experiences of the sector as it embeds literacy and numeracy in vocational courses.

Emerging issues will be identified for consideration by the TEC as part of the broad Literacy and Numeracy Action Plan after each iteration of the theoretical framework and guidelines.

The following diagram illustrates the iterations of the theoretical framework and guidelines over the next three years.



Policy background

Literacy and numeracy skills provide the essential base for building a competitive, highly skilled and productive workforce. Employers, unions and education providers have increasingly recognised that improving literacy and numeracy skills presents a critical challenge for the current workforce.

The decision to build the sector's capability to embed literacy and numeracy into the provision of education and training in other areas rests on understandings about **how adults learn** considered alongside an analysis of the **settings** that provide optimum learning opportunities.

Embedding literacy and numeracy in provision such as vocational training is considered to be the most effective and efficient way to provide direct, purposeful instruction in contexts (settings) that allow both the initial opportunity to acquire new literacy and numeracy knowledge and skills, and plenty of scope for practicing them.

The key policy documents that describe the Government's strategy to increase the literacy, language and numeracy skills of the workforce in New Zealand are:

1. *Tertiary Education Strategy 2007–12 incorporating the Statement of Tertiary Education Priorities 2008–10*, which identifies increased opportunities for literacy, language and numeracy in the workforce as a national priority for tertiary education.
2. *New Zealand Skills Strategy Action Plan 2008*, which has as the third of its five goals "influence the supply of skills through a more responsive education and training system". This is supported by two actions:
    - Increase literacy, language and numeracy learning opportunities, and the quality and relevance of those learning opportunities.

- Raise workforce and employer awareness of the benefits of literacy, language and numeracy skills.

3. *Literacy, Language and Numeracy Action Plan 2008–2012*, which outlines the government's responses to the challenges set in the *New Zealand Skills Strategy Action Plan 2008*. Over the next four years, an additional $168 million is available for the development and implementation of a range of initiatives that aim to progressively increase the number of adults who have the literacy and numeracy skills required to meet the changing demands of modern society and workplaces.

The *Literacy, Language and Numeracy Action Plan 2008–2012* gives priority to raising the literacy and numeracy skills of those already in the workforce and those near work. This is likely to lead to the quickest return in terms of improvements in competitiveness, and is one way to ease continuing skill shortages. A workforce focus will mean that the literacy and numeracy skills taught are pertinent to both employers and individuals.

Research confirms that improving workforce literacy, language and numeracy skills works best if the learning is in a context that is relevant to the learner, for example, existing workplace training. The *Literacy, Language and Numeracy Action Plan 2008–2012* proposes a significant increase in the amount of explicit literacy and numeracy teaching that is embedded into vocational training.

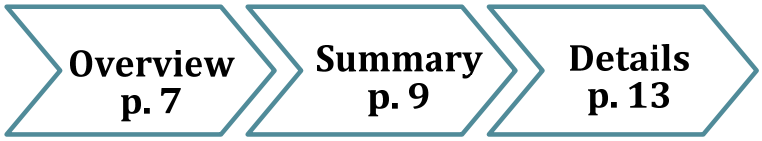
Section One: Theoretical Framework [1]

The key understandings from research

Three key sets of understandings underpin the guidelines that have been developed to support tertiary education organisations to embed literacy and numeracy into a range of other provision. These are based on the evidence about:

- how adults learn
- the features of effective embedded literacy and numeracy practice, and
- managing and sustaining change to professional practice.

The key findings or understandings from research are presented here in three ways, giving progressively more detailed information. These can be used in different ways depending on the purpose and audience.



First, the overview below gives a single-sentence summary of the key understandings for each of the three areas that form the focus of this research report. This overview is a useful introduction to the research findings.

Secondly, starting on page 5, there is a brief summary of each of the three areas of focus. This provides readers with three or four bullet points that expand the key understandings for each area.

Thirdly, starting on page 9, there is a detailed explanation of each key understanding (four for each area).

[1] This is adapted from a literature review undertaken for the Ministry of Education.

Overview of key understandings

1. How adults develop their literacy and numeracy expertise

1.1 Adults engage in learning for their own larger purposes. These purposes are associated with their roles in society as workers, family members and community members.
1.2 Adult learners develop expertise by building on their existing knowledge, skills and experiences.
1.3 Adult learners develop their literacy and numeracy most effectively in contexts that have meaning to them. As learners develop their expertise, their increasing awareness of their knowledge and skills allows them to apply them in a wide range of contexts.
1.4 Adults who have experienced repeated failure are likely to feel anxious and reluctant to engage in further learning.

2. The features of effective embedded literacy and numeracy provision

2.1 Successful approaches to embedding literacy and numeracy clearly link the literacy, numeracy and vocational components of the course.
2.2 Where tutors work as a team, learners are more likely to stay in training and complete literacy and/or numeracy qualifications in addition to vocational qualifications.
2.3 Effective assessment in programmes where literacy and numeracy are embedded makes use of Learning Progressions to provide direction for teaching programmes and to monitor progress toward learning goals.
2.4 Embedded literacy and numeracy provision is facilitated by appropriate organisational policies, management structures, resourcing and working conditions.

3. Managing and sustaining change to achieve effective long-term embedding of literacy and numeracy

3.1 Organisations are more likely to develop and maintain effective approaches to embedding literacy and numeracy when the value of literacy and numeracy is understood and literacy and numeracy are viewed as integral parts of vocational training.
3.2 Teaching materials are important tools that can substantially influence the content and enactment of instruction.
3.3 Professional development programmes can be effective in improving tutor practice and learner performance.
3.4 Assessment data provides valuable information that can be used systematically to improve programmes.

Summary of each key understanding

1. How adults develop their literacy and numeracy expertise

1.1 Adults engage in learning for their own larger purposes. These purposes are associated with their roles in society as workers, family members and community members.

- Learning programmes that are transparent allow adults to see how their learning links to their own particular purposes.
- Adults need to be involved in setting learning goals and monitoring their progress towards these.
- Motivation is a key factor in engagement and achievement. Learners are motivated when they can see the value of learning for their own goals.

1.2 Adult learners develop expertise by building on their existing knowledge, skills and experiences.

- Effective teaching and learning focus on the development of learners' conceptual understandings through meaningful learning experiences.
- Teaching approaches, such as those that are based on constructivist theory, should build on learners' existing knowledge, experiences and understandings, and support individuals to actively construct meaning for themselves.
- As learners develop expertise in a field they become increasingly able to structure their knowledge and develop metacognitive strategies that allow them to monitor their own learning.
- To support adults to learn by building on their existing knowledge, skills and experiences, tutors require a sound knowledge of their subject areas and how aspects of learning in those areas are interrelated.

1.3 Adult learners develop their literacy and numeracy most effectively in contexts that have meaning to them. As learners develop their expertise, their increasing awareness of their knowledge and skills allows them to apply them in a wide range of contexts.

- Thinking and learning depend greatly on the social and cultural contexts in which they occur.
- Learning can be transferred from instructional contexts to work or other everyday situations. Transfer is enabled when instruction is meaningful and learners can see that their learning will be of use to them in their everyday lives.
- Learning is increased through interaction with more knowledgeable individuals who can scaffold developing understandings.

1.4 Adults who have experienced repeated failure are likely to feel anxious and reluctant to engage in further learning.

- Where teaching approaches focus exclusively on correct answers and provide little cognitive support, adult learners who have experienced repeated failure may develop negative perceptions of their own ability.
- Mathematics anxiety decreases the efficiency of the working memory and makes it difficult for individuals to think logically. Adults who have not learned to read or write may see themselves as unable to master literacy skills.

- Educators who model positive attitudes towards literacy and/or numeracy and instruction focused on relevant content in meaningful contexts have been found to positively influence the attitudes of anxious learners.

2. The features of effective embedded literacy and numeracy provision

2.1 Successful approaches to embedding literacy and numeracy clearly link the literacy, numeracy and vocational components of the course.

- Links between literacy and numeracy learning and vocational learning are clearly and explicitly identified.
- Explicit literacy and numeracy instruction is provided as it is required for the vocational task at hand.
- Teaching and learning materials reflect use of literacy and numeracy within the vocation, and are differentiated for learners' varying literacy and numeracy needs.

2.2 Where tutors work as a team, learners are more likely to stay in training and complete literacy and/or numeracy qualifications in addition to vocational qualifications.

- Successful team approaches may involve tutors in joint planning, observation and team teaching as appropriate. Regardless of the approach used, tutors require sufficient time to be allocated to enable them to work together.
- Team approaches are supported where literacy, numeracy and vocational tutors have opportunities to learn from each other.
- Effective teaching teams in adult education are learner focused and share responsibility for learner progress.

2.3 Effective assessment in programmes where literacy and numeracy are embedded makes use of Learning Progressions to provide direction for teaching programmes and to monitor progress toward learning goals.

- Learning continuums describe the growth of knowledge and skills that occurs as learners develop their expertise in a particular area.
- Diagnostic and formative assessment that maps student progress against Learning Progressions provides valuable direction for teaching programmes.
- A range of successful assessment procedures provides both formal and informal feedback to learners about their progress.
- Appropriate literacy and numeracy assessment instruments are useful in adult education.

2.4 Embedded literacy and numeracy provision is facilitated by appropriate organisational policies, management structures, resourcing and working conditions.

- Institutions that adopt a whole-organisation approach to the development and support of embedded programmes are most likely to be effective.
- It is important for administrative procedures and the allocation of practical resources to reflect the importance of literacy, numeracy and vocational learning.

3. Managing and sustaining change to achieve effective long-term embedding of literacy and numeracy

3.1 Organisations are more likely to develop and maintain effective approaches to embedding literacy and numeracy when the value of literacy and numeracy is understood and literacy and numeracy are viewed as integral parts of vocational training.

- Approaches are more likely to be sustained where managers understand that embedded literacy and numeracy are effective in increasing participation and raising achievement.
- Literacy and numeracy teaching is more likely to be effective where it is regarded as an integral part of vocational training.
- Tutors and employers play a key role in communicating the value of literacy and numeracy skills to learners.

3.2 Teaching materials are important tools that can substantially influence the content and enactment of instruction.

- Teaching materials are tools used by tutors as they design instructional programmes. The ways in which tutors use teaching materials are dependent upon their own understandings, the understandings and characteristics of the learners they teach, and the contexts of instruction.
- Because teaching materials directly influence the process of teaching they have been widely used as a tool in instructional reform.
- Teaching materials need to be developed in ways that clearly anticipate the role of the tutor in implementation, and include important information that enables tutors to make decisions about how and when to use the material presented.

3.3 Professional development programmes can be effective in improving tutor practice and learner performance.

- Effective professional development programmes focus directly on the link between learning and tutor practice.
- Effective professional development programmes support tutors to identify and examine their current understandings and approaches as they develop their professional knowledge base.
- Ongoing professional development programmes support tutors to take responsibility for student learning and this provides a sound basis for continuous improvements to knowledge and practice.

3.4 Assessment data provides valuable information that can be used systematically to improve programmes.

- Continuous programme improvement requires organisations to clearly specify learning goals, systematically monitor the progress of all learners towards these goals and then revise teaching programmes on the basis of this information.
- Individual and aggregate measures of achievement enable organisations to focus on improving the performance of both individual learners and the organisation as a whole.
- Professional learning communities can successfully effect and sustain change by highlighting learner performance.

Details of key understandings

1. How adults develop their literacy and numeracy expertise

Key understanding 1.1

Adults engage in learning for their own larger purposes. These purposes are associated with their roles in society as workers, family members and community members.

Research findings

Children attend school because of legal mandates and strong social and cultural forces that view school as the "work of childhood" (Comings, Parrella, & Soricone, 2000, p. 1). In contrast, adults generally make an active choice to participate in educational programmes and they do so in order to achieve broad purposes in their lives.

> We undertake cognitive tasks not merely as ends in themselves but as a means for achieving larger objectives and goals that have meaning in the community (Scribner, 1988).

Adults seek to develop their literacy and numeracy skills in order to gain access to information, give voice to their opinions and ideas, take action to solve problems and create future opportunities in the form of further qualifications. Achieving the purposes they set for themselves enables adults to effectively fulfil their roles in society as workers, family members and community members.

Adults are more likely to engage in learning programmes for sustained periods and achieve success when it is clear to them how their learning is linked to their own particular purposes. Transparent learning programmes acknowledge and support learners by helping them to establish specific learning goals in line with their purposes. In addition, where learners are involved in monitoring their progress towards learning goals they are more likely to persist and achieve success in learning programmes.

Motivation is a key factor in engagement and achievement. Learners are motivated when they can see the value of learning for their own goals. Adults are more likely to be motivated to engage with literacy and numeracy learning when it is embedded within a vocational or leisure course which is their primary motivation.

Implications for practice

Adult learners are more likely to be engaged and achieve success when:

- Learning programmes clearly articulate course content and outcomes to enable adults to be clear about how the learning links with their own particular purposes.
- Course information is clear, unambiguous and accessible. Specific examples of content can be useful in communicating with potential learners.
- Adult learners are involved in setting learning goals and monitoring their progress towards these.
- Learning activities incorporate clearly specified outcomes.

Embedding literacy and numeracy learning within vocational courses will increase adults' motivation for developing their knowledge and skills in literacy and numeracy.

References: Bingman & Stein, 2001; Coben, 2003; Comings, Parrella, & Soricone, 2000; Gillespie, 2002; Gunnarsson, 1997; Roberts, et al., 2005; Scribner, 1988; Swain, et al., 2005.

Key understanding 1.2

Adult learners develop expertise by building on their existing knowledge, skills and experiences.

Research findings

Learners actively construct knowledge as they make sense of new information and experiences by extending or changing their current ideas and understandings (schema). A constructivist approach to teaching and learning focuses on supporting learners to develop expertise through meaningful learning experiences that build on their existing knowledge. (This is in contrast to a behaviourist approach where skills and knowledge are developed through reinforcement.)

Within this approach, the role of the tutor is to support individuals to actively construct meaning for themselves.

> … taking a constructivist approach to building knowledge and skills focuses on helping students develop their understanding and make sense of the world (Bingman & Stein, 2001, p. 19).

Instruction is aimed at developing a "richly structured knowledge base" (Gillespie, 2002, p. 2) by activating prior knowledge and building on the schema learners have. The connections between areas of learning are valued and emphasis is given to the ways in which different areas of content are related.

Teaching is deliberately focused on supporting learners to develop control over strategies by ensuring they have a sound and secure knowledge base. As learners develop expertise in a field they become increasingly aware of the key concepts and/or strategies that help them to structure and utilise their knowledge.

As they develop expertise, learners can be supported to develop metacognitive strategies similar to those used by experts to monitor and control their own thinking processes. Assisting learners to develop and measure their success by reflecting on what they have learnt helps them to take responsibility for their learning and develop independent learning and study skills. It also assists them to adapt their knowledge and skills for different contexts or problems (transfer).

To support adults to learn by building on their existing knowledge and experiences, tutors require a sound conceptual understanding of their subject area and an appreciation of the ways in which different aspects of learning within their area are related. Effective teachers of literacy and/or numeracy possess deep knowledge of the ways in which expertise in these areas is developed and, in particular, of how learners build metacognition that enables them to become independent and to transfer their skills to new contexts.

Implications for practice

Teaching and learning approaches that effectively build on adults' existing knowledge and skills:

- acknowledge and value learners' existing knowledge by supporting them to identify their current understandings and investigate these in the process of building their expertise
- are focused on the development of conceptual understandings and flexible strategy use rather than the memorisation of facts, rules or procedures
- develop reflective and critical thinking and reasoning
- utilise teaching and learning activities that are relevant and meaningful to learners

- articulate key ideas or strategies and organise learning around these
- make explicit links between areas of learning
- support learners to reflect on their own learning in order to gain increased control over their own thinking processes and develop independent study skills, and
- promote the development of conceptual knowledge among tutors.

References: Anderson, 2004; Askew, et al., 1997; Bingman & Stein, 2001; Cobb, 1994; Coben, 2003; Fosnot, 1996; Gillespie, 2002; Ma, 1999; Piaget, 1978; Swain, et al., 2005; von Glasersfeld, 1995.

Key understanding 1.3

Adult learners develop their literacy and numeracy most effectively in contexts that have meaning to them. As learners develop their expertise, their increasing awareness of their knowledge and skills allows them to apply them in a wide range of contexts.

Research findings

A large body of literature has demonstrated that adults' thinking is influenced by the social and cultural contexts in which it occurs. Learning is optimised when it is made as relevant as possible to learners' lives (including their chosen and required roles as adults), the problems they face and the contexts in which these arise.

Adult learning is recognised as a form of participation in social practices: learning is enhanced by social interaction. Vygotsky and other researchers working in the socio-cultural tradition highlight the importance of social interaction in teaching and learning programmes. These researchers outline how learning is enhanced through interaction with more knowledgeable individuals who can scaffold developing understandings. Where adults work collaboratively to develop knowledge and skills in a social context a learning community is developed and new understandings are generated.

Several factors have been found to influence the transfer of learning from instructional contexts to work or other everyday situations. Learning is more easily transferred where learners are aware of the "underlying principles, patterns and relationships" (Gillespie, 2002, p. 1) within content; where instruction is linked to larger ideas that can be translated across contexts, learners are more likely to make this translation. Learners are also more likely to gain transferable knowledge when the instruction is meaningful. Instruction is meaningful for learners when it is engaging and the tasks enable learners to see that their learning will be of use to them in their everyday lives. Such tasks do not necessarily need to mirror an authentic everyday situation. In addition, approaches that acknowledge students' own use of problem-solving strategies and that encourage them to articulate these have also been found to enable transfer.

Implications for practice

Learners will develop literacy and numeracy skills, and are most likely to transfer their learning to new contexts, where teaching and learning programmes:

- clearly convey the key principles and larger ideas within the subject area
- engage learners in meaningful contexts and authentic tasks, and
- support students to articulate their own use of strategies for problem solving.

Learning is increased where learners are part of a collaborative learning community and are given opportunities to:

- be supported by more knowledgeable individuals
- support each other's learning by giving and receiving assistance and advice, and
- engage in group work.

References: Bingman & Stein, 2001; Bruner, 1985; Carraher & Schliemann, 2002; Cobb, 1994; Coben, 2003; Evans, 2000; Gillespie, 2002; Lave, 1988; Saxe, 1988; Swain, et al., 2005; Vygotsky, 1987.

Key understanding 1.4

Adults who have experienced repeated failure are likely to feel anxious and reluctant to engage in further learning.

Research findings

Where teaching approaches focus exclusively on correct answers and provide little cognitive support, learners who have experienced repeated failure may develop negative perceptions of their own ability. For some adults attempting numeracy learning, this can contribute to the development of "mathematics anxiety". Although mathematics anxiety generally develops in childhood, its effects are still felt in adulthood and it is widespread throughout the population.

> Math anxiety is a bona fide anxiety reaction, a phobia with both immediate cognitive and long-term educational implications (Ashcraft, 2002, p. 184).

Mathematics anxiety decreases the efficiency of an individual's working memory because intrusive thoughts and worries take the focus away from the mathematics task at hand. This makes it difficult for individuals to think logically and results in increased errors and longer processing times when solving problems mentally. In the long term, mathematics anxiety leads to decreased competence and reduced course completion rates, which may restrict the career options available to adults.

Adults who have not learned to read and write may have similar problems. Previous educational experience is likely to have been difficult and unsuccessful. Learners may see themselves as unable to master basic literacy skills. Some adults will have become disaffected with, and afraid of, learning in traditional education contexts.

Educators who model positive attitudes towards literacy and/or numeracy learning have been found to positively influence the attitudes of anxious learners and mitigate the effects of anxiety on learning. Where learning programmes are focused on relevant content in meaningful contexts and learners are involved in open-ended activities with extended opportunities for problem solving and discussion, anxiety is also reduced.

Adult learners who aspire to a particular job or career will experience a socialisation process as they train for that position. Where literacy and numeracy skills are integral to vocational training, learners accept these as part of their new professional identity, leading to increased motivation and confidence for learning literacy and numeracy, and decreased anxiety.

Implications for practice

Adult literacy and numeracy educators need to be aware that anxiety will be affecting the learning of some course participants.

The effects of anxiety on learning can be mitigated by:

- tutors who model positive attitudes towards literacy and numeracy
- instructional programmes focused on relevant content in meaningful contexts
- teaching and learning programmes that provide learners with extended opportunities for problem solving and discussion, and
- vocational programmes that include literacy and numeracy skills as an integral part of vocational training.

References: Ashcraft, 2002; Ashcraft & Kirk, 2001; Coben, 2003; Evans, 2000; Roberts, et al., 2005; Swain, et al., 2005; Torgerson, et al., 2004.

2. The features of effective embedded literacy and numeracy provision

Key understanding 2.1

Successful approaches to embedding literacy and numeracy clearly link literacy, numeracy and vocational components of the course.

Research findings

Approaches to embedding literacy and numeracy are more likely to be successful where the links between literacy, numeracy and vocational learning are identified clearly and explicitly. In particular, vocational, literacy and numeracy tutors need to understand the ways in which literacy and numeracy are used in vocational tasks and the literacy and numeracy demands of the learning environment.

Research into effective embedded literacy and numeracy approaches emphasises the importance of the relative timing of literacy, numeracy and vocational instruction. To be effective, literacy and numeracy support needs to be delivered as it is required for the instructional or vocational task at hand. This ensures that the literacy and/or numeracy delivered is "wholly and immediately relevant" (Bates, 2005, p. 26) to learners and helps them to achieve success in the vocational area. Ideally, this support is provided as learners are engaged in a practical task, rather than in a separate classroom and a different time. However, separate provision can be effective if it is closely linked to the vocational learning and taught by tutors who clearly understand and articulate these links.

Once the connections between literacy, numeracy and vocational learning have been established, it is important for all aspects of the teaching and learning programmes to reflect these links. In particular, learning materials will be more relevant for learners where these links are clear, and differentiating these materials for learners' varying literacy and numeracy needs will increase their accessibility.

Implications for practice

Vocational programmes will more effectively integrate literacy and numeracy learning where:

- there are clear and explicit links between vocational, literacy and numeracy content
- vocational, literacy and numeracy tutors understand the ways in which literacy and numeracy are used in specific vocational tasks and activities
- vocational, literacy and numeracy tutors understand the literacy and numeracy requirements of the learning environment
- literacy and numeracy instruction is delivered as it is required for vocational learning
- the connections between literacy, numeracy and vocational learning are clearly evident in teaching materials
- teaching and learning materials are differentiated for learners' varying literacy and numeracy needs.

References: Bates, 2005; Casey, et al., 2006; Cranmer, et al., 2004; National Research and Development Centre for Adult Literacy and Development, 2006; Roberts, et al., 2005.

Key understanding 2.2

Where tutors work as a team, learners are more likely to stay in training and complete literacy and/or numeracy qualifications in addition to vocational qualifications.

Research findings

> Successful teacher teams are strongly motivated to provide embedded provision; they have time to plan and work together, and are willing to learn from each other (National Research and Development Centre for Adult Literacy and Development, 2006).

The implementation of a team approach by vocational, literacy, numeracy and learning support tutors is strongly linked to the effectiveness of embedded literacy and numeracy approaches. However, the ways in which tutors operate as a team vary according to their knowledge, skills and the constraints of the vocational course in which they work. Effective approaches in adult education may involve tutors working collaboratively by planning together, by sharing teaching time and space, team teaching or observing each other at work with learners. Because the relationship between vocational, literacy and numeracy learning is dynamic, tutors need to be able to work together flexibly and recognise the changing priorities at any one time during the vocational training. Regardless of the approach taken, common to all successful teams is the need for vocational, literacy, numeracy and learning support tutors to have sufficient time allocated to work together.

Team approaches are supported where literacy, numeracy and vocational tutors have opportunities to learn from each other. Studies investigating embedded approaches emphasise the "importance of teamwork, underpinned by a level of understanding, on the part of both LLN [literacy, language and numeracy] and vocational teachers, of one another's work" (Casey, et al., 2006, p. 31). In particular, literacy and numeracy tutors need to understand how literacy and numeracy are used both in the classroom and in the workplace that learners are training for. Conversely, vocational tutors require an understanding of the importance of literacy and numeracy, and an ability to adapt vocational content and teaching approaches to reflect the key literacy and numeracy demands involved in each.

Effective teaching teams in adult education are learner focused and share responsibility for learner progress. In practice, this means tutors share vocational objectives for learners and regularly discuss learner progress using shared achievement information.

Implications for practice

Vocational programmes are more likely to effectively embed literacy and numeracy learning where tutors work as a team. Effective team approaches are those in which:

- vocational, literacy, numeracy and learning support tutors have time allocated to work together
- the model of delivery incorporates teamwork in a way that is appropriate for the tutors, students and vocational objectives of the course that they deliver
- joint planning, team teaching and opportunities for tutors to observe each other teaching are used flexibly within teaching and learning programmes
- vocational, literacy and numeracy tutors have opportunities to learn from each other and gain an understanding of each other's areas, and
- tutors discuss learner progress using shared achievement information.

References: Bates, 2005; Casey, et al., 2006; Cranmer, et al., 2004; Ivaniĉ et al, 2006; National Research and Development Centre for Adult Literacy and Development, 2006; Roberts, et al., 2005; Swain, et al., 2005.

Key understanding 2.3

Effective assessment in programmes where literacy and numeracy are embedded makes use of Learning Progressions to provide direction for teaching programmes and to monitor progress toward learning goals.

Research findings

A learning continuum, or progression, clearly describes the growth of knowledge and skills that occurs as learners develop their expertise in a particular area. Effective progressions focus on more than the acquisition of facts or isolated skills; they describe important aspects of learning that distinguish novice from expert. This includes a range of developing skills and abilities, the fluency and independence with which new skills can be applied and the range of situations they can be applied to. Where there are clearly described Learning Progressions that are consistent with the goals of the programme, these can be used to help ensure students' developing knowledge is relevant to the vocation they are training for and useful in achieving their purposes.

Learning Progressions provide valuable direction for teaching programmes. Effective diagnostic assessment establishes where a learner is initially placed on the progression by identifying their current skills and understandings. Teaching can then be directed towards developing the knowledge required to move the learner along the progression. As teaching continues, formative assessment provides information about a learner's progress towards learning goals.

Successful embedded literacy and numeracy provision makes use of diagnostic and formative assessment procedures to provide both formal and informal feedback to learners about their progress. Where learners have a clear picture of their current skills and next learning steps in relation to their learning goals, they are more likely to feel motivated and confident about their learning.

Researchers in adult literacy and numeracy education consider there to be a lack of effective assessment instruments available. They describe the need for the development of meaningful forms of assessment that focus on developing real skills rather than requiring respondents to answer formal types of test questions.

Implications for practice

Effective assessment procedures:

- make use of Learning Progressions that clearly describe how learners' knowledge and skills will grow as they develop their expertise
- use diagnostic assessment information to establish where a learner is initially placed on the learning progression by identifying their current skills and understandings
- use formative assessment to monitor learners' progress towards learning goals, and
- provide formal and informal information to learners about their progress.

References: Bingman & Stein, 2001; Casey, et al., 2006; Coben, 2003; Cranmer, et al., 2004; Cumming & Gal, 2000; Stities, 2002; Swain, et al., 2005; Tertiary Education Commission, 2008; Tertiary Education Commission, 2008; Torgerson, et al., 2004.

Key understanding 2.4

Embedded literacy and numeracy provision is facilitated by appropriate organisational policies, management structures, resourcing and working conditions.

Research findings

Embedded literacy and numeracy provision is more likely to be successful in organisations that adopt a whole-organisation approach to the development and support of embedded programmes. In particular, researchers agree on the importance of managerial support in the development of successful programmes.

> Support for embedding from senior and middle managers through institution-wide policies makes it easier to direct resources in ways that will support embedded LLN (Casey, et al., 2006, p. 32).

The importance of aligning organisational policies, management structures, resourcing and working conditions with effective embedded provision is well recognised in the research literature. Research focused on the development of effective practices to support embedded provision provides examples of the practical ways organisations can support embedded literacy and numeracy learning. In particular, the importance has been identified of appropriate course documentation, organisational polices such as professional development and staff promotion policies, job descriptions and performance management systems. Additional practical constraints such as timetables, teaching spaces and teaching and learning resources have also been identified as factors that support the provision of embedded literacy and numeracy programmes.

Implications for practice

Organisations can support the effective provision of embedded literacy and numeracy programmes by ensuring:

- entry requirements for vocational courses clearly specify required literacy and numeracy
- course objectives and goals incorporate literacy, numeracy and vocational goals
- the professional development policy supports literacy and numeracy tutors to increase their understanding of the vocation, and vocational tutors to increase their understanding of literacy and numeracy
- the staff promotion policy incorporates aspects of literacy and numeracy learning
- job descriptions clearly define the different roles of teaching staff in delivering embedded programmes
- performance management systems reflect the importance of literacy and numeracy within vocational programmes
- timetabling allows for aspects of teamwork and sufficient contact time, and
- teaching facilities and equipment are distributed to support literacy, numeracy and vocational learning.

References: Casey, et al., 2006; DfES, n.d.; Govers, 2008; Roberts, et al., 2005.

3. Managing and sustaining change to achieve effective long-term embedding of literacy and numeracy

Key understanding 3.1

Organisations are more likely to develop and maintain effective approaches to embedding literacy and numeracy when the value of literacy and numeracy is understood, and literacy and numeracy are viewed as integral parts of vocational training.

Research findings

Senior managers play a key role in developing and maintaining embedded literacy and numeracy programmes. When managers understand that embedded literacy and numeracy are effective in increasing participation and raising achievement, programmes are more likely to be sustained. In addition to understanding the benefits of embedded literacy and numeracy, it is important for managers to "fully understand the implications of embedding, both in terms of the practical support it requires but also in terms of pedagogy and teachers' expertise" (Casey, et al., 2006, p. 45). Where managerial support is provided, the effective embedded approaches developed by committed and enthusiastic tutors are more likely to be utilised by other tutors.

Literacy and numeracy teaching is more likely to be effective when literacy and numeracy are regarded as integral parts of vocational training. This is in contrast to approaches that view literacy and numeracy as optional, required only by those learners who need additional learning support.

> Learners improve their literacy, numeracy and other key skills when the whole organisation believes key skills are an essential underpinning for learning vocational skills and technical knowledge (Cranmer, et al., 2004, p. 4).

By positioning literacy and numeracy as essential parts of vocational training the stigma associated with needing assistance is reduced, so learners are more likely to succeed.

Learners who appreciate the value of literacy and numeracy skills for their future career opportunities are more likely to be motivated and achieve success. Tutors and employers play a key role in communicating the value of literacy and numeracy skills to learners. Vocational tutors are more likely to be able to effectively communicate the value of literacy and numeracy skills to learners with regard to their career aspirations because they "… have a natural legitimacy … in the eyes of the learners [because] they represent the role to which the learner aspires" (Roberts, et al., 2005, p. 9). Employers also play a key role in communicating the value of literacy and numeracy to learners. The active involvement and support of employers increase learner motivation and engagement.

Implications for practice

Effective embedded approaches to literacy and numeracy are more likely to be developed and maintained when:

- managers understand that embedded literacy and numeracy are effective in increasing participation and raising achievement
- literacy and numeracy are regarded as integral parts of vocational training, rather than additional support for those with particular learning needs
- tutors effectively communicate the value of literacy and numeracy to learners with regard to their future career opportunities, and
- employers are actively involved in learning and support learners' attendance.

References: Bates, 2005; Casey, et al., 2006; Cranmer, et al., 2004; National Research and Development Centre for Adult Literacy and Development, 2006; Roberts, et al., 2005; Sagan, et al., 2005; Swain, et al., 2005.

Key understanding 3.2

Teaching materials are important tools that can substantially influence the content and enactment of instruction.

Research findings

Teaching can be understood as a process of design.

> Teachers perceive and interpret existing resources, evaluate the constraints of the classroom setting, balance tradeoffs and devise strategies – all in the pursuit of their instructional goals (Brown & Edelson, 2003, p. 1).

Within this view, curriculum materials are a tool used by tutors as they design instructional programmes. The ways in which tutors use learning materials are dependent upon their own understandings, the understandings and characteristics of the students they teach, and the contexts of instruction. Where tutors have a sound understanding of content they tend to improvise instruction, devising learning activities independently from teaching resources. By contrast, where tutors lack understanding, they place responsibility for learning onto teaching materials, following set instructional activities and sequences. Between these two extremes, tutors adapt learning programmes by modifying teaching materials to better address student needs, fit with their teaching style or align with classroom circumstances.

Researchers in this area use the term “enacted curriculum” to acknowledge the difference between the teaching and learning that take place in the classroom and the teaching and learning intended by content frameworks and the developers of teaching materials. This term acknowledges the active role of educators in designing instruction: “… the enacted curriculum is actually jointly constructed by teachers, students, and materials in particular contexts” (Ball & Cohen, 1996, p. 7).

Because teaching materials directly influence the process of teaching they have been used widely as a tool in instructional reform.

> A primary lure of curriculum materials is that, of all the different instruments for conveying educational policies, they exert perhaps the most direct influence on the tasks that teachers actually do with their students each day in the classroom (Brown & Edelson, 2003, p. 1).

Researchers evaluating the effectiveness of such reforms stress that “… the materials themselves matter in teacher interactions with curriculum materials …” (Remillard, 2005, p. 240). They outline that curriculum materials need to be developed in ways that clearly anticipate the role of the tutor in curriculum design. In particular, teaching materials need to include important information that enables tutors to make decisions about how and when to use the material presented. This information may include descriptions of content, effective ways to represent key concepts and the benefits and limitations of these, and information about probable learner responses and the reasoning behind these.

Implications for practice

Effective teaching materials will anticipate the role of the tutor in curriculum design and therefore:

- include descriptions of important content knowledge
- include important representations that can be used to communicate key content to learners and provide information about how these can be used in teaching
- include information about probable learner responses and the reasoning behind these

- include information about the ways in which aspects of learning are related, both in terms of conceptual ideas and across time
- are relevant to tutors' current understandings, and
- are written and presented in ways that communicate effectively with tutors.

References: Ball, 1990; Ball & Cohen, 1996; Ben-Peretz, 1990; Brown & Edelson, 2003; Cohen & Ball, 1999; Pea, 1993; Remillard, 2005; Schmitt, 2000; Sherin & Drake, 2004; Spillane, 2006.

Key understanding 3.3

Professional development programmes can be effective in improving tutor practice and learner performance.

Research findings

Effective professional development programmes are those that focus clearly on the link between learning and tutor practice. As an outcome of such programmes, tutors understand the ways in which their own practice affects the learning that occurs in their classrooms: "The core question is, what do we as teachers need to do to promote the learning of our students?" (Timperley, 2008, p. 11).

Efforts to improve instruction are most likely to produce genuine changes to practice when programmes are focused on developing the professional knowledge base of tutors. Tutors require a comprehensive knowledge of the subject, an understanding of how to teach key concepts effectively and an awareness of how to assess learners' progress in the area.

> Successful professional development efforts are those that help teachers to acquire or develop new ways of thinking about learning, learners, and subject matter, thus constructing a professional knowledge base that will enable them to teach students in more powerful and meaningful ways (Borko & Putnam, 1995, p. 60).

By contrast, where tutor knowledge is not engaged and extended in professional development programmes, participating tutors are likely to adopt surface features of the new approach while maintaining the core content of their previous practice.

Effective professional development programmes provide opportunities for tutors to connect their professional learning with their current understandings and approaches. Because "… teachers' knowledge and beliefs affect how they perceive and act on various messages about changing their teaching" (Borko & Putnam, 1995, p. 59), effective programmes support tutors to clarify their own understandings as they build a professional knowledge base. Effective programmes also address the contexts in which participating tutors' work. New approaches are introduced in a way that "is consistent with the principles of effective teaching but also systematically assists teachers to translate those principles into locally adapted applications" (Timperley, 2008, p. 9).

Research suggests that when tutors are involved in ongoing professional development programmes that are clearly linked to their current teaching situation, they are more likely to take increased responsibility for learner achievement and develop effective teaching practices.

> Change appears to be promoted by a cyclical process in which teachers: have their current assumptions challenged by the demonstration of effective alternative practice, develop new knowledge and skills, make small changes to practice, and observe resulting improvements in student outcomes (Timperley, 2008, p. 14).

Where tutors take responsibility for learner achievement there is a sound basis for continual improvement to knowledge and practice.

Research into effective embedded literacy and numeracy provision highlights the importance of professional development for both the vocational and the literacy and numeracy tutors. In particular, vocational tutors need support to increase their understanding of learners' varying literacy and numeracy needs and develop their knowledge of how literacy and numeracy are used in vocational tasks. Literacy and numeracy tutors need support to develop teaching approaches that are guided by vocational content and recognise the role of literacy and

numeracy in the vocation. Both vocational tutors and literacy and numeracy tutors would benefit from professional development programmes that develop collaborative approaches to teaching.

Implications for practice

Professional development programmes are most likely to lead to improvements in tutor practice and learner performance when:

- tutors are supported to understand the ways in which their own practice affects the learning that occurs in their classrooms
- tutors are supported to identify and examine their current understandings and methods
- tutors are supported to implement new approaches in the specific contexts in which they work
- tutors have an increasing sense of responsibility for learner achievement
- programmes develop tutors' knowledge of content
- programmes develop tutors' understandings of effective pedagogy
- programmes develop tutors' knowledge of how to assess learners' progress
- programmes engage tutors in a range of learning activities: formal and informal, group and individual, planned and unstructured
- programmes involve tutors in an ongoing cycle of professional development, and
- programmes support tutors to make changes to practice and then observe the effects of these.

In effective embedded literacy and numeracy approaches, professional development programmes:

- support vocational tutors to increase their understanding of learners' varying literacy and numeracy needs and develop their knowledge of how literacy and numeracy are used in vocational tasks
- support literacy and numeracy tutors to develop teaching approaches that are guided by vocational content and recognise the role of literacy and numeracy in the vocation, and
- support the development of collaborative approaches to teaching.

References: Askew, et al., 1997; Borko & Putnam, 1995; Butler, et al., 2004; Casey, et al., 2006; Coben, 2003; Franke, et al., 1998; Guskey, 2000; Roberts, et al., 2005; Smylie, 1995; Swain, et al., 2005; Timperley, 2008; Wilson & Berne, 1999.

Key understanding 3.4

Assessment data provides valuable information that can be used systematically to improve programmes.

Research findings

Research into programme improvement highlights the value of achievement data in the process of improving instruction. Within this approach, the "achievement of student outcomes is the criterion for judging the effectiveness of all other programme practices and components" (Bingman & Stein, 2001, p. 23). Achievement data provides a measure of whether learners are successfully meeting learning goals, and this in turn provides information on the effectiveness of teaching programmes and other organisational practices. An effective model of continuous programme improvement requires organisations to clearly specify learning goals, systematically monitor the progress of all learners towards these goals and then revise teaching programmes on the basis of this information.

This approach is consistent with a learning paradigm perspective that views learning as the key responsibility of educational institutions, while the contrasting instructional paradigm emphasises the delivery of instruction as the primary duty of the organisation.

> … in the Learning Paradigm, the power of an environment or approach is judged in terms of its impact on learning. If learning occurs, then the environment has power ... To know this in the learning paradigm we would assess student learning routinely and constantly (Barr & Tagg, 1995, p. 17).

A learning paradigm perspective emphasises the importance of using both individual and aggregate measures of achievement in order to continuously improve the performance of both individual students and the organisation as a whole.

Professional learning communities can successfully effect and sustain change by highlighting learner performance. When tutors work collaboratively to reflect on achievement data and modify teaching approaches "… the entire team gains new insights into what is working and what is not, and members discuss new strategies that they can implement in their classrooms to raise student achievement" (DuFour, 2004, p. 10).

Implications for practice

Organisations are more likely to engage in ongoing cycles of improvement when systems are established to review achievement information regularly.

The use of assessment data to systematically improve programmes is facilitated when:

- learner performance goals are defined clearly
- effective assessment methods are in place to measure progress towards learning goals
- achievement information is aggregated and analysed regularly
- tutors work collaboratively to reflect on achievement data and modify teaching approaches appropriately, and
- instructional programmes and organisational practices are adapted on the basis of insights gained from assessment information.

References: Barr & Tagg, 1995; Bingman & Stein, 2001; DuFour, 2004; Levesque, et al., 1996; Timperley, 2008; US Department of Education, 2003.

Tertiary Education Commission
Te Amorangi Mātauranga Matua

Section Two:
Guidelines for Embedding Literacy and Numeracy

For Institutes of Technology and Polytechnics

NZ SKILLS STRATEGY

Section Two: Guidelines for Embedding Literacy and Numeracy

Introduction

The purpose of these guidelines is to support providers to systematically apply principles of effective practice as they strengthen and extend opportunities for learners to improve their literacy, language and numeracy skills.

The theoretical framework (section one) provides the rationale for embedding literacy and numeracy into other (for example, vocational) provision.[2] The theoretical framework describes three sets of evidence-based understandings about:

1. how adults develop their literacy and numeracy expertise
2. the features of effective embedded practice, and
3. managing and sustaining curriculum change.

These guidelines indicate the ways in which these understandings can be applied to the planning, decision-making and actions for programmes at the local level.

Embedded teaching and learning combine the development of literacy and numeracy with vocational and other skills. The literacy and numeracy skills developed provide learners with the competence, confidence and motivation necessary for them to succeed in the vocational programme, or at work and in life.

Literacy is the written and oral language people use in their everyday life and work; it includes reading, writing, speaking and listening. Skills in this area are essential for good communication, critical thinking and problem-solving in the workforce. It includes building the skills to communicate (at work) for speakers of other languages. Numeracy is the bridge between mathematics and real life. It includes the knowledge and skills needed to apply mathematics to everyday family and financial matters, work and community tasks.

In these guidelines, the term "literacy and numeracy" is used to refer to all of the literacy, language and numeracy skills described. For simplicity, "literacy and numeracy" is used in these guidelines to denote either literacy or numeracy or both.

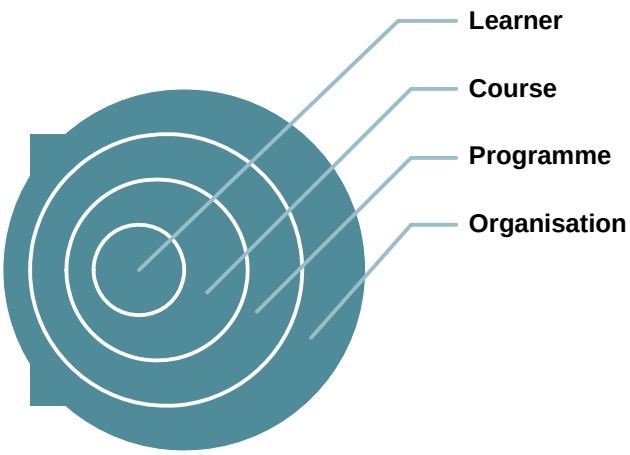
A learner's vocational success can easily be affected by poor development of literacy and numeracy skills. The primary motivation for many learners is their vocational or other goals rather than the specific development of their literacy or numeracy skills. Embedding literacy and numeracy within vocational and other programmes enables learners to develop both sets of skills in a contextualised and meaningful way.[3] The aim is for embedded literacy and numeracy to be recognised and implemented as the norm, not the exception, and this requires sustained changes to many organisational and professional practices.

These guidelines cover three aspects or layers of implementation that organisations will need to consider. As shown in the diagram, the learner is at the centre of a structure that operates at the organisational, programme and course levels.

---

[2] In these guidelines, "vocational" is used in a broad and general sense to indicate any programmes or courses in which learners may be engaged for a variety of purposes but which are not stand-alone literacy or numeracy programmes or courses.

[3] Learning and Skills Council (2007) *Evaluation of Skills for Life Quality Initiative 2005–06.*



For each layer, there are guidelines suggesting specific actions. Each suggested action has a series of prompts and examples that can be used to guide the process of embedding literacy and numeracy. The prompts will assist with considering when and how to embed literacy and numeracy into level 1–3 certificate programmes so that these crucial aspects of learning are made explicit. The actions and prompts will not cover everything that an organisation will need to consider, and some may not be relevant.

This is the first iteration of these guidelines and it is intended that they will be refined and elaborated on during the implementation period from 2009 to 2011.

Embedding literacy and numeracy at the organisational level

Successful embedding of literacy and numeracy is not simply a matter of putting structural features in place. It requires shared understandings and beliefs about the value of embedding, right across the tertiary education organisation (TEO). The evidence is clear that embedding contributes to learners' vocational success and personal development as well as their literacy and numeracy needs when it is valued by the TEO.

Tertiary education organisations need to have policies, management structures and resourcing that support embedded provision in both principle and practice.

There are different approaches to embedding literacy and numeracy into vocational or other programmes. It is important that a TEO adopts an approach that fits its philosophy, the programmes offered, the learners, the staffing and the teaching and learning materials available.

Guideline 1

Include literacy and numeracy in the core business of the tertiary education organisation.

Action:

Develop a literacy and numeracy policy through a process of discussion and consultation involving all stakeholders: managers, staff, learners and funders. The policy should be set in the context of the TEO's overall strategy. The purpose of this policy is to outline the TEO's intentions in relation to literacy and numeracy, and to guide their implementation.

Prompts:

- Is the development of literacy and numeracy considered in principle by the TEO to be relevant to all learners, not only those who have identified literacy and numeracy needs?
- Does the policy situate literacy and numeracy as fundamental components of the TEO's business?
- Does the policy reflect knowledge of national and regional developments, new initiatives and emerging priorities?

Action:

Reflect policy in strategic objectives, business and action plans of the TEO. A TEO's literacy and numeracy policy and associated procedures will be consistent with the strategy of the organisation, reflected in its Investment Plan and aligned with the Tertiary Education Strategy and current Statement of Tertiary Education Priorities.

Prompts:

- Does the TEO have planning and partnership arrangements that ensure it has sound information about the range of local needs, including significance of literacy and numeracy skills gaps for local employers?
- Is the policy to strengthen literacy and numeracy in vocational programmes included in promotional and marketing materials?
- Does the structure identify a person within the senior management team with responsibility and accountability for leading and managing literacy and numeracy policy implementation?
- Are resources for embedding literacy and numeracy included in the TEO's budget?

- Does the TEO have a high-level map of current literacy and numeracy provision and practice across the TEO?
- Is the policy reflected in the TEO's human resources strategy (including recruitment, professional development and performance management)?
- How is the policy supported by other systems and processes within the TEO?

Guideline 2

Develop an action plan for strengthening literacy and numeracy that sets out what the tertiary education organisation wants to achieve, prioritises areas for development, says exactly what will happen when and how progress will be measured.

Action:

Identify suitable programmes for developing an embedded curriculum in 2009 and consider what support these programmes will need in order for literacy and numeracy to be successfully embedded.

Prompts:

- Are there programmes that have a history of learners' literacy and/or numeracy forming barriers to success or retention?
- Are there strategic objectives of the TEO that would suggest a suitable programme (for example, industry advice, specific local needs)?
- Are there particular staff capabilities and interests that can be drawn on and extended?
- What would the review cycle of programmes indicate?
- Are there programmes that would be more suitable than others as starting points (for example, year-long programmes that will allow more opportunities for literacy and numeracy teaching and learning)?
- In what ways has the professional development of vocational and literacy/numeracy tutors been included in the action plan?
- How will vocational tutors be supported to increase their awareness of the literacy and numeracy needs of learners, and to develop their vocational teaching to cater for the differentiation required to meet those needs?
- How will literacy and numeracy tutors be supported to adapt their teaching approach to one that is led by the vocational curriculum?
- Are there programmes that are sufficiently flexible to enable embedding of literacy and numeracy?

Action:

Roll out the plan to 2011.

Prompts:

- Is there a plan to help identify suitable programmes for embedding literacy and numeracy in 2010 and 2011?
- Will the TEO be ready for business as usual (all relevant programmes have literacy and numeracy embedded) in 2011?

Action:

Link the action plan to achieving key performance indicators (KPIs), monitoring the strengthening of literacy and numeracy, and planning for professional development at the organisational level.

Prompts:

- Do the KPIs specify literacy and numeracy?
- Are there systems and processes for tracking or monitoring improvement in learner outcomes (for example, at organisational, programme or course level)?
- Is there evidence of increased staff capacity to embed literacy and numeracy?
- Do staff recruitment and induction practices reflect the intention to embed literacy and numeracy into all aspects of teaching in level 1–3 certificate programmes?
- Does the staff appraisal system recognise skills, knowledge and attitudes relevant to embedding literacy and numeracy?
- In what ways has the professional development of vocational, literacy and numeracy tutors been included in the action plan?
- How will vocational tutors be supported to increase their awareness of the literacy and numeracy needs of learners, and to develop their teaching to cater for the differentiation or adaptations required to meet those needs?
- How will literacy and numeracy tutors be supported to adapt their teaching approach to one that is led by the vocational curriculum?

Embedding literacy and numeracy at the programme level

The purpose of the planning phase at the programme level is to strengthen an existing vocational or other programme so that it includes opportunities for deliberately teaching literacy and/or numeracy, as well as opportunities to practise this learning in meaningful contexts.

Evaluation at the programme level ensures that course, tutor and learner requirements can inform planning so that programmes are responsive to changing needs.

Guideline 3

Consider the impact of embedding on the whole strategy for delivering a programme from recruitment of learners, through to teaching and learning materials, assessment, staffing and timetabling.

Action:

Consult and communicate with stakeholders (including reference groups, learner groups, potential employers, programme staff) to inform literacy and numeracy planning at the programme level.

Prompts:

- Are links made and maintained with stakeholders to seek their input and confirmation of programme planning?
- Are links made and maintained with other local providers (for example, of ESOL programmes, of stand-alone literacy courses and employers who offer work experience) to inform planning for embedding literacy and numeracy into vocational programmes?

Action:

Ensure that literacy and numeracy are embedded within the programme documentation. Documentation includes the programme aims, objectives and/or philosophy; the graduate profile; programme delivery; programme content.

Prompts:

- Is literacy and numeracy development considered in principle to be relevant to all learners, not only those who have identified literacy and numeracy needs?
- How are literacy and numeracy embedded and made explicit in the aims and objectives of the programme?
- How will it be determined whether or not the literacy and numeracy aspects of the graduate profile are met?
- How is the programme structured (through the programme objectives) to support students to build on the literacy and numeracy competencies they have when they start?
- Does the total duration of the programme allow students to gain the competency as defined in the programme objectives?

Action:

Map the high-level numeracy and literacy demands of the courses within the programme then identify key opportunities for strengthening literacy and numeracy within the programme's courses.

Prompts:

- How can the Learning Progressions be used to map the literacy and numeracy demands of courses within the programme?
- What methods are used to identify opportunities within the programme (including individual courses) to embed literacy and numeracy?
- How are decisions made about the ways in which literacy and numeracy will be embedded within a programme?

The diagram illustrates the ways in which literacy and numeracy can be woven through a vocational programme. In some courses, the strands are closely woven together, in one or two courses, there may be a strong literacy or numeracy focus that supports the programme as a whole.

Action:

Identify the literacy and numeracy needs of the target learner group before programme entry and as a part of the end-of-programme assessment.

Prompts:

- What does data from past cohorts show about the literacy and numeracy needs of the learners?
- What methods will be used to establish needs at a high level before entry (for example, pre-programme screening that may use Learning Progressions as a reference)?
- Is planning in place to ensure a roll-out of pre- and post-programme literacy and numeracy assessment by 2010?
- How is literacy and numeracy assessment information at programme entry and exit shared and used at the programme and course levels?

Guideline 4

Analyse staffing within identified programmes and identify how the programme-wide teaching team will operate so that it takes account of programme demands, learner needs, staff capabilities, management and organisational structures, and teaching and learning materials.

Action:

The areas of expertise required for embedding literacy and numeracy in the programme must be acknowledged. Within the programme's teaching team,[4] there needs to be expertise in all relevant areas (vocational subject, literacy and numeracy) as required for the learner group.

Prompts:

- Do managers with responsibility for staff timetables ensure staff who are to work together

[4] Teaching team refers to all teaching staff involved in a programme. It will include vocational or other content tutors as well as literacy and numeracy tutors (for example, learning support staff).

have dedicated time to plan together and opportunities for informal discussions?
- What are the structured opportunities for sharing literacy and numeracy skills within the teaching team to build on current expertise and experience?
- Has there been an analysis of the skills of current programme staff to teach literacy and numeracy within vocational programmes?
- What professional development will be needed for staff to gain the skills necessary for them to embed literacy and numeracy within courses in both the short and long term?
- Are specialist literacy and numeracy tutors or learning support tutors available? If so, how will these resources be used within the programme and what opportunities are there for the specialist teachers to become familiar with the content and style of vocational teaching and learning?

Action:

All tutors need to have an understanding of the importance of embedding literacy and numeracy, and of how literacy and numeracy will be taught within the programme. This should include the use of assessment and teaching methods, target setting and teaching resources.

Prompts:

- Have tutors had and used opportunities to belong to literacy and numeracy cluster groups and to receive relevant professional development? If not, how will this be planned?
- What are the opportunities for active planning within the teaching team to support the strengthening of learners' literacy and numeracy?
- Is there a shared process for addressing each stage of learning, including initial diagnostic assessment, target setting and progress review?
- What resources will be required across the programme to support tutors and learners to meet literacy and numeracy demands?
- How will learners with high levels of literacy and numeracy needs be supported at the programme level?

Guideline 5

Evaluate at programme level to ascertain the outcomes of embedding literacy and numeracy, to report against KPIs and to inform planning.

Action:

Evaluation systems are developed and used to monitor literacy and numeracy aims and objectives, and the teaching team's ability to meet the aims and objectives.

Prompts:

- To what extent have the literacy and numeracy aims and objectives been met?
- Have the literacy and numeracy of learners improved?
- Has embedding of literacy and numeracy enabled learners to better meet vocational or other programme outcomes (for example, retention, completion)?
- Is the teaching team able to identify and meet the literacy and numeracy needs of learners (check for attitudes, knowledge, classroom practice)?
- How will assessment information gathered at the end of programme be used to report in relation to KPIs and to inform future planning?

Embedding literacy and numeracy at the course level

The model for using the Learning Progressions has three points of reference or decision making that work together at the course level: knowing the demands of the course, knowing the learner and knowing what to do. This model is used to inform the guidelines at this level, with the addition of a fourth element: knowing how to do it.

Guideline 6

Identify course learning outcomes for both strands: the vocational or other strand, and the literacy/numeracy strand.

Action:

Identify literacy and numeracy outcomes as well as the vocational or other content outcomes for courses.

Prompts:

- Does the course documentation make the literacy and numeracy outcomes explicit (either within a vocational outcome or expressed as specific literacy or numeracy outcomes)?
- How are the literacy and numeracy outcomes communicated to the learner? Are their benefits made clear?

Guideline 7 (knowing the demands)

Analyse course requirements, content and materials to identify the opportunities for embedding and strengthening literacy and numeracy within the course context.

Action:

Identify requirements and expectations with respect to literacy and numeracy of learners entering this course.

Prompts:

- Are expectations realistic in relation to the literacy and numeracy demands of the course (for example, are they higher or lower than required to complete the course)?
- How are the expectations and the supports available communicated to the learners?
- How flexible is the course structure towards learners whose literacy and numeracy needs are greater than expected or required?

Action:

Use the Learning Progressions and supporting resources to map the demands of the course content and materials.

Prompts:

- Have the Learning Progressions been used to map the literacy and numeracy demands of the key tasks, texts or problems within the course?
- Have the Learning Progressions been used to map the demands of course workbooks and other print materials that learners are required to use?

- Has consideration been given to replacing, rewriting or adapting course materials that place a higher literacy or numeracy demand on learners than they can reasonably be expected to meet?

Guideline 8 (knowing the learner)

Ascertain the literacy and numeracy strengths and needs of individual learners and take these into account in the context of the vocational or other course.

Action:

Identify the strengths and needs of the individual learners in relation to the literacy and numeracy demands of the course.

Prompts:

- What tools and methods will tutors use to determine learners' literacy and numeracy strengths and needs (for example, using the diagnostic tools in the resources that support the Learning Progressions)?
- How is information about the learners' literacy and numeracy strengths and needs gathered, analysed, used and monitored throughout the course?
- How will assessment information be recorded, stored and shared with other tutors and the learners?

Guideline 9 (knowing what to do)

Plan literacy and numeracy activities to meet the needs of the learners and to fit within the work scheme of the course.

Action:

Based on identified demands and needs, plan a sequence of literacy and numeracy activities to match the vocational or other course outline and the literacy and numeracy needs of the learners.

Prompts:

- What are the key learning activities in the course that are designed to strengthen the learners' literacy and numeracy?
- Where are the opportunities for literacy and numeracy activities in existing materials (including workbooks)?
- What support will tutors need to teach the literacy and numeracy skills (for example, the materials that support the Learning Progressions; time to plan, review and collaborate; support from literacy and numeracy tutors)?
- Are relevant literacy and numeracy teaching materials available to all teaching staff to support their practice?

Guideline 10 (knowing how to do it)

Consider the significant and sustained change in the professional practice of many vocational and specialist literacy/numeracy tutors that will be needed to embed literacy and numeracy as the norm in vocational classes.

Action:

Support the teaching practices of vocational, literacy and numeracy tutors so that these practices incorporate the features of best practice based on the theoretical understandings about embedded instruction.

Prompts:

- Is the explicit teaching of literacy and numeracy linked to practical vocational content and activities and to the diagnosed literacy and numeracy needs of the learners?
- Are the literacy and numeracy materials used contextualised to the vocational area?
- Is there differentiation of the vocational subject according to the literacy and numeracy needs of the learners?
- What shifts in practice will be needed to make the current teaching practice most effective?

Action:

Develop and use agreed processes for evaluating literacy and numeracy teaching practices and the effectiveness of these practices in embedding literacy and numeracy into the course content. Evaluation of literacy and numeracy teaching practices is built into every course.

Prompts:

- How will literacy and numeracy teaching practices be evaluated?
- What opportunities are there for individual and teaching team review at the course level?
- How will evaluation information be recorded, shared and used to inform future planning (for example, to identify training needs)?
- For large programmes with multiple courses, how are staffing and timetabling issues evaluated and addressed to meet literacy and numeracy needs across a programme?

Guideline 11

Build assessment and evaluation of literacy and numeracy outcomes as well as vocational or other outcomes into every course.

Action:

Develop and use agreed processes for shared reviews of learner progress in the course against both vocational and literacy and numeracy outcomes.

Prompts:

- How will the literacy and numeracy be assessed in relation to the stated outcomes?
- How are learners helped to assess their own literacy and numeracy needs in relation to the course?
- How do learners receive feedback on their progress in literacy and numeracy?
- What are the consequences if learners do not meet desired literacy and numeracy outcomes by the end of the course?
- How are overall course outcomes evaluated and reported?

Bibliography

Anderson, R. C. (2004). Role of reader's schema in comprehension, learning and memory. In R. B. Ruddell and N. J. Unrau (eds), *Theoretical Models and Processes of Reading,* 5th ed. (pp. 594–606). Newark, Del: International Reading Association.

Ashcraft, M. H. (2002). Math Anxiety: Personal, Educational, and Cognitive Consequences. *Current directions in psychological science: a journal of the American Psychological Society*, 181–185.

Ashcraft, M. H., & Kirk, E. P. (2001). The Relationships Among Working Memory, Math Anxiety, and Performance. *Journal of Experimental Psychology, General, 130* (2), 224–237.

Askew, M., Brown, M., Rhodes, V., William, D., & Johnson, D. (1997). *Effective Teachers of Numeracy.* London: King's College London.

Ball, D. L. (1990). Reflections and Deflections of Policy: The Case of Carol Turner. *Educational Evaluation and Policy Analysis 12* (3), 247–259.

Ball, D. L., & Cohen, D. K. (1996). Reform by the Book: What Is – or Might Be – the Role of Curriculum Materials in Teacher Learning and Instructional Reform. *Educational Researcher*, *25* (9), 6–14.

Barr, R. B., & Tagg, J. (1995, November/December). From Teaching to Learning. *Change*, 12–25.

Bates, S. (2005). Integrating Literacies: The CAVSS approach. *Reflect*, 26–27.

Ben-Peretz, M. (1990). *The Teacher-curriculum Encounter: Freeing teachers from the tyranny of texts.* Albany, NY: State University of New York Press.

Bingman, B., & Stein, S. (2001). *Results That Matter, An Approach to Program Quality Using Equipped for the Future.* Washington, DC: National Institute for Literacy.

Borko, H., & Putnam, R. (1995). Expanding a Teacher's Knowledge Base: A Cognitive Psychological Perspective on Professional Development. In T. Guskey, & M. Huberman (Eds.), *Professional Development in Education, New Paradigms and Practices* (pp. 35–66). New York, NY: Teachers' College Press.

Brown, M., & Edelson, D. (2003). *Teaching As Design: Can we better understand the ways in which teachers use materials so we can better design materials to support their changes in practice?* Evanston, Ill: The Center for Learning Technologies in Urban Schools.

Bruner, J. (1985). Vygotsky: A historical and conceptual perspective. In J. Wertsch (Ed.), *Culture, Communication, and Cognition: Vygotskian perspectives* (pp. 21–34). Cambridge: Cambridge University Press.

Business New Zealand; New Zealand Council of Trade Unions; Industry Training Federation; New Zealand Government (2008). *New Zealand Skills Strategy Action Plan 2008*. Accessed 22 September 2008, from NZ Skills Strategy: http://www.skillsstrategy.govt.nz/.

Butler, D. L., Lauscher, H. N., Sandra, J. S., & Beckingham, B. (2004). Collaboration and self-regulation in teachers' professional development. *Teaching and Teacher Education*, *20*, 435–455.

Carraher, D. W., & Schliemann, A. D. (2002). Is Everyday Mathematics Truly Relevant to Mathematics Education? (J. Moshkovich & M. Brenner, Eds.) *Monographs of the Journal for Research in Mathematics Education*, *11*, 131–153.

Casey, H., Cara, O., Eldred, J., Grief, S., Hodge, R., Ivanič, R., et al. (2006). *"You Wouldn't Expect a Maths Teacher to Teach Plastering ..." Embedding literacy, language and numeracy in post-16 vocational programmes – the impact on learning and achievement.* London: NRDC.

Cobb, P. (2007). Putting Philosophy to Work: Coping With Multiple Theoretical Perspectives. In F. K. Lester, *Second Handbook of Research on Mathematics Teaching and Learning: A project of the National Council of Teachers of Mathematics* (pp. 3–38). Charlotte, NC: Information Age Publishing.

Cobb, P. (1994). Where Is the Mind? Constructivist and Sociocultural Perspectives on Mathematical Development. *Educational Researcher*, *23* (7), 13–20.

Coben, D. (2003). *Adult Numeracy: Review of research and related literature.* London: NRDC.

Cohen, D. K., & Ball, D. L. (1999). *Instruction, Capacity and Improvement.* Philadelphia: University of Pennsylvania, Consortium.

Comings, J., Parrella, A., & Soricone, L. (2000). Helping Adults Persist: Four Supports. *Focus on Basics*, *4* (A), 1–6.

Cranmer, S., Kersh, N., Evans, K., Jupp, T., Casey, H., & Sagan, O. (2004). *Putting Good Practice into Practice: Literacy, numeracy and key skills within apprenticeships.* London: NRDC.

Cumming, J., & Gal, I. (2000). Assessment in Adult Numeracy Education: Issues and principles for good practice. In I. Gal (Ed.), *Adult Numeracy Development: Theory, research, practice* (pp. 305–333). Cresskill, NJ: Hampton Press.

DfES Skills for Life Strategy Unit (undated). *Raising Standards Guides: Further Education Colleges.* Retrieved 15 August 2008, from Department for Children, Schools and Families: http://www.dcsf.gov.uk/readwriteplus/raisingstandards/fec2/leadership/howeffective/howtosuccess/.

DuFour, R. (2004, May). What is a "Professional Learning Community"? *Educational Leadership*, 6–11.

Evans, J. (2000). *Adults' Mathematical Thinking and Emotions: A study of numerate practices.* New York: Routledge Falmer.

Fosnot, C. (1996). Constructivism: A Psychological Theory of Learning. In C. Fosnot (Ed.), *Constructivism: Theory, Perspectives, and Practice* (pp. 8–33). New York, NY: Teacher's College Press.

Franke, M. L., Carpenter, T., Fennema, E., Ansell, E., & Behrend, J. (1998). Understanding Teachers' Self-Sustaining Generative Change in the Context of Professional Development. *Teaching and Teacher Education*, *14* (1), 67–80.

Gillespie, M. K. (2002a). *EFF Research Principle: A Contextualized Approach to Curriculum and Instruction.* Washington, DC: National Institute for Literacy.

Gillespie, M. K. (2002b). *EFF Research Principle: A Purposeful and Transparent Approach to Teaching and Learning.* Washington, DC: National Institute for Literacy.

Gillespie, M. K. (2002c). *EFF Research Principle: An Approach to Teaching and Learning That Builds Expertise.* Washington, DC: National Institute for Literacy.

Govers, E. (2008). *Starting from Scratch: An exploration into embedding literacy and numeracy in existing programmes.* Eastern Institute of Technology. .

Gunnarsson, B. L. (1997). The writing process from a sociolinguistic viewpoint. *Written Communication*, vol. 14, no. 2, 139–150.

Guskey, T. (2000). *Evaluating Professional Development.* Thousand Oaks: Corwin Press Inc.

Ivanič, R., Appleby, Y., Hodge, R., Tusting, K., and Barton, D. (2006). *Linking Learning and Everyday Life: A Social Perspective on Adult Literacy, Language and Numeracy Classes.* National Research Development Council Report. London: NRDC.

Lave, J. (1988). *Cognition in Practice: Mind, mathematics, and culture in everyday life.* Cambridge: Cambridge University Press.

Learning and Skills Council (2007). *Evaluation of Skills for Life Quality Initiative 2005–06*.

Levesque, K., Bradby, D., & Rossi, K. (1996). Using Data for Program Improvement: How Do We Encourage Schools To Do It? *Centrefocus*, *12*, 1–6.

Literacy and Basic Skills Program of the Ottawa-Carleton District School Board (2004). *An Exploration of Collaborative Materials Development in Adult Numeracy Teaching*. Retrieved 19 August 2008, from National Adult Literacy Database: http://www.nald.ca/fulltext/cmdreport/cover.htm.

Ma, L. (1999). *Knowing and Teaching Elementary Mathematics: Teachers' understanding of fundamental mathematics in China and the United States.* Mahwah, NJ: Lawrence Erlbaum Associates.

Ministry of Education (undated). *Tertiary Education Strategy 2007–12 incorporating the Statement of Tertiary Education Priorities 2008–10*. Wellington: Ministry of Education.

National Research and Development Centre for Adult Literacy and Development (2006). *Skills for Life Quality Initiative, Embedded Teaching and Learning.* London: NRDC.

Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Pea, R. D. (1993). Practices of distributed intelligence and designs for education. In S. G (Ed.), *Distributed Cognitions, Psychological and Educational Considerations* (pp. 47–87). New York: Cambridge University Press.

Piaget, J. (1978). *The Development of Thought, Equilibration of Cognitive Structures.* (A. Rosin, Trans.) Oxford: Basil Blackwell.

Remillard, J. T. (2005). Examining Key Concepts in Research on Teachers' Use of Mathematics Curricula. *Review of Educational Research*, *75* (2), 211–246.

Roberts, C., Baynham, M., Shrubshall, P., Brittan, J., Cooper, B., Gidley, N., et al. (2005). *Embedded Teaching and Learning of Adult Literacy, Numeracy and ESOL: Seven case studies.* London: NRDC.

Sagan, O., Waite, E., Cowan, S., Casey, H., & Evans, K. (2005). *Putting Good Practice into Practice: Literacy, numeracy and key skills in apprenticeships.* London: NRDC.

Saxe, G. (1988). Candy Selling and Math Learning. *Educational Researcher*, 14–21.

Schmitt, M. J. (2000). Developing Adults' Numerate Thinking: Getting Out From Under the Workbooks. *Focus on Basics*, *4* (B).

Scribner, S. (1988). Head and Hand: An Action Approach to Thinking. *Annual Meeting of the Eastern Psychological Association.* Arlington, VA.

Sherin, M., & Drake, C. (2004). *Janine Remillard*. Retrieved 19 August 2008, from The University of Pennsylvania Graduate School of Education: http://www.gse.upenn.edu/~janiner/pdf/Sherin.drake.curricmodels.pdf.

Smylie, M. A. (1995). Teacher Learning in the Workplace: Implications for School Reform. In T. Guskey & M. Huberman (Eds.), *Professional Development in Education, New Paradigms and Practices* (pp. 92–113). New York: Teachers College Press.

Spillane, J. P. (2006). *Distributed Leadership.* San Francisco: Jossey-Bass.

Stities, R. (2002). *EFF Research Principle: An Approach to Assessment Based on Cognitive Science*. Washington, DC: National Institute for Literacy.

Swain, J., Baker, E., Holder, D., Newmarch, B., & Coben, D. (2005). *'Beyond the daily application': Making numeracy teaching meaningful to adult learners.* London: NRDC.

Tertiary Education Commission (2008a). *Literacy, Language and Numeracy Action Plan 2008–2012*. Wellington: Tertiary Education Commission.

Tertiary Education Commission (2008b). *Learning Progressions for Adult Literacy and Numeracy: Background Information.* Wellington: Tertiary Education Commission.

Tertiary Education Commission (2008c). *Learning Progressions for Adult Numeracy.* Wellington: Tertiary Education Commission.

Timperley, H. (2008). *Teacher Professional Learning and Development, Educational Practices Series; 3.* Brussels: International Bureau of Education.

Torgerson, C., Brooks, G., Porthouse, J., Burton, M., Robinson, A., Wright, K., et al. (2004). *Adult Literacy and Numeracy Interventions and Outcomes: A review of controlled trials.* London: NRDC.

US Department of Education (2003). *Using NRS Data for Program Management and Improvement.* Washington, DC: American Institutes for Research.

von Glasersfeld, E. (1995). A Constructivist Approach to Teaching. In L. Steffe & J. Gale (Eds.), *Constructivism in Education* (pp. 3–15). Hillsdale, NJ: Lawrence Erlbaum Associates.

Vygotsky, L. S. (1987). Thinking and Speech. In L. S. Vygotsky, R. W. Rieber & A. S. Carton (Eds.), *The Collected Works of L. S. Vygotsky* (N. Minick, Trans., Vol. 1, pp. 37–285). New York: Plenum Press.

Wilson, S. M., & Berne, J. (1999). Teacher Learning and the Acquisition of Professional Knowledge: An Examination of Research on Contemporary Professional Development. *Review of Research in Education*, *24*, 173–209.

Glossary of Terms

Competency	The knowledge, cognitive and practical skills, and the attitudes (including motivation) needed to meet demands or carry out tasks successfully.
Context, contextualise	Contextualising literacy and numeracy learning means using topics, tasks or situations from the contexts learners are in (for example, a vocational course, a workplace) as the basis for literacy or numeracy instruction.
Course	A specific and prescribed series of instructional or study tasks or sessions. Several courses may together form a programme of study.
Curriculum	The content of a course or programme; the topics, tasks and activities that, together, form the teaching and learning within a course.
Demands	Requirements or needs for a task, for example, the reading skill required to read and interpret a document
Diagnostic	Used to identify, indicate or characterise something. For example, a diagnostic assessment is used to identify specific skills.
Embedded teaching and learning	Teaching and learning of one subject or skill (for example, literacy) within the context and tasks of another subject or skill (for example, panel beating).
Integrated instruction	This term is used to describe the weaving together of vocational instruction with literacy and numeracy instruction. In New Zealand this is now referred to as “embedded instruction”.
Key performance indicators	The most relevant indicators or achievements used to evaluate the work performance of an organisation, a team or person.
Learning support tutor	A tutor who provides support to learners (and/or their tutors) who have learning difficulties. These difficulties typically include literacy or numeracy. Support may be provided in a variety of ways.
Literacy	Literacy is the written and oral language people use in everyday life and work. A person’s literacy refers to the extent of their oral and written language skills and knowledge and their ability to apply these to meet the varied demands of their personal, study and work lives.
Needs	The knowledge, skills and abilities that are necessary in order to perform particular tasks or to carry out particular activities.
Numeracy	Numeracy is the bridge between mathematics and real life. A person’s numeracy refers to their knowledge and understanding of mathematical concepts and their to

	ability to use their mathematical knowledge to meet the varied demands of their personal, study and work lives.
Outcomes	Results. The achievement of the goals set for a particular programme, course or learners.
Programme	A planned and coordinated sequence of study to achieve a specified aim. A programme is often made up of separate or linked courses.
Qualification	A recognised acknowledgement that a person has satisfactorily completed a prescribed programme or course of study.
Specialist literacy and/or numeracy tutor	A tutor who has expertise in literacy and/or numeracy instruction. Specialist literacy and/or numeracy tutors provide support to learners and other tutors in a variety of ways, most often through supporting embedded literacy and numeracy in vocational or other programmes.
Strengths	Abilities, skills or knowledge.
Teaching team	The group of people who, together, are responsible for instruction within a programme. In a tertiary organisation, teaching teams may comprise a mix of tutors who are specialists in subject, discipline, vocational or work areas as well as tutors who are specialists in teaching literacy and/or numeracy.
Tertiary education organisation	Institutes of technology and polytechnics, universities, wānanga, private training establishments, industry training organisations, other tertiary education providers, rural education activities programmes.
Vocational	Related to work or other purposeful outcomes. Vocational programmes prepare learners for a specific community or employment area or teach general work-related skills.