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WORKING IN THE LIGHT OF EVIDENCE, AS WELL AS ASPIRATION

A LITERATURE REVIEW OF THE BEST AVAILABLE EVIDENCE ABOUT EFFECTIVE ADULT LITERACY, NUMERACY AND LANGUAGE TEACHING

Prepared for the Tertiary Education Learning Outcomes Policy Group,
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John Benseman
Alison Sutton
Josie Lander

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Our report title is used acknowledging Diana Coben's statement (2003, p. 116) that detailed critical studies are required "before it will be possible to delineate good practice in the light of evidence rather than aspiration." We think aspiration is still necessary alongside research evidence.

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GLOSSARY

ABE	Adult basic education
ACE	Adult and community education
ALLS	Adult Literacy and Life-Skills Survey
ALAF	Adult Literacy Achievement Framework (draft)
AR	At risk learners
BSA	Basic Skills Agency (UK)
CAI	Computer Aided Instruction
CASAS	Comprehensive adult student assessment system
CTs	Controlled Trials (also known as quasi-experimental research): uses treatment and control groups, but the participants are not randomly assigned and may have unseen differences; statistical controls allow researchers to compensate for the differences between the two groups
Effect size	A way of quantifying the effectiveness of a particular intervention, relative to some comparison intervention.
Empirical research	Based on valid and reliable data (rather than theory or opinion); data may be quantitative or qualitative
ESOL	English for Speakers of Other Languages
GED	General Education Development qualification
IALS	International Adult Literacy Survey
ICT	Information communication technology
LD	Learning disabilities (including dyslexia)
LNL	Literacy, numeracy and language
MFLP	Manukau Family Literacy Project
NCSALL	National Center for Study of Adult Learning and Literacy (USA)
NRP	Report on the National Reading Panel: Teaching children to read
NRDC	National Research and Development Centre for Adult Literacy and Numeracy (UK)
Phonemes	The smallest unit of sounds in a word
Phonemic awareness (PA)	The ability to hear, differentiate and attend to the individual sounds in a word
Phonics	The relationship between sounds and the letters that represent them
PAC	Parent and child together time (a component of the Keegan model for family literacy)

RCT	Randomised controlled Trials (also known as experimental research designs) using two identical groups of participants randomly assigned to treatment and control groups
TABE	Test of Adult Basic Education (a US assessment tool)
TALS	Test of Applied Literacy Skills (a US assessment tool)
Tutors	Adult literacy teachers, who may be paid or voluntary
Tuition	Teaching or instruction
Wananga	A public tertiary institution that provides programmes with an emphasis on the application of knowledge regarding Maori traditions and custom
Whanau	Family

EXECUTIVE SUMMARY

Project brief and background

The purpose of this literature review is to provide a critical evaluation of the available research evidence about effective practices in literacy, numeracy and language (LNL) teaching and programme provision in order to inform policy development within the broader arena of foundation learning.

This review has sought original research studies that reliably relate specific aspects of teaching practice and programmes' operations to learning outcomes – especially demonstrable changes in the literacy skills of learners. Over the last three decades there has been a considerable amount of research and writing in the sector, most of which did not meet the criteria for this review. Evaluation studies are by far the most common type of research. Their purpose is usually to illustrate programme benefit and learner gain but they rarely supply sufficient evidence of learner gain or evidence of the specific factors that may have lead to it, to warrant inclusion in this review. There is also a significant body of literature that discusses approaches to teaching and programme organisation that appear to be more driven by philosophy and definitions of literacy than by empirical evidence of what works and have therefore not been included.

Despite the growing recognition of the importance of LNL, there is still a dearth of specific research relating to this area in New Zealand and the situation is only marginally better overseas. It is noteworthy however that in the process of undertaking this review, we have become aware of a considerable number of substantial, intervention studies that are currently underway or due for completion in 2005-2006. The results of these studies are likely to be very useful to us in future.

Methodology

Two experienced database researchers initially undertook a systematic search of more than 60 databases and research web pages using a combination of key words derived from the project brief. The intent was to locate high quality studies (either quantitative or qualitative) that demonstrated a clear relationship between learner outcomes and specific components of teaching or provision. All potential studies (in excess of 500) were initially read where possible (usually on-line) and screened for relevance to the project. More than 300 studies broadly matching the project brief were then located and acquired through downloads, library interloan or direct access. Each of these articles was then read by at least two of the research team and rated for its validity in terms of the project brief. Studies that satisfied both reviewers were included in the review.

Initially we were seeking experimental research studies.[1] However, the overall quality of the studies located was not particularly high and fell somewhat short of comparable reviews carried out in schooling and the early childhood sectors. On the

[1] Either randomised controlled trials, or controlled trials, where groups of learners received different interventions and any effects were statistically measured.

advice of the project's technical advisor Professor John Hattie, the scope of the research was expanded to include case studies, observational studies and collections of professional wisdom from practitioners, in order to ensure a reasonable pool of studies to consider and to identify 'the best available evidence'.

Findings

The findings of this review need to be considered tentative, due to the limitations of the research base from which they are drawn. The difficulties of researching adult LNL have already been described; research to date has been of variable quality and much of it has involved such small sample size that it is difficult to generalise from the findings. Therefore, we cannot present a list of factors that will definitively ensure effective teaching of adult literacy, numeracy and language learners and result in learners' gaining LNL skills.

However, an analysis across the strongest studies and reviews found some congruency of findings, which enables us to group those findings and have some confidence that the particular factors identified are likely to contribute to learner gain.

Factors that appear likely to enhance learner gain include:

- *Appropriately skilled teachers who can identify the strengths and weaknesses learners have in speaking, reading, writing and numeracy*.[2] Findings from two studies suggest that full-time teachers are more likely to enhance learner gain, and that learners benefit when there is assistance from teacher aides or volunteer tutors. Findings also suggest the importance of teachers having adequate non-teaching time for planning and professional development (Basic Skills Agency, 2000; Benseman, 2001; G Brooks et al., 2001; Fitzgerald & Young, 1997; Kruidenier, 2002b; Padak, Sapin, & Baycich, 2002).
- *Deliberate and sustained acts of teaching, clearly focused on learners' diagnosed needs.* All LNL learners, including those who have learning disabilities or dyslexia, would benefit from teachers who are able to offer a range of teaching strategies. Many studies commented that the actual amount of deliberate teaching in LNL programmes was often not very high. (Basic Skills Agency, 2000; Condelli, 2003; Condelli & Wrigley, 2004a; Kruidenier, 2002b; Rice & Brooks, 2004; H.S Wrigley, 2003)
- *A curriculum that is linked to the authentic literacy events that learners experience in their lives.* An authentic curriculum appears to lead to gain for learners in family literacy, for ESOL learners and for mainstream LNL learners (supported by more tentative findings that an authentic curriculum assists in achieving learner gain in workplace and prison programmes). (Condelli, 2003; Condelli & Wrigley, 2004a; Kruidenier, 2002b; Padak & Padak, 1991; Purcell-Gates, Degener, Jacobson, & Soler, 2002)
- *Programmes that allow for high levels of participation, probably more than 100 hours of tuition*. Learners with low levels of skill need more tuition for

[2] This finding resonates with the research on effectiveness in New Zealand schools (Hattie, 2002a), where "what teachers know, do and care about" is recognised as one of the greatest influences on student learning (p. 7).

longer, as do ESOL learners. It should be noted that the research reviewed had a mix of findings. Three studies (including one ESOL study) found learners made gain when receiving over 100 hours teaching (with one study suggesting learners would need 300+ hours to move between levels). Two other findings suggested fewer hours might also be effective; one of these found learners improved when learners had more than 50 hours provision; while in another the greatest level of improvement occurred when learners had 51-60 hours between pre- and post-tests. Researchers commented that, regardless of the exact number of hours before learners made gains, for many LNL participants the total hours of teaching received were likely to be considerably less than the figures suggested above. While most of the research focused on total amount of provision, the intensity or regularity of tuition is probably also important. For example, one study suggested that learners made less gain once they received more than nine hours teaching per week. Intensive courses may be particularly important. For some ESOL learners, regular attendance was a more significant variable in achieving skills than the actual hours per week. (Basic Skills Agency, 2000; Boudett & Friedlander, 1997; Comings, 2003; Kruidenier, 2002b; Shameem, McDermott, Blaker, & Carryer, 2002)

- *Explicit teaching of reading, by teachers who are well trained in the reading process, and who are skilled in identifying reading difficulties and using appropriate teaching strategies to address them.* Findings suggested learners are more likely to make gain when there is explicit, structured teaching of alphabetics, fluency, vocabulary building and comprehension. ESOL learners gain when there is explicit teaching of comprehension and vocabulary. Reciprocal reading was identified as an effective teaching strategy; others what warrant further investigation include oral reading, strategies to increase comprehension and fluency-related strategies. (Besser et al., 2004; Kruidenier, 2002b; Rich & Shepherd, 1993; Sabatini, 2002; Snow & Strucker, 2000)

- *On-going assessment that takes into account the variation in learners' skills across the dimensions of reading and writing*. Assessment processes need to incorporate measurement of all four components of reading: alphabetics, fluency, vocabulary and comprehension. The assessment of reading needs to use more than silent reading and oral comprehension questions as assessment tools. A study of learners' perspectives also identified the importance of on-going assessment. (Besser et al., 2004; Davidson & Strucker, 2002; Kruidenier, 2002b; Ward, 2003)

- *ESOL programmes structured to maximise oral communication, discussion and group work*. Findings suggest learners make gain, particularly in comprehension, when there are bi-lingual tutors who teach concepts and explain learning tasks and instructions using learners' first languages and when they attend regularly. (Condelli & Wrigley, 2004; Condelli & Wrigley, 2004a; C. Roberts et al., 2004; Shameem et al., 2002)

- *Programmes that deliver clearly structured teaching using a range of methods*. Provision needs to occur in a range of contexts that: meets learners' needs; that allows for learning plans for every learner; and where those plans are related to regular assessments and reviews with learners. Most of these factors are not necessarily unique to LNL teaching – they should be components of any quality adult education provision. (Basic Skills Agency, 2000; Boudett & Friedlander, 1997; G Brooks et al., 2001; G. Brooks et al., 2001; Comings, Parrella, & Soricone, 1999, 2000; Condelli & Wrigley, 2004a; Eldred, 2002; Yaffe & Williams, 1998)

- *Writing programmes that use writing based on expressing learners' experiences and opinions.* Programmes that include project-based instruction that focus on issues of common interest, on authentic tasks and materials and that encourage a variety of writing activities are more likely to promote gain. (Gillespie, 2001; Kelly, Soundranayagam, & Grief, 2004; Purcell-Gates et al., 2002)
- *Making efforts to retain learners, including pro-active management of the positive and negative forces that help and hinder persistence.* Findings suggest that childcare, transport assistance, and access to social services make a difference, as does building self-efficacy and self-confidence in learners and ensuring that learners receive personalised attention. (Comings et al., 1999; Eldred, 2002; B. A. Quigley & Uhland, 2000; Yaffe & Williams, 1998)
- *Family literacy programmes that have a clear focus on literacy/numeracy development:* Findings suggested that programmes that are more likely to ensure gain have parents committed to improving their children's chances, have teaching sessions for parents only and children only, as well as together; have home visits; collaborate with other participating groups, to ensure programme and services integration; and have staff whose skills match the unique challenges of family literacy. (Alamprese, 2001b; Benseman, 2002, 2003c, 2004; Padak, Rasinski, & Mraz, 2002; Philliber, Spillman, & King, 1996; St Pierre et al., 2003; St. Pierre et al., 1995)

There are some factors that may enhance learner gain, but for which there has been only limited research and where findings are even more tentative:

- Programmes that have an awareness and management of critical periods in the programme (when learners were susceptible to failure and/or withdrawal); provide pastoral care in times of need and crisis; have adequate fiscal resources and facilities; have administrative leadership.
- Teaching staff who undertake regular professional development; praise and encourage learners; are open as people to their students and have both credibility in their field and a passion for their subject.
- Assessment that includes self-assessment by learners, and constructive, verbal feedback from the tutor.
- Teaching that creates a positive and supportive learning environment; is able to balance challenge and support for learners; encourages peer support in the form of sharing skills and ideas and friendships; accentuates learners' strengths. Again, these attributes appear to be aspects of good adult education practice.
- Computer Assisted Instruction may be a fruitful teaching strategy in teaching mathematics and other aspects of LNL in comparison with 'traditional' teaching and with learners with low levels of skill; does not replace skilled teachers; may motivate learners and develop self-confidence.
- Reading programmes that ensure learners' prior knowledge is used from the beginning (in integrated programmes), rather than assuming that adult beginning readers need to concentrate on strategies for processing print first; that include various strategies related to teaching alphabetics, fluency, vocabulary and comprehension as suggested in K-12 research; that teach learners to monitor their comprehension and understanding as they read; and

that are at least 70% on task (i.e. that the majority of time is spent on reading and writing tasks).

- Family literacy programmes that: have public celebrations of key events and achievements and that have a 'second step' programme for the adult learners as they move on from the programme to maintain the "community of learning".
- Community-based programmes that: have community ownership of programs and resources and where there is trust and collaboration between providers and communities.
- Bridging programmes that: are centralised, especially their co-ordination (rather than being run in individual academic departments).
- Workplace literacy programmes where there is commitment from the participating company, tuition occurs during work time and where curriculum is related to real-life demands.
- Prison-based programmes that: incorporate a community-building process into their reading programme; and where there is contextualised content in reading teaching, as this increases attendance rates and levels of engagement.

Fourthly, there are factors that are *not* supported by research evidence at this time.

- There are no clear findings that one form of delivery (1:1/small group/class) or context is better than any other. There were numbers of studies with very small numbers of learners saying 1:1 is effective, as well as others saying that participation in small groups is what makes programmes 'not like school'. There was evidence that a range of factors will impact on effectiveness in any form of delivery or context e.g. students' motivations to attend and their life stages, the language and literacy diversity of students within a group, strategies to retain students, the extent programmes use authentic contexts and materials, the intensity of instruction and the skill of the teachers.
- There is no evidence to support a policy of differentiating dyslexic from non-dyslexic students in adult literacy, numeracy and ESOL.
- The research evidence on numeracy does not provide guidance on the time and the nature and extent of teaching required for adults to make significant progress.

Finally, we were not able to identify any research that met the criteria for our study on the following subjects listed in the research brief.

- integrated or embedded provision
- any socio-demographic characteristics of tutors
- strategies related to teaching te reo Maori or Maori programme provision
- factors associated with progress in numeracy
- assessment and its effect on learning outcomes.

Recommendations

The methodologies of any New Zealand studies need to be enhanced in a number of ways:

- Ensuring that all studies (even if when there are problems with methodologies or findings) are released into the public arena: without critical review of the work being done, the foundation learning field cannot mature and develop.
- Learning from overseas by tracking the large scale studies being developed by specialised LNL research organisations and replicating appropriate studies so we can build systematically on a larger body of knowledge.
- Reducing the number of small studies and maximising learner numbers in any projects undertaken so that findings have the potential to be more generalisable. Small-scale intensive insight studies may be more appropriate for the New Zealand context and scale of provision than larger controlled trials but nonetheless, we need to endeavour to achieve reasonable sample sizes.
- Ensuring systematic literature reviews are conducted for all research projects and the findings integrated into final reports.
- Efforts are made to disseminate findings to practitioners in a number of ways including, but not restricted to print publications.

A research programme could usefully be developed over the medium term in a number of areas, including (but not limited to):

1. **LNL teachers**: this review has showed how central LNL teachers are in achieving learner outcomes and yet we know remarkably little about who these people are, the contexts and nature of their employment and the organisation of their work, their motivations and aspirations, training, issues and philosophies of teaching and the impact of professional development they undertake etc. A large-scale survey would provide useful baseline information for the future expansion of both initial and on-going professional development programmes. Any study should encompass whether tutors work with ESOL learners and/or teach numeracy. When investigating numeracy information would be useful on what they teach, what their professional development needs are; and their beliefs and perceptions of self-efficacy related to their own numeracy.

2. **Specific teaching methods for reading**: New Zealand has had a long history of research into child-related reading that has been largely untapped by the adult LNL sector. There is scope to take some of the methods identified as potentially useful in this review and construct research to test their effectiveness in New Zealand LNL contexts. Some aspects that warrant attention include: reciprocal reading, which the research indicates is an effective means for teaching adults, oral reading, and strategies to develop fluency and comprehension.

3. **Authentic curriculum:** it would be very useful to identify to what extent authentic curriculum is being incorporated into teaching across the variety

of contexts of LNL provision in New Zealand, and analyse issues around its use and the opportunities this approach offers us.

4. **Learner-focused longitudinal research**: a longitudinal, intensive study of approximately 20-30 learners over two years (with the expectation of 5-10 dropping out over that period) could provide information about what learners believe they learn, how their LNL skills progress and what they believe has helped and hindered them. A case study approach would also provide a rich description of additional programme factors, for example, effective recruitment, attendance patterns, barriers to participation, and learner progression on to other outcomes in work and education.

1 INTRODUCTION

1.1 Background

New Zealand's participation in the second round of the International Adult Literacy Survey (IALS) in 1996 (OECD, 1997) was an important milestone in the development of this educational sector. The survey's findings showed that a significant proportion of the New Zealand adult population had considerable literacy difficulties. The study was significant not only for establishing the degree of overall need for literacy education among adults, but also for its demonstration that this need was not confined to any particular social group – although some groups clearly had greater levels of need than others. IALS also underlined the complexity of literacy skills in its use of three dimensions (prose, document and quantitative) and the measurement of these skills along a continuum, in contrast to the common public perception of a literacy/illiteracy dichotomy.

Since the publication of the IALS findings, foundation learning, (a broader term than adult literacy and incorporating literacy, numeracy and language, or LNL) has been increasingly recognised as an important component across the tertiary sector (Benseman, 2003b; Cain Johnson & Benseman, in press). The importance now placed on foundation learning is reflected in its inclusion in the current government policies and strategies (Ministry of Education, 2001, 2002, 2003, 2003a).

There has been a growing interest in the role of evidence-based research to inform the development of policy and improve the quality of provision.

1.2 Project brief

The purpose of this literature review was to provide a critical evaluation of research evidence about effective practices in adult literacy, numeracy and language (LNL) teaching and programme provision.[3] This report forms part of a cluster of research studies to establish benchmarks in foundation learning provision in Aotearoa/New Zealand during 2004.[4]

It is important to stress that this review has sought original research studies that relate specific aspects of teaching and/or programmes' operations to learning outcomes – especially demonstrable changes in the literacy skills of learners. Over the last three decades there has been a considerable amount of research and writing in the sector, but most did not meet the criteria for this review. Evaluation studies were by far the most common type of research identified in our initial search; typically these evaluations identified the benefits gained from programmes without linking outcomes to specific aspects of the programme, and in

[3] This study does not include consideration of other, more diverse, elements sometimes included in the concept of foundation learning or foundation skills, such as critical thinking, foreign languages, problem solving, team work, and motivation to learn.

[4] The other elements include a project to map the extent and nature of foundation learning provision nationally, an initial survey of assessment methodologies and an observation study of teachers of adult literacy, numeracy and language.

particular, with very little analysis of which specific aspects of curriculum or teaching practice had a positive impact on learners' skills. There is a large amount of research that describes and advocates particular teaching models based on application in one or two programmes, but without supplying sufficient evidence of learner gain to warrant inclusion in this review. There is also a significant body of literature that are 'position pieces', some theorising from existing research, some appearing to be more driven by philosophy and definitions of literacy than by empirical evidence of what works. These are not research studies per se and have therefore not been included.

1.3 Using an evidence-based approach

Evidence-based research first emerged in medicine over 50 years ago and is widely acknowledged as the cornerstone to that field's development of effective protocols for the treatment and prevention of disease. The move to using an evidence-based approach in education has been more recent, but has gathered momentum over the past few years as educators have been required to build programmes on more solid evidence about 'what works' (a common assertion is that education has been based 90% on professional 'wisdom' and only 10% on empirical evidence[5]).

In the US for example, federal legislation such as the 2001 *No Child Left Behind Act* included demands of accountability based on research that meets 'gold standards' of quality. In 2002 the *Education Sciences Reform Act* was signed, "to provide for improvement of Federal education research, statistics, evaluation, information and dissemination." The Act led to the establishment of the Institute of Education Sciences, charged essentially with moving towards a 90% empirical evidence/10% professional wisdom split.

The empirical evidence being sought has been based on a hierarchy of research methods:

> *Experimental* designs using two identical groups of participants randomly assigned to treatment and control groups (also known as randomised controlled trials or RCTs).
>
> *Quasi-experimental* designs also use treatment and control groups, but the participants are not randomly assigned and may have unseen differences; statistical controls allow researchers to compensate for the differences between the two groups (also known as controlled trials or CTs).
>
> *Correlational with statistical controls* employs treatment and control groups that are not identical, but statistical controls are used to compensate for differences that may be important.
>
> *Correlational without statistical controls* employs treatment and comparison groups that are different, but the differences are assumed to be not important, usually because of the large sample size.
>
> *Case studies* may employ only a treatment group and assumes that the differences among participants are not important or obvious, since the sample

[5] Empirical evidence is based on experiment and observation rather than on theory or opinion. It can be both quantitative and qualitative.

> is usually small (Grover J. Whitehurst, Director of the Institute of Education Sciences, quoted in Comings, (2003).

The value attributed to research evidence is usually related to its location on this hierarchy, with greatest recognition of the top categories and historically at least, decreasing acknowledgement of the latter categories.

There has been considerable debate in educational circles about the merits and limitations of the increased focus on empirical evidence and it is worth noting that the quantitative/qualitative pendulum has swung a number of times over recent years. For example, in a review of the current state of quantitative research in reading (Kamil, 2004, p. 100) the author notes "two decades ago, experimental quantitative methodology dominated reading research. A decade ago, there were many who were suggesting the end of experimental quantitative research as a paradigm."

Research programmes in adult basic education (ABE) in many western countries have also been changing to have more of a focus on empirical research, but not without real concerns. Researchers in the LNL field have challenged the desirability and even feasibility of restricting the research evidence to such a narrow weighting of studies that are simply inappropriate for the complex world of LNL learners and programmes.[6]

> The diversity of adult education[7] is badly served by the narrowing of research. The knowledge base is already too narrow, and focussing resources into one fairly limited research paradigm is unlikely to lead to anything than a loose set of de-contextualised findings (Belzer & St. Clair, 2004).

Using randomisation (as in RCTs) as a principal determinant of whether research is of good quality may be neither accurate nor useful in the LNL context. In the course of this project, Professor John Hattie critiqued a recent review of RCTs and CTs in adult literacy, numeracy and language (Torgerson et al., 2004) and the source documents for 21 of the studies involved in that review. His comments below illustrate how their quality affects the potential value that controlled trials offer in identifying the impact of interventions. A full version of his critique is provided in Appendix A.

> Moreover, choosing specified designs, no matter how defensible, assumes that studies using these designs are necessarily somehow superior to studies using other designs. What is striking about the 21 studies we located from Torgerson et al. is their variable quality – with most of low quality. Using randomised or controlled designs clearly does not lead to high quality studies. The median sample size is only 52, and given there are at least two groups (experimental and control) the 'typical' study has only 26 people in each group. The average attrition rate is 66%, so two-thirds of each sample did not complete the study. It would have been more defensible to include all possible studies, code them for the nature of the experimental design, and for the quality of the study and then use meta-analysis techniques to address whether the effects differ as a consequence of design and quality. The aim

[6] These concerns are not confined solely to researchers of adult LNL (Kamil, 2004; Lomax, 2004). Even in areas such as heart surgery, arguments have been made for the inclusion of practitioner knowledge to make empirical findings work better in everyday practice (Berwick, 1996, quoted in Comings, 2003, p. 8).

[7] *Adult education* is often used synonymously with *adult literacy* in the US.

should be to summarise high quality studies, regardless of their design – if quality is a moderator to the final conclusions.

This collection of articles clearly points to the delimitations in making a method of assignment (randomisation) the major consideration in deciding on the quality of studies. It is difficult to imagine a more unconvincing collection of studies – with low sample size, high attrition, low statistical power, and so many pre-test differences. As well, there are so few studies that critical moderators cannot be investigated in any meaningfully generalisable way to evaluate their potential influences on the effect-sizes[8]. Most important, if more studies had been included then the key assumption that the effect-sizes from RCT and CT are different according to the design of the study, could have been evaluated.

A more appropriate view of evidence-based practice (de-emphasising the value of particular research methodologies) to see it as integration of professional wisdom with the best empirical research available (Whitehurst, 2004). This broader interpretation enables the findings from research based on rigorous methodology to be combined with action research, observations and analyses, case studies or more detailed explorations of 'learning events' or local experience to provide rich data from which to make decisions (Whitehurst, 2004). Small scale, well-organised in-depth studies can illustrate good practice and provide useful insights into teaching and learning. In this review we have included case studies and mixed method studies that are not experimental or correlational, but which have significant research rigour and where the results are congruent with what we know about adult learning and literacy and language learning.

Of course, much of what teachers do has not been researched, nor is it ever likely to be. Teachers will continue to use experience, and local knowledge to develop, adapt and enhance teaching practices and programmes to benefit learners. However, taking quality research findings into account in planning and delivering LNL teaching is likely to enhance the opportunities learners have to make real progress.

1.4 Reading research in the light of the local context

When considering the applicability of international literature and research findings to New Zealand, the particular characteristics of learners and provision in this country need to be taken into account.

1.4.1 The nature of adult LNL learners in New Zealand

The nature of the learners themselves is one of the key features of teaching adult literacy, numeracy and language. Many of the characteristics of learners portrayed in the literature reviewed during this study appear to be similar to those for learners in New Zealand.

[8] An effect size is the percentage of the standard deviation from the pre-test. Effect sizes are relative measures of how much improvement over a control group an intervention yields (Kamil, 2004).

It is highly probable (although not been validated through specific local research) that LNL learners here will have 'spiky' skills profiles similar to those overseas (Besser et al., 2004; Grief & Windsor, 2002; Strucker & Davidson, 2003), which means they will have quite diverse needs. Many English-speaking learners have much better reading than writing skills; some have better oral/aural skills than others. Some ESOL learners speak English, but have never learned to read or write the language; others have no literacy skills in any language and very beginning spoken English skills.

The confidence learners bring to the task of learning LNL also varies considerably. Some adults who need additional LNL skills because of changes in employment may be confident about themselves as learners. Others may have been unsuccessful at school and have extensive feelings of negativity if not outright antagonism, towards schools and teachers (Benseman & Tobias, 2003). Adults re-entering the education system who perceive themselves as having been unsuccessful at school may be apprehensive of receiving 'more of the same'. Even when their school experiences were positive, many of those with low literacy did not participate in post-school education; the time lag since studying means some have little confidence in their abilities to learn new skills or improve existing ones in a formal educational setting. For many people, achieving some degree of self-efficacy[9] is essential to maintaining a level of motivation to stay engaged in their learning. These characteristics are common to LNL learners throughout the western world.

ESOL learners are found in programmes specifically catering to them (e.g. in dedicated Training Opportunity and Youth Training (TO/YT) courses or community programmes), but also in larger numbers in mainstream LNL provision. ESOL learners with high levels of literacy in their first language have different learning needs from those with very limited language and literacy and it may be more effective to teach them separately. Conversely it may not be effective to place ESOL learners with low literacy and little language together with adult literacy learners with fluent spoken English (Manwaring, 2001; Shameem et al., 2002; Suda, 2002a).

A proportion of learners may have learning disabilities. Over half of those assessed in IALS in New Zealand as Level 1 (for prose, document and quantitative domains) and over a quarter of those assessed as Level 2 had answered 'yes' to the supplementary question, "Did you ever have a learning disability?" (Chapman, Tunmer, & Allen, 2003). To make the diversity of learners even greater, some LNL tutors[10] report anecdotally that the proportions of students with learning issues exacerbated by drug and alcohol abuse are increasing, although we have no actual data on this.

On top of these issues as learners, the realities of being parents, workers and family members often make sustained periods of learning difficult. The stress of multiple roles is an issue for many adult students, but in comparison with other tertiary students, LNL students are more likely to be on benefits or have low incomes with the resultant strain on resources that study imposes. Issues such as transport, childcare, and family health are also major issues for many LNL learners, exacerbated by low incomes (Benseman, 2004). ESOL learners may be coming to

[9]Self-efficacy is a belief in one's ability to carry out the actions necessary to manage particular situations. It is more specific and contextualised to learning than self-confidence or self-esteem. For further information see http://www.emory.edu/EDUCATION/mfp/efficacy.html

[10] In this report, the term 'tutor' refers to an adult LNL teacher, regardless of whether they are paid or voluntary.

terms with resettlement issues, which affect their motivation to learn, and some may have had no experience of schooling at all.

School students in New Zealand receive on average 15,000 hours of schooling (Hattie, 2002a). It is a real challenge for LNL teachers to help learners acquire or enhance their literacy, numeracy and language skills in a programme of a few hundred hours (and often much less), when those learners have highly diverse motivations and skills profiles, and when many have significant issues about their capacity to be effective learners or are learning a new language.

What is not yet known is what features might distinguish LNL learners in New Zealand from learners overseas, and how that might impact on teaching and learning processes and the implementation of research-based interventions.

1.4.2 The nature of literacy, numeracy and language provision in New Zealand

A second feature of LNL provision is the diversity of providers and contexts in which provision occurs (Cain Johnson & Benseman, in press). Historically provision was dominated by only a few organisations (i.e. Literacy Aotearoa - formerly the Adult Reading and Learning Assistance Federation (ARLA), Workbase: The New Zealand Centre for Workforce Literacy Development, and the National Association of ESOL Home Tutor Schemes). Now, a diverse range of organisations and institutions provide LNL, including Private Training Establishments (PTEs), private educational companies, Tertiary Education Institutions (TEIs) such as polytechnics and wananga and increasingly, adult and community education providers (the ACE sector). Some of these providers have LNL as core business; others provide it as an adjunct to other teaching.

Provision currently occurs in a wide range of contexts: the community, workplaces, prisons, unemployed programmes, private homes, community organisations and churches and is funded out of a correspondingly diverse range of sources (predominantly government departments). Teaching takes place under a range of titles including: adult literacy, numeracy, ESOL, family literacy, whanau literacy, foundation skills, learning support and bridging education.

The learners are taught using a range of methods (about which we still know very little) and can receive anything from less than one hour to 30 hours of tuition a week. The actual extent of 'direct acts of teaching' in any of these programmes is not yet known. Learners can be taught on a one-to-one basis, in small groups or classes of up to 20 learners. Assessment can range from informal verbal encouragement to formal tasks measured against the performance criteria for unit standards.

In general terms, LNL provision in New Zealand has tended to draw more on the British tradition of learner-centred curricula and many programmes do not use textbooks or workbooks. In contrast, the American model is heavily influenced by GED[11] preparation and programmes "often rely extensively on reading texts and

[11] The General Educational Development (GED) is a test in maths, English, social studies and taken by individuals who do not have a high school diploma. Passing the test implies that the taker holds the same knowledge he/she might hold having completed high school in the US. Much of the foundation learning-related education in the US is geared toward learners passing their GED.

workbooks cloned from elementary schools" (Gretes & Green, p. 28). The curriculum for ESOL provision in the USA has focused more on the challenges immigrants and refugees face in negotiating English in every day life but still with extensive use of textbooks.

We have very little systematic knowledge about those who teach LNL to those diverse learners in the plethora of contexts and providers discussed above and how their skills, knowledge and attributes compare with those undertaking similar teaching overseas. Adult literacy tutors historically have been predominantly Pakeha women volunteers (Hill, 1990); the workforce may now somewhat more diverse, but as yet there is no comprehensive picture. In one of only a few studies that has collected data on tutors (Sutton, 2004) a sample of 80 tutors showed 85% were women, 75% Pakeha, 65% were over 40 and approximately 42% had full-time LNL-related jobs.

There is no standardised training system for LNL teachers/tutors and many teachers have minimal levels of formal LNL-related training relative to other educational sectors. In Sutton's study for example, only 17% were categorised as having teaching and specialist adult literacy qualifications.

Important aspects of programme organisation may differ between programmes here and those overseas, which might impact on how research is undertaken and implemented e.g. hours of work (full/part time employment) contact time versus preparation time, access to ICT, professional development opportunities etc.

Our professional experience suggests there may be other (but as yet unverified) areas of difference between New Zealand and overseas including:

- higher retention in some New Zealand programmes than overseas; however, we have little data on this and none on the regularity of attendance of learners
- leaving for employment is considered as a positive outcome for vocational programmes here, regardless of the extent of any LNL skills gain
- the opportunity for more learner-centred curricula here (certainly in some community-based provision) than seems to be evident in the overseas literature and in a related vein the limited use of textbooks
- an emphasis here on culturally appropriate provision (for Maori and Pasifika learners); we did not identify any studies meeting the criteria for this review that related to programmes for indigenous people
- New Zealand's historical pattern of voluntary participation, compared with the degree of compulsion apparent in the USA where continued government assistance may be linked to participation in literacy programme, for example for parents receiving welfare or ex-inmates or young offenders who are signed up to literacy programmes as a condition of their not going (back) to prison
- less differentiation of provision based on formalised assessments and learners' literacy or language levels (compared with ABE /GED distinctions in the USA and National Standards in the UK)
- in New Zealand vocational and workplace literacy provision is very evident in the sector alongside provision in tertiary institutions, compared with for example the USA where vocational provision is far less visible within the ABE/ESOL sector

- tutors who have less formal LNL training and fewer professional development opportunities than teachers working in some programmes overseas

As our research programme unfolds over the next few years we will gain greater insight into our distinctiveness.

2 PROJECT METHODOLOGY

Every evidence-based review adopts a different methodology, depending on the nature of the sector involved and the literature that is identified during the review process. As the process outlined below will illustrate, our initial methodology has evolved to take into account the current characteristics of LNL research, in keeping with Alton-Lee's (2003) view that developing a methodology for providing a research synthesis is an iterative process.

This is the first study in New Zealand that looks systematically at adult literacy, numeracy and language teaching and learning and its purpose is to inform policy development in a relatively new part of tertiary education.[12] Therefore, we have included more explanatory information about the components of literacy, numeracy and language teaching, more background information about particular research studies and have been more inclusive of studies than might otherwise have been the case, in order to provide readers with a fuller understanding of the field.

2.1 Literature retrieval

The first stage of searching was carried out by two experienced database researchers/librarians, using the initial set of criteria as stipulated in the research contract which were:

- Research studies in English where outcomes were clearly linked to interventions or programme characteristics. 'Outcomes' included:
    - changes in literacy, numeracy and language[13] skills (both tested and self-reported, but with a preference for the former)
    - gains in employment, acquisition of a better job, increased income, participation in other education, reduced reliance on welfare, achievement of educational qualifications, increased involvement in children's education
    - changes in self-confidence, self-esteem or self-efficacy
    - achievement of learners' personal goals
    - any other outcomes that may need to be considered in this review, and in any future programmes.

- Studies of sufficient quality to enable statements of confidence about their generalisability beyond specific contexts (including refereed journals, doctoral or masters theses).

[12] LNL teaching is a relative newcomer to the educational world, both in New Zealand (Hill, 1990) and internationally (Hamilton & Merrifield, 2000; Kett, 1994).

[13] The scope of our study did not include Second Language Acquisition (SLA), the study of how people acquire a language other than their mother tongue. SLA investigates 'such factors as age, aptitude, personality, motivation, cognitive style and learning strategies' (Barton & Pitt, 2003, p. 9). SLA is more often aligned to linguistics than education. Readers interested in how people acquire a second language could refer to *Second Language Acquisition* (Ellis, 1997).

- Studies published since 1990, unless regarded as landmark studies.

We were looking for information about a broad range of factors that may have influenced learner outcomes, including:

- **Tutor/educator factors**:
  - tutor/educator educational experience
  - pedagogical characteristics and theoretical approach to teaching and learning (with reference to different learning environments)
  - curriculum planning and preparation
  - background and identity characteristics (e.g. gender, ethnicity).

- **Learning environment factors that directly influence the teaching and learning process including:**
  - curriculum content
  - assessment practices (including initial diagnostic assessment)
  - curriculum delivery environment (including combinations of teaching teams, use of pedagogical resources, class size and student-teacher ratio, combinations of contexts)
  - optimum intensity of learning and duration of engagement in learning.

Any evidence regarding the characteristics of effective policies in respect of the identified factors influencing outcomes was also sought.

Appendix B provides a complete list of the databases and web-sites that were covered in this search; Appendix C lists the keyword descriptors used in the searches. Where the descriptors did not match for a particular database, comparable synonyms were used.

The search identified studies primarily from the USA and Britain. We then looked more specifically to the literature from Australia and Canada but found very little research that met our criteria.

A total in excess of 300 articles and reports were identified at this first stage and entered on an EndNote database for initial consideration.

2.2 Reviewing initial selection

In the second stage, at least two of the research team (Benseman, Sutton and Lander) independently read the abstracts and/or full texts of the identified articles and reports and evaluated them using the criteria listed above, plus additional criteria appropriate to the type of study concerned. This second stage of the search eliminated more than 200 of the initial list, usually because of a combination of factors:

- evaluations not related to any specific element of the programme

- inadequate reporting of outcomes
- multiple interventions used, thereby precluding the ability to differentiate between the interventions
- intervention not specified, unclear or unable to be replicated
- very small sample sizes
- very limited information about methodology or results
- poor data collection, usually due to very high rates of attrition[14]
- poor linking to outcomes
- inaccessibility of the full report/article
- ICT[15] interventions likely to be technologically dated.

Because of the small number of studies located (relative to most literature searches), the researchers erred on the side of inclusion at this stage to ensure even a moderate number of studies for consideration. All of the studies meeting the criteria were then requested through Interloan or downloaded in full off Web sources.

2.3 Scrutiny of selected studies

The process above identified approximately 70 individual studies suitable for close investigation. At this point, the NRDC posted on their web-site a research review of randomised controlled trials (RCTs) and controlled trials (CTs) in adult literacy and numeracy (Torgerson et al., 2004). This review initially identified 4,555 studies using very broad descriptors; of those 149 studies were of sufficient quality to be read in full and yet only 36 RCTs and CTs had sufficient high quality data to be reviewed by experts. Of the 36, only six showed clearly attributable positive outcomes.

We had located the majority of those studies already ourselves in our search and initially thought that because of the rigorous process used for critiquing the studies that were included, we would be able to use the NRDC analysis as a shortcut for part of our own review.

However, on closer reading, the Torgerson review had several significant limitations that meant we had to look more broadly. Firstly, it only covered randomised controlled trials (RCTs) and controlled trials (CTs), excluding all other evaluations, case studies and other correlational studies, which meant the body of material on which we could draw was very small. Secondly, as already discussed in Section 1.3, some of the studies were of dubious quality. Thirdly, some of the studies were clearly dated (e.g. computer-based programmes from the early 1980s). Fourthly, the findings were not presented in a useful format for policy-makers or practitioners, particularly in terms of the implications arising from the findings. Their study did not include English for speakers of other languages (ESOL). Finally, some of the contexts were not applicable to the New Zealand foundation learning sector.

[14] Adult literacy programmes often have high withdrawal rates, making it difficult to achieve high completion rates in studies (B. A. Quigley & Uhland, 2000).

[15] The use of computer technology and software to teach literacy

A major draft literature review of teaching interventions for adult ESOL learners (Condelli, 2003; Condelli & Wrigley, 2004) was then located. This review identified 17 key studies in adult basic education (nine of which are included in the NRDC study). All 17 studies were reviewed against 43 criteria and the author's observations about the quality of those studies also called into question the merits of taking a narrow evidence-based approach:

> The 17 studies identified reflect a haphazard and unorganized approach toward studying adult literacy and are not guided by any theory, approach or school of thought about good pedagogy. (p. 9)

The authors then took a more traditional approach to reviewing studies relevant to adult ESOL literacy, drawing on second language acquisition and ESOL literature. This review informed our discussion in the ESOL section of our report.

To enhance the usefulness of this review and in keeping with the broader concept of 'evidenced-based' research we had adopted, we then sought other sorts of research, which were screened according to a number of factors:

- whether there was sufficient information about methodology to make it possible to replicate the study
- whether the research appeared to be congruent with New Zealand contexts
- publication in referred journals
- favouring multi-site/multi-agency studies, over single institution research
- the reputation of the organisation or researcher conducting the study
- whether the methodology was transparent and appropriately linked to the findings.

If we had maintained our original inclusion criteria, we would have had a very limited number of studies to review and even those would not have been of sufficient quality to satisfy the criteria for most evidence-based literature reviews. In a small number of cases we have included reports that are based on the 'professional wisdom' of groups of practitioners, when little else is known.

While in some instances the research base is thin, large-scale research studies currently underway are building a much richer and more detailed picture of adult LNL provision around the world. Findings from these studies, although not based on samples on the scale available in the schooling sector,[16] do point to teaching and learning practices that are effective and enhance learners' opportunities to make gain.

[16] A recent synthesis of studies on effective schooling reviewed over 500,000 studies, involving results from millions of learners (Hattie, 2002b).

2.4 Assessment instruments used to determine change

The validity of the assessment instruments used to monitor changes in participants' LNL skills is central to the identification of factors influencing LNL outcomes. Without valid, reliable measures of outcomes, the ability to demonstrate effectiveness of any educational element is severely limited.

The design and use of assessment instruments are contentious not only in New Zealand, but also internationally. There is considerable opposition from practitioners and learners to the notion of assessment testing, predominantly because of the perceived lack of appropriate tests and a negative association with schooling – a spectre that most practitioners strive to overcome with their learners. In the US (often seen as the 'home of tests and testing'), there is considerable use of LNL assessment tests, but this widespread practice occurs predominantly because of funding requirements, rather than any true acceptance of their validity or usefulness. Indeed, most practitioners use the tests under duress rather than out of professional choice (Ehringhaus, 1991).

In New Zealand, there are no standardised adult-specific LNL assessment tools available and researchers have been known in the past to resort to tests such as the Burt Word Reading Test, which was designed and standardised for school children.

Assessment can be done for a number of purposes:

- to initially identify learners who need help (screening)
- to analyse specific difficulties in order to design a learning programme appropriate to the needs of the individual learner (diagnostic)
- for recording learner progress over a given period or on exit from a programme
- to map learner skill levels against national or international standards
- to certify certain levels of competence have been reached (i.e. as in the US initiative Equipped for the Future which offers a 'work readiness credential')
- various combinations of the above.

Assessment tools for the first three purposes (screening, diagnostic and learner progress) are often tailor-made by teachers or institutions, whereas the latter purposes are served by professionally-designed, standardised tests. The most commonly used of these standardised tests in the US are the *Test of Adult Basic Education (TABE)*, the *Comprehensive Adult Student Assessment System* (CASAS) and the *Test of Applied Literacy Skills* (*TALS)*, which are most commonly used for funder reporting purposes, but can be used by teachers for their individual learners.[17] A number of the studies reviewed mentioned a problem of resistance to testing (see for example, Batchelder & Rachal, 2000) and despite their widespread usage, these tests are frequently criticised for their inability to measure the 'true achievements' of programmes (Sticht, 1999).

Beder (1999) has made the point, that despite all the research undertaken to date, the field is still left with a contradiction in regard to determining whether learners have made gains. Learners themselves perceive they gain in skills, but the test results

[17] For a comprehensive discussion of assessment see Kruidenier (2002a).

used to measure improvement do not necessarily reflect these gains. Do learners inflate their self-report because it is socially desirable to gain literacy, or are they making important gains that tests are not sensitive enough to measure? If learners are right, perhaps major gains are contextual and personal. If the tests are right, the quality of teaching and staff development needs to be examined. Either way more quality research is needed about how, or what, gain is measured.

In Britain, a recent review of standardised assessment instruments (Torgerson et al., 2004) concluded that none of the 15 instruments that have been used in that country over the past decade met the quality criteria required to make them appropriate for use in research. The National Foundation for Educational Research in the UK has therefore been commissioned to develop a new instrument suitable for adult literacy assessment in research projects and there are also plans to develop one for adult numeracy.

A survey of the assessment instruments and processes used by New Zealand practitioners is due to be published during 2005 and should provide useful information about current patterns and associated issues.

3 RESEARCH FINDINGS

This section describes what has been ascertained from the literature about the factors that appear to be important to ensure quality learner outcomes, organised in five themes: quality; participation and retention; characteristics of provision (e.g. curriculum, whether provision is individualised or in groups, the impact of ICT); the specific components of LNL (reading, writing, ESOL, and numeracy); and a discussion of the different contexts in which LNL provision takes place.

3.1 QUALITY

The research on quality fell into three groupings: what sort of programmes were effective, what factors were considered necessary for quality programmes and learners' perspectives on these topics.

3.1.1 Effectiveness of programmes

While it is almost universally assumed that LNL interventions are more effective than not providing any interventions at all[18], it is perhaps useful to start by addressing this fundamental question before addressing *how* the impacts were achieved.

The literature does point to programmes having an impact, although there is not a great deal of research on this topic. A NCSALL study (Beder, 1999) identified adult literacy research conducted in the USA since the late 1960s that identified outcomes and impacts for learners. While the report is not particularly helpful for the central purposes of our review (because it is not evaluating organisational practices or pedagogical interventions that lead to those outcomes), it does point to programmes making a difference. From 115 studies, 23 were considered credible enough to analyse and from which to make tentative conclusions about the effectiveness of the adult literacy education program in the United States:

- In general, it is likely that participants in adult literacy education receive gains in employment.
- In general, participants in adult literacy education believe their jobs improve over time. However, there is insufficient evidence to conclude that participation in adult literacy education causes job improvement.
- In general, it is likely that participation in adult literacy education results in earnings gain.
- In general, adult literacy education has a positive influence on participants' continued education.

[18] In their review of RCTs and CTs, Torgerson et al. (2004) point out that having control groups that receive no teaching (as opposed to conventional teaching) is pointless, as an intervention/no intervention at all comparison is rarely a policy option; rather, the options are usually between different types of intervention.

- Although the evidence suggests that participants in welfare-sponsored (e.g. JOBS Program) adult literacy education do experience a reduction in welfare dependence, the evidence is inconclusive as to whether adult literacy education in general reduces welfare dependence for participants.
- Learners perceive that participation in adult literacy education improves their skills in reading, writing, and mathematics.
- As measured by tests, the evidence is insufficient to determine whether participants in adult literacy education gain in basic skills.
- In general, adult literacy education provides gains in GED acquisition for participants entering at the adult secondary (ASE) level.
- Participation in adult literacy has a positive impact on learners' self-image.
- According to learners' self-reports, participation in adult literacy education has a positive impact on parents' involvement in their children's education.
- Learners perceive that their personal goals are achieved through participation in adult literacy education.

More recently, Brooks et al.'s review of British research of programme effectiveness (2001, p. 124) concluded that when lessons from both the UK and the USA are combined:

- There was plausible evidence that basic skills tuition benefited students' reading and writing.
- The average gains in reading and writing in general basic skills provision were undramatic but worthwhile.
- The evidence on the impact of general adult numeracy tuition was sparse and unreliable.
- There was a small amount of attainment evidence showing impact on ESOL and ICT.

3.1.2 Quality of programmes and teachers

The Basic Skills Agency (BSA) report *Effective Basic Skill Provision for Adults* (Basic Skills Agency, 2000) is based on BSA action research evaluations carried out between 1975 and 1997, evidence from BSA's consultancy experience from 1985 to 1998 and research on effectiveness funded by the agency.[19] One part of this report summarises what they believe to be the hallmarks of quality programmes:

- Programmes that deliver clearly structured teaching in literacy and numeracy (using a mixture of teaching methods).
- Programmes that deliver skills acquisition in a range of contexts that meet the motivation and interests of learners specifically related to that context.

[19]Although these studies are not specifically identified, the BSA has earned a reputation in Britain as a credible, high quality agency in the adult literacy field and therefore the analysis has credibility.

- Programmes that have high expectations of learners' achievements have higher levels of attendance, completion and outcomes.
- Programmes that produce for each learner a learning plan that lists and provides activities and material to meet specified individual need (including learner aims, learner perceptions of strengths and weaknesses, priority areas for development, skills broken down into manageable steps with appropriate learning strategies, an estimated timeframe, the resources needed and a way of reviewing and recording progress).
- Programmes that regularly assess and review learner progress and adjust individual learning plans accordingly.
- Programmes that enable learners to gain credit and accreditation for their learning and enable progression.
- Programmes that adjust the length of programme according to the level of skills required, including a realistic amount of tuition time (p. 11).[20]

The BSA report also lists ways in which effective programmes make use of staff:

- Adequate time for staff to plan and co-ordinate provision.
- Limited reliance on teachers working 2-4 hours week. Full-time teaching staff ensure better consistency of teaching methods and better use of professional development resources.
- Teachers having a recognised qualification appropriate to the field.
- Teachers need to have credibility in the context in which they are teaching (particularly important for vocational programmes where teachers need a set of job-related competencies and skills in addition to LNL teaching).
- Using volunteers to support learners providing they undergo a rigorous selection process, receive both initial and in-service training, are supervised and supported by paid staff and make a minimum commitment to the programme.

Another British study investigated the LNL progress learners made over two years (G. Brooks et al., 2001). The sample included 2,135 learners and 177 tutors with a 57% retention of learners between pre- and post-testing.[21] The learners were drawn from 'normal', on-going basic skills programmes. Most received 30 hours of tuition between pre- and post-testing, had reading levels similar to nine-year-olds, poor qualifications and were judged by their tutors to range from 'very weak' to 'about the national average'. Overall, the students (including all sub-groups) achieved a small, but statistically significant improvement in reading and writing. The progress was judged to be "undramatic, but worthwhile" (p. 1). The study concluded that two of the three factors associated with learners making progress were related to the teachers: the tutors having qualified teacher status and where they had additional help (volunteers or paid assistants); the third factor was the amount of tuition – see Section 4.3 below.

[20]Many of these appear generic and quality general adult education programmes would display similar characteristics.

[21]This study has been strongly criticised for its attrition rate, use of inappropriate tests, inclusion of inappropriate learners (skill levels too high) and drawing incorrect conclusions (Hamilton, 2001). Even so, it remains the only national study of its type and is worth noting.

A New Zealand study (Benseman, 2001) of 13 Training Opportunities tutors who were rated as effective teachers included some tutors who were teaching literacy and numeracy, although they were primarily teaching other content areas. Although not on literacy teachers per se, this study is included because of its New Zealand context and the similarities between the learners involved and typical LNL learners. The study identified the following characteristics and teaching practices of these successful teachers:

- their overwhelmingly positive attitudes towards their learners
- accentuating learners' strengths
- their use of the learners' experiences in teaching
- their ability to create a positive and supportive learning environment
- their awareness and management of critical periods in the programme (when learners were susceptible to failure and/or withdrawal)
- their passion for their subject, expertise in their subject and links to industry[22]
- being 'open' as people to their students
- providing pastoral care in times of need and crisis
- teaching learners how to set realistic long-term goals
- their ability to balance challenge and support for learners
- using specific teaching strategies and methods they had developed and refined.

In New Zealand, the TEC has developed its own *Indicators of Good Practice in Literacy Provision in Training Opportunities and Youth Training* (Tertiary Education Commission, 2003a). These guidelines (for general vocational programmes) were written by a small group of literacy practitioners and programme administrators based on professional wisdom rather than empirical evidence. The principal actions providers are expected to undertake include:

- having a literacy policy/vision/mission statement based on a definition of literacy
- including literacy in their quality management system
- providing a 'literacy friendly' environment
- ensuring there are literacy 'drivers' (individuals who take responsibility for development of literacy in the organisation)
- planning for professional development
- enabling staff to access professional and support networks
- ensuring tutors have access to resources
- providing tutor non-contact time allocation (for planning and preparation)
- understanding the literacy demands of programmes and providing learning opportunities to meet them
- undertaking robust initial assessment and learning plans

[22] Relevant to vocational rather than LNL specialist tutors.

- recording literacy skill gain
- ensuring tutors have learner-centred teaching strategies
- assistance for learners with high literacy needs.

Apart from specifying that learning strategies need to be 'learner-centred', there are no specific teaching methods or strategies identified in the list and overall, less emphasis on programmes providing specific teaching and learning opportunities than those in the UK, which refer to literacy-focused programmes.

The findings of the studies above emphasise the importance of effective initial training for tutors[23] and comprehensive professional development programmes.[24]

It is worth noting that the retention of qualified, skilled LNL teachers is often a major issue for LNL providers. With poor pay, employment conditions and minimal career prospects, skilled practitioners are often 'poached' by providers in more mainstream forms of provision. This situation is especially true of community-based programmes (May, Hill, & Donaghy, 2004).

It is not easy to meet the complex needs of learners but not all has to do with the quality of teaching. A policy-oriented and descriptively rich case study of three learners (Venezky, Sabatini, Brooks, & Carino, 1996) illustrated how difficult it was for learners to make progress.[25] The teachers were confronted with a wider range of abilities in their classrooms than they could teach effectively and had little, if any, diagnostic information to guide their individual instruction, in a context made more complex by open entry/open exit policies and a desire to have separate learning plans and materials for each student.

Their observations revealed a number of less than optimum practices that contrast to the elements of effective practice outlined earlier, many of which relate to organisation and resourcing. These elements included diagnostic assessment not integrated into curricula and teaching programmes; students were not given any opportunity to develop fluency; more students than tutors could handle. Most students had some aspect of learning difficulty that required individual assistance that they were unlikely to receive; students needed practice in holistic tasks, not just the component parts contained in pre-purchased material; and too much concern was paid to self-esteem to the extent that students were not challenged to attempt things that were new, uncomfortable but also necessary for their skills development.

[23] Several publications would be useful resources for the creation of training programmes in New Zealand. The first is a recent NRDC study of recent initial teacher training programmes for LNL (Lucas 2004); the others relate to a NCSALL study of 100 ABE teachers as they take part in a variety of professional development strategies (C. Smith & Hofer, 2003).

[24] In the recent trial of the draft Adult Literacy Achievement Framework (Sutton, 2004) tutors self-identified the need for more training in literacy teaching.

[25] Thirteen students were studied in depth but only three written about in this report. Although a very small sample, it has been included because it serves as a model for rich case studies, supplying insights into learners, the programme and organisational matters that are impacted on by programme and funding policies.

3.1.3 Learners' perspectives on effectiveness

Few literature reviews of compulsory education incorporate learner perspectives on the factors they perceive as relating to effectiveness, because in schools with compulsory attendance requirements, learner perspectives are usually peripheral to the debate. In LNL, where voluntary participation is usually the norm (at least in New Zealand) we believe learner perspectives warrant greater consideration. If adult learners do not rate the programme positively, there is an increased likelihood of withdrawal or erratic attendance – both of which clearly limit the likelihood of positive learning outcomes.

It must be acknowledged that acquiring quality data on learner perspectives is problematic, especially in terms of validity. For example, (as we mentioned in section 2.2) learner self-assessments of literacy skills often vary from standardised test results (the former usually under-rate difficulties); these discrepancies can be seen for example in the IALS findings where less than a third of those in the lowest level self-rated their skills as either 'poor' or even 'moderate' (OECD, 1997). While some researchers (Sticht, 1999) still believe that learner self-assessments are a valid process, others are less convinced (Jones, 1997). When investigating retention and drop-out (Quigley & Uhland, 2000) where researchers have probed beyond initial reasons for leaving a programme it has often emerged that the learners simply did not like the teaching style of the literacy instructor and felt that it was ineffective. ESOL learners' voices are also often missing, largely due to the difficulty and cost of interviewing and translating languages other than English.

Research incorporating learner perspectives tends to fall into two main categories: what specific strategies and factors learners report as helping their learning; and studies that explore learners' perspectives on what types of impact LNL participation has on their lives and skills. We have endeavoured to focus on the former in this review, but the latter is important in that these sorts of studies (e.g. (Bingman, Ebert, & Bell, 2002; Bingman, Ebert, & Smith, 1999) provide insights into what learners take away from programmes, irrespective of what funders and teachers intend. The most obvious example is the consistent outcome of increased self-confidence and self-efficacy, often independent of any gains in LNL skills (Benseman & Tobias, 2003), which leads some commentators to challenge whether LNL are more about changing learners' life circumstances than teaching LNL skills *per se*.

A small number of studies explicitly asked learners what aspects of programmes they considered effective. Following an evaluative study of an Even Start Family Literacy programme (Yaffe & Williams, 1998), the researchers returned to interview six female participants' to identify what they thought made the programme successful. The women said that "the most attractive feature" was the all-female environment,[26] which they found "trusting and supportive" (p. 13). A close second was the removal of barriers to attendance such as "the convenience of having free child-care at the same site as the adult education programme" (p. 14). The factors associated with learning mentioned by all or most of the women included "individualized instruction and assistance in studying" (p. 15).

A case study of 30 learners and ten tutors from a basic skills centre in the UK (Eldred, 2002) sought to discover what they thought about successful teaching and

[26] With such a small sample, the authors restricted their discussion to this particular Even Start programme and indicated that further research is required to determine if this "theme has implications for other adult literacy programmes"(p. 17).

learning.[27] For the second part of the study, when asked what leads to success, the majority of learner responses were about "the skills of the tutor…and the fact that tuition was not like school" (p. 16). They talked about "the relationship with the tutor, the learning environment and methods" (p. 23). Unfortunately, little space is given to presenting or discussing these findings in the report. The finding that only 10% of learners identified regular attendance as a being a factor that helped them succeed[28], suggests that research into what is *not* important to learners may be equally useful to programme planners and tutors.

More recently, a British study (Ward, 2003) specifically set out to record learners' perspectives on achievement and progress. Researchers interviewed seventy adults, using individual and group semi-structured interviews and a 'learning journey' metaphor to facilitate these discussions. Whilst there are no comments relating to effective teaching and learning strategies, the results are a rich source of programme-related factors that learners identify as contributing to successful learning. One set of factors is linked to 'starting out': those with the most involvement in planning tended to be the most satisfied with their progress (p. 27). Another set of factors relates to the context: in a class of 40 learners with two or three tutors, the learners felt they were achieving very little because of the lack of individual tuition. Peer support in the form of sharing skills and ideas, and friendships, were important to learning and achievement. Progress was inhibited where learners were uncomfortable with the constant flow of people around them in a busy Centre (p. 31).

> The relationship between tutors and learners was a crucial element of learning and most respondents valued and respected their tutors and trusted their expertise. Tutors' attitudes were really significant, as learners wanted a tutor who made them feel as though they were in charge of their own learning…. Learners felt it was important to feel on the same level as their tutor or they wouldn't learn, and progress was viewed as more shaky where negative relationships were reported (p. 37).

Praise of "the effort devoted to gaining achievement was a significant factor in learning, particularly as a motivational tool." Encouragement was noted as "a key factor in building confidence and self-esteem…Conversely, lack of interest in their achievements or dismissive remarks were profoundly discouraging" (p. 38).

Finally, the learners linked assessment practices with effectiveness. They reported that self-assessment and the tutor's judgement of their achievements (most preferring constructive, verbal feedback) were supportive of their learning. Most learners preferred assessment to be "an ongoing process based on discussion and portfolio building supported by tutor feedback and individual reflection, particularly where skills acquisition and the ability to do things in their lives were the main aims" (p. 40).

Other studies did not *explicitly* seek learner perspectives on effectiveness, yet reported learner comments on teaching and learning strategies that were considered valuable. This group of studies includes action research undertaken in the US

[27] Although a very small sample, light on an explanation and justification of their study's design, it does appear 'fit for purpose' and is commenting on an area little researched.

[28] A finding that stands in opposition to most other studies on this dimension of effectiveness

(Lunsford, 2001). It is of limited applicability[29] yet in a field where learner 'invisibility' in research is common, a brief mention is warranted. Within the context of a GED programme, Lunsford changed from a "teacher-directed, pedagogical approach to a facilitative andragogical approach." When learners were asked what they thought about the change, one of the main comments was that they felt motivated by the personalized attention they were receiving.

King and Wright's (2003) study collected data from 19 ABE learners who volunteered to attend interviews. The multiple-choice, open-ended, and exploratory probe questions included some comments on factors associated with success as a minor part of the study.[30] The researchers briefly comment on one theme – that learners identified "learning taking place with and because of community support" (p. 112); that is, working together in teams or small groups helped them learn. More specifically, learners said that they associated this type of environment with having someone to ask for help, helpful discussions, being listened to, sharing experiences, and having fun.

A follow-up study of adult literacy learners in Christchurch (Benseman & Tobias, 2003) included some observations by the participants about the programmes' strengths from their perspectives as learners. These elements included the 'non-school' environment where they felt respected, listened to and generally treated as adults. Other pluses were the tutors who went out of their way to support the learners in times of need or crisis, working in small groups and the tailoring of programmes to individual learners' needs.

3.1.4 Discussion

There is evidence that providing tuition for LNL learners is more effective than not, although this evidence is both sparse and not available in all areas.

There is a considerable degree of commonality about the components of what is regarded as quality provision from researchers and study results. Key characteristics include highly trained staff who relate positively to learners, explicit teaching of literacy and programmes that provide individualised tuition. Learners also confirm the importance of qualified and supportive staff. The findings that relate to the need for appropriately qualified and trained teachers are in line with issues already identified in New Zealand.

There has been a growing emphasis in New Zealand for contextualised teaching and individualised learning plans, in a similar vein to the outline of quality provision presented in the BSA (2000) report. Nevertheless, the issues raised by Venezky et al (1996) about the reality teachers face in the light of these policies need to be borne in mind. The diverse and complex nature of learners LNL needs place great demands on teachers, impact on the ability of programmes to deliver, and we know nothing about the impact of open entry on learner achievement.

[29] The report lacks sufficient description of the method to be assessed or replicated, and only 15 learners appear to be involved in this study. Also, the reporting of learners' perspectives relied on "occasional informal discussions" with the group at the start of the project and then the tutor's journaling following one to one meetings rather than direct recording methods which have greater credibility.

[30] The study's focus was on what facilitates perspective transformation, a particular outcome of adult learning proposed initially by Jack Mezirow, whereby learners come to reframe how they understand their world.

Most of the elements identified in these studies are consistent with what adult learning theorists such as Knowles and Brookfield have long advocated: adult appropriate environments where learners feel valued and supported, especially in times of need. Adults value intimate teaching arrangements where their learning needs are explicitly recognised and tuition is tailored to these needs.

Skilful, supportive teachers who provide on-going feedback are rated highly and back-up services such as childcare services help make attendance less difficult.

Incorporating, or at least being aware of, learners' perspectives in the design of programmes and teaching, is an important component in LNL. As the New Zealand LNL research programme develops, ensuring that learners' perspectives are included should be incorporated into methodologies. This perspective needs to be done more robustly, than for example, in simple satisfaction surveys. Perspectives from learners will be particularly important when considering whether and how provision meets the needs of special groups of learners such as Maori, Pasifika, ESOL and young adults.

3.2 PARTICIPATION AND RETENTION

As already discussed, participation is a central issue for LNL because most learners attend voluntarily and can vote with their feet. The amount of teaching learners actually receive, together with retention are key research issues to review in assessing what makes for effective provision.

3.2.1 Mandatory participation

While most learners in New Zealand still participate in LNL on a voluntary basis, there are increasing indications of a limited degree of compulsion in some programmes, for example resulting from court sentences or conditions imposed for receiving various government benefits. Compulsion (albeit subtle or involving some degree of 'choice') is anathema to many practitioners who see the voluntary nature of participation as integral to LNL and one of the key features underpinning its effectiveness – and in strong contrast to the compulsory schooling system where many LNL participants developed their poor levels of self-efficacy.

An RCT on this aspect of provision (Martinson & Friedlander, 1994) was carried out as part of the evaluation of the Californian *Greater Avenues for INdependence* (GAIN). GAIN involved more than 179,000 welfare-to-work participants, of whom two-thirds were assessed as needing basic education. These enrolees were then required to participate in basic education (ABE, GED and ESOL) or risk temporarily losing part of their benefit. The sample for this RCT study contained 581 GAIN enrolees and 500 controls from five diverse California counties.

The study was discussed in Torgeson, et al (2004) but we were unable to source the original. The initial results showed no statistically significant change on LNL test scores on participants compared to the control group, despite an average participation of 500 hours. However, the initial results had included those who had enrolled in GAIN, but not actually participated in any education. A re-analysis of the results (Boudett & Friedlander, 1997) comparing post test results of participants and non-participants found that those with higher pre-test scores (i.e. who had more LNL skills to start) benefited more than others. Participation up to 1000 hours of provision also appeared to correspond to higher post-test scores. The re-analysis suggested that there had to be major improvements in the quality of the programme before any significant improvements (particularly in people with low skills) would be seen across the (very large) participant population as a whole.

3.2.2 Amount of participation

The question 'how much tuition is enough?' is akin to asking 'how long is a piece of string?' yet nonetheless it is an issue of central concern to policy-makers and others. Ensuring sufficient time to achieve learning gain to satisfy learners, tutors and funders is a basic, but important, quality of effective LNL provision, but is problematic in the absence of any agreement on what learners should know or be able to do when leaving programmes. This is compounded by the great diversity of skills and

knowledge students start with and their different expectations about what level of proficiency may be good enough for them.

Before looking at the various estimates on this issue, it is worth reiterating that many LNL learners have already had a decade of schooling, sometimes including some additional specialist remedial tutoring. Despite this amount of tuition (or perhaps even because of some of it), these learners have not made sufficient progress in their LNL skills; changing this situation will not occur easily or quickly in the great majority of cases. When the tuition is not intense (e.g. one or two hours a week in many cases-40-80 hours total per year) the challenge is even greater for learners and teachers.

The publication *Effective Basic Skills Provision for Adults* (Basic Skills Agency, 2000) estimates "the number of learning hours (including direct tuition, assessment, supervision, guidance and tutorial support) required for learners at different levels of attainment to achieve competence in any one level"[31] (p. 19) are:

Below entry level	330-450 hours
Entry level	210-329 hours
Level 1	120-209 hours

Interpreting this conservatively, a learner would need in excess of 660 hours minimum to progress from below entry level through to Level 1 and possibly as much as 1000 hours (although the period of time over which this might occur was not discussed).

Brooks et al.'s study quoted above (2001, p. 4) showed that "students who attended 51-60 hours of literacy tuition between pre- and post-test made the largest gain of any subgroup. Since the maximum number of teaching weeks between the tests was about 20, these were students who had attended very regularly." Because students on intensive courses attend regularly, the authors tentatively conclude that intensive courses "could be particularly effective" in this regard.

A NCSALL review by Comings (2003) refers to three studies that concluded that approximately 100 hours of instruction is needed to achieve an increase of one grade level equivalent on a standardised test of reading comprehension.[32] Comings' own research (Comings, Sum & Uvin, 2001) showed that after 150 hours of instruction, "the probability of making a one grade level or greater increase was 75%" (p. 10); in other words, three of every four learners progressed at least one grade after 150 hours of tuition, but this amount is not a water-tight guarantee of success as one quarter do not make this amount of progress.

According to Comings, the real issue is that the average student in the US spends fewer than 70 hours total in a programme over a 12-month period – less than one tenth of what their K-12 school equivalent does. The 70-hour figure is somewhat optimistic as adults who drop out before completing 12 hours of instruction are not included in this figure. The true average is probably considerable lower.

A recent major study of ESOL teaching (Condelli, 2003) found that regular attendance by ESOL learners appeared to be more important than the amount of

[31] These levels relate to the UK National Standards for adult literacy and numeracy and at this point are not comparable to anything in New Zealand. Pre-literate and very beginning readers would be below entry level.

[32] This does not equate to levels in the UK standards.

tuition per week and that students attending more hours per week gained more in comprehension.[33]

There is very limited data on the amount of provision learners receive in New Zealand. In one study (Sutton, 2004) more than 50% of the 347 participants in the draft ALAF trial received less than 20 hours over the trial period which was a maximum of 20 weeks. Extrapolating this data for a year, a learner would receive far less than the 100 hours benchmark discussed above. Just under 20% of the sample received more than 100 hours tuition in the same time-frame. In the only New Zealand study that was identified linking hours to achievement (Shameem et al., 2002) ESOL learners receiving 12 hours tuition per week (240 hours in total during the study) made gains in both reading and writing while those receiving two hours per week (40 hours in total) only made progress in reading.[34]

3.2.3 Retention

Given the basic premise that learners need to attend a reasonable minimum amount of tuition in order to make significant gains and that participation is predominantly voluntary,[35] the retention of learners becomes a central issue to this debate. Quigley and Uhland (2000) claim that "dropout is surely one of the most enigmatic, most exasperating, and overall most depressing issues in the entire field of adult literacy" Quigley (1997) quotes American data on attrition: funded programmes attract only 8% of those eligible for them, 20% of those who say they will attend do not show up; of those who do, the attrition rate is over 70%. Another study reported by Quigley (ibid.) showed a dropout rate of 18% before 12 hours of tuition had been completed, 20% at 16 weeks and 50% after 16 weeks. A national evaluation in the US (Young & et al., 1995) found that most learners leave before completing 100 hours and most also report that they have not met their own goals.

Withdrawal from a programme is not always a negative outcome. A British study of 1,920 learners (Kambouri & Francis, 1994) showed a 79% annual attendance rate overall, although when withdrawals were included, this figure dropped to 40-60%. Of those who left, over a third progressed in some way or other to other courses or jobs. Another third left for unknown reasons, the remainder cited personal or domestic reasons. Rates of actual attendance for *persisters* and *leavers* were similar.

Despite its clear importance, only three studies were identified for our review and the topic remains under-researched, especially in terms of specific interventions that help increase retention rates.

A NCSALL study by Comings, Parrella and Soricone (1999) analysed the barriers and social and organisational supports that influence whether learners persist in their studies. By understanding how positive, supporting influences can be maximised and negative, inhibiting factors can be minimised or eliminated, the authors argue that practitioners can effectively increase overall retention rates, both at individual and programme levels. Based on a literature review, consultations with experienced practitioners and interviews with 150 students, the study found that immigrants, parents of teenage or grown children and those over the age of 30 were the groups

[33] This study is discussed more fully in Section 3.6.3

[34] See more description of the study in Section 3.6.3

[35] Albeit with some degree of coercion in some cases

most likely to persist. Similarly, learners who had been involved previously in basic skills education, self-study or workplace training and those who include very specific goals were less likely to withdraw. Based on these findings, they identified four key supports to persistence:

- Management of the positive and negative forces that help and hinder persistence (especially the strongest ones).
- Build self-efficacy (belief in one's ability to learn successfully), not just self-confidence) about reaching goals (especially through mastery learning, vicarious experiences provided by social models such as former students, social persuasion from a culture of support and opportunities to address physiological and emotional states).
- Establishing and revising student goals to use as a context for instruction.
- Making tangible progress towards the goals.

The authors make a specific point that policy-makers should hold providers accountable for the quality of the strategies and structures that programmes use to increase learner retention.

In a quasi-experimental study of retention, Quigley & Uhland (2000) identified a group of 20 'at-risk' (AR) learners[36] in a large educational complex in Pittsburgh. The AR learners were identified using criteria project members had developed from their professional experience: expressed hostility or overt negativity, overt anxiety about joining the programme, obvious uncertainty about the programme's value, evident lack of commitment to staying in the programme, anxiousness expressed in body language and/or a desire to cut the initial interview short. The assessments were counter-checked by another project member and further exploration of the ARs' schooling experiences was undertaken (using the *Prior Schooling and Self-perception Inventory*) on the assumption that negative school experiences increased the likelihood of withdrawing from the programme. They were also given the *Witkins Embedded Figures Test* to measure need for acceptance by peers, co-workers and friends. Participants were then randomly referred to a control and three treatment groups. The treatment groups had one of three strategies: a conventional classroom setting, but with considerable support provided by the teacher and a counsellor; small group tuition (4-6 learners); or one-to-one tuition.

After three months, none of the control group was retained, 20% of the 1:1 group, 40% of the classroom group and 60% of the small group remained. The authors concluded that ARs can be identified reasonably accurately at enrolment,[37] that all three of the intervention strategies work better than mainstream classrooms (a format they point out is associated with what has failed for these learners in the past) and that small groups may well be the most effective tuition grouping for increasing retention.

Methodologically, this is not a sophisticated study, but it is a good example of practitioners working closely with a researcher to pilot and evaluate a number of strategies to overcome an issue.

[36] The original goal of 40 AR learners was not possible within the constraints of the programme operations.

[37] An observation also reported in Morrow et al.'s (1993) study.

A study to estimate the effect of persistence (the hours of instruction) on student outcomes (Fitzgerald & Young, 1997) examined records from 44 literacy programmes in 22 states, using regression techniques and a path analysis framework. Valid and matched pre- and post-test scores were available for a sample of 614 students. CASAS was used to measure the achievement of ESOL learners and TABE for other learners. The hypothesis was that basic skills achievement would increase with greater persistence. However, this only held true for ESOL students. The reading achievement of other students appeared to decline after nine hours tuition per week. The study identified several practices that do have a positive effect on outcomes. For ESOL this included student participation, full time and experienced ESOL staff and client support services; for other students they included the use of individualised curricula and full-time staff.

High retention rates are often quoted as a key feature of family literacy programmes. A review of family literacy programme research (Padak, Sapin et al., 2002) identified the following features as central to promoting retention: meeting learners' needs through participatory teaching, family-based activities, on-going assessment to foster a sense of success, social networks, integration of services, the use of authentic materials and the enthusiasm of the teacher.

3.2.4 Discussion

Based on the studies reviewed above studies, it is reasonable to conclude that a minimum of 100 hours over a year is needed in order to have a realistic chance of improving LNL skills. Learners at the more basic levels probably require even greater amounts of tuition to make equivalent gains. While there is no specific data on intensity of tuition (i.e. hours per week), more intensive programmes are logically a more effective way of ensuring minimum amounts of tuition. Regular attendance may be as, if not more important than, hours per week for ESOL learners.

Recruiting LNL learners is not always easy and retaining them for reasonable amounts of tuition is an important component of successful programmes. The limited amount of research in this area points to the possibility of identifying potential withdrawals and the value of actively working to increase their retention through a range of strategies such as those used in the studies reviewed.

We know the hours available for learners vary between programmes and contexts, but as yet there is little data about the average number of hours of tuition LNL students attend in a year in New Zealand; nothing is known about the regularity of attendance. Systematic data has not been collected across the various contexts in New Zealand on how many learners drop out of tuition and when.

The nature and extent of 'deliberate acts of LNL teaching' is also likely to vary between programmes. It may be that the skill level of tutors has much to do with whether explicit teaching actually occurs. It may also be that literacy gain is much more likely to occur in programmes that have LNL as a specific focus and where literacy outcomes are expected rather than where literacy support is provided to help learners achieve non-literacy course outcomes.

3.3 FEATURES OF PROVISION

This section discusses several aspects of how provision is organised, including how curricula is determined, the number of learners taught at a time, the impact of computer aided instruction and a discussion on whether tutors need to use different approaches with students described as learning disabled or dyslexic.

3.3.1 Curriculum

The focus in this section is less on specifically what is taught and more on the extent to which any curricula balances external programme or vocational considerations and individual learner needs.

Learner-centred curricula

Historically in New Zealand, the content of LNL programmes was largely drawn from learners' experiences, interests and demands. This *learner-derived content* or *authentic instruction* refers to where teaching content is taken from the everyday environment of the learner, rather than pre-designed and sequenced programmes that often rely on individual workbook completion, repetition and drills. This pattern developed for two main reasons: the influence of British adult literacy models in the formative years of the field (Hill, 1990) and the fact that very little tuition at that point was tied to formalised qualifications that dictated curricula content (and therefore enabled or required the preparation of standardised material). The one exception in this respect was probably the ubiquitous driver's licence test.

This learner-centred curriculum tradition is also reflected in the writings of adult learning theorists such as Knowles (1984), Freire (1971) and Brookfield (1986). While a learner-centred curriculum is still valued by practitioners in New Zealand, there is no empirical evidence of how widespread the approach now is in practice. With the increased incorporation of unit standard assessments into LNL programmes there has probably been some movement away from learner-derived content.

This review identified few robust studies that examined how curriculum was established. A British study of adult literacy teachers (G Brooks et al., 2001) found that while they used both commercially published materials and resources they had developed themselves, they used the published material less frequently. Authentic instruction is less common in ABE teaching in the United States, where there is a dominance of commercially supplied workbooks, readers, and textbooks, especially in relation to the GED.[38]

One study is particularly noteworthy in relation to curriculum (Purcell-Gates et al., 2002).[39] The researchers examined two dimensions of adult literacy instruction – the 'authenticity' (or 'real life' nature) of the activities and texts used in the teaching and

[38] ESOL teachers are more likely to use environmental print and pictures or 'realia' (objects from students' lives such as pieces of clothing, household objects etc) to get the meaning of English words across or to start conversations.

[39] This study (which is methodologically more sophisticated than most) is also reported as a NCSALL study (Purcell-Gates, Jacobson, & Soler, 2000).

the degree of collaboration between teachers and students – and changes in the literacy practices of the students, such as the types of texts read and written. In this way, the study explored the theoretical claim that some types of instruction are more effective than others. But rather than rely on changes in learner behaviour being measured by criterion-referenced tests, the researchers assessed the outcomes directly on what they call "the ultimate end-goals of all literacy instruction – actual reading and writing practices of the students" (p. 73). Their measure is therefore based on the *practice* of reading and writing, rather than the *ability* to read and write as measured by tests.

The study was descriptive and correlational. Multiple methods (a teacher questionnaire, researcher observation and student interviews) were developed through extensive piloting to classify instruction across the two dimensions under study (authenticity and collaboration). These two dimensions were then able to be used to classify the classes (ranging from 'highly teacher directed' to 'highly collaborative' and 'from highly authentic' to 'highly school-only') and measured against changes in the literacy behaviours of 173 students.

The study concluded that there was no relationship between the degree of collaboration and changes in literacy behaviours. On the other hand, the study did find a positive relationship between those engaging in real life, authentic activities in the classroom and changed literacy behaviours.

> The results document that it is indeed beneficial, relative to the purposes of adult literacy instruction, to incorporate materials and literacy activities in the instructional program that reflect real-life texts and purposes for reading and writing them to the greatest degree possible (p. 91).

Furthermore, because the study controlled for the literacy level of the students, the authors concluded "there is no reading ability threshold at which this type of practice is inappropriate" (p. 90).

While the authors were clear about the limitations of their study (e.g. using volunteers rather than random selections[40] and correlational rather than experimental), they believed that "this type of design is close to being the best that researchers can do with this population of adult learners" (p. 88). The authors claimed that:

> This is the first time that research has documented this for outside-of-school contexts, despite the widespread belief among academics that this type of instruction is best practice and despite the considerable lip service given to this principle by practitioners (p. 90).

The earlier related study that established the methodology (Purcell-Gates et al., 2000) included an examination of whether the degree of collaboration between the learners and teachers affected changes in reading and writing behaviours. While they concluded that it did not, they also cautioned that this finding may be to do with how they operationalised and documented the collaborative dimension. They believe collaboration needs further study, rather than concluding that it is not influential – especially as collaboration is such a strong component of much LNL philosophy.

[40] It is also interesting to note how difficult they found it locating genuinely authentic/collaborative classes; actual observation of classes often failed to match the teachers' perceptions of the classes.

Integrated or embedded provision of LNL

The concept of concurrently developing LNL skills and other competencies is an approach adopted by vocational education and training delivery in Australia (Watson, Nicholson, & E, 2001). It is also increasingly common in the UK[41]. Integrated literacy has been advocated by Skill New Zealand/TEC over recent years for TO and YT courses.

There appears to be very little outcome-focused research related to embedded or integrated literacy provision at this point.[42] A very brief report of preliminary findings from a study currently underway in England and Wales (Clary, 2003) suggests the balance of basic skills content increases as courses progress; that planning is particularly important to ensure specialist literacy and subject specialists can both jointly prepare beforehand and liaise during programmes; that integrating or embedding LNL is rewarding, but time-consuming and challenging. An 'experts seminar' of 105 experienced practitioners called together at the start of the programme (Clary, 2002) recorded a number of factors for success that practitioners believed had been established from existing programmes:

- that integrating literacy had to be seen as part of a 'whole organisation' approach
- that learners' needs had to be central
- that there had to be mechanisms to recognise the LNL needs that may emerge for the subject specialist tutors themselves and appropriate training provided for them
- that not all learners in any course might have LNL needs and this needed to be taken into account in planning
- that the process takes time and additional staffing and is costly.

It is worth noting that in England and Wales, funders require that achievements in both the subject area and LNL be recorded in embedded programmes.

Discussion

The findings that authentic instruction leads to learner gain will strike a chord with many practitioners, who believe that real-world literacy activities provide the best platform for learner engagement and motivation. It has yet to be determined to what extent practice in New Zealand actually builds in real life literacy events and situations.

There has yet to be any substantive independent examination of how the process of integration of vocational and literacy skills takes place in New Zealand contexts, nor any in-depth analysis of whether the approach results in greater LNL gain for learners than LNL–specific programmes.

[41] An Embedded Literacy Portal has just been has just been developed to assist UK tutors to deliver LNL competencies embedded within other formal courses.

http://www.dfes.gov.uk/readwriteplus/embeddedlearning/cfbtgeneralinfo.cfm

[42] Despite the significance of this approach in the Australian vocational education system, our review did not identify appropriate studies.

3.3.2 Class/ small group/ 1:1 teaching

Historically in New Zealand, LNL tuition was been dominated by one-to-one teaching by volunteers, but over recent years (especially with the growing role of paid tutors) and an increase in vocational programmes, there has been much more class and small group provision. Workplace provision usually occurs 1:1 or in very small groups. Individual tuition in some ESOL contexts means there are 2-3 learners present. Funding sources often influence how provision is organised (e.g. ACE funding often requires a minimum of 6 learners per class and sometimes up to 12.

The only study we were able to find that examined the impact of small groups versus 1:1 was an American CT (Morrow & et al., 1993) involving three sites. Group students received 1.5 hours of instruction twice a week over a seven-month period, averaging 46 hours. Unfortunately, only nine of the initial 20 students taught in groups completed the programme.[43] A control group of 11 students received 1:1 instruction for an average of 63 hours each. The study found that reading proficiency gain (as measured in tests) did not differ across the instructional methods (both groups made gains, effect size of .66), although a greater proportion of 1:1 students reported achieving their identified personal goals – usually furthering education and/or increased recreational reading. This difference however was thought to be primarily due to methodology problems. In keeping with these tentative findings, the article concludes that the study "does not support the relative superiority of either instructional approach in raising reading proficiency levels" (p. 25).

Although not on group vs. 1:1 instruction, another American CT (R. E. Roberts & Cheek, 1994) used an intervention involving a 'community-building' process with a group of 31 prison inmates. The process involved an intensive workshop to build trust, communication and cohesion over two and a half days with follow-up sessions weekly. They were then taught using an SRA reading programme, as was a first control group of 34 prisoners. A second control group received no intervention of any kind. There were significantly higher gains for the intervention group (effect size of .38), although it is difficult to envisage implementing this type of intervention outside the prison environment, as the need to develop trust in this context is abnormally high. The programme also achieved considerable non-literacy outcomes in relation to health, substance abuse and general rehabilitation.

The ESOL literature (see Section 3.6) for more detail suggests that group rather than 1:1 teaching is necessary for effectiveness, to ensure ESOL learners have opportunities for real-life related practice in oral English; the social practice of English is an important pre-requisite in effective teaching.

Discussion

The research review did not reveal any findings on the effectiveness of one size of provision over another. There are many variables to take into account, including the skills of teachers, whether there is constant turn over of students in groups and hours of tuition.

As yet we don't have national data on the proportions of learners that receive class, small group or individual tuition. As more is known, we can then consider researching

[43] Although the authors claimed that there were no significant differences between those who completed and those who withdrew.

which types of provision seem more effective for what types of learners. There is some evidence that ESOL learners may do better in groups.

3.3.3 Computer-based LNL

The terminology in this area is diverse, inconsistent and confusing – a feature that is seen as reflective of the pace of development in its applications (Clarke & Engelbright, 2003). Terms commonly used include *telematics*, *IT or ICT* (information technology or information communications technology – usually a broader term that includes computer systems and may also include non-computer technology such as videos), *CAI* (computer-assisted instruction), *CAL* (computer-assisted learning), *CBL* (computer-based learning), *CMC* (computer-mediated communication) and *ILS* (integrated learning system). There is little consistency of usage of these terms in the literature or everyday parlance. CAI or CAL are probably more commonly used in the New Zealand schooling sector (Parr, 2003), and although ICT is probably the most common term in much LNL literature (especially in Britain), we used CAI most often in this report as it tends to be the term in the studies reviewed.

The diversity of technology involved and how it is used in educational programmes is also considerable. First generation CAI programmes were 'drill and practice' with limited interaction or feedback and where the computer was basically a typewriter. Second and third generation programmes have seen an increase in the amount of interactivity, greater access to information and learning options, as well as linking to the Internet and other forms of technology. While these subsequent generations of CAI are undoubtedly sophisticated and much improved on their earlier counterparts, the time lag of adopting new systems and/or software (usually dictated by cost) means that most CAI in use is still relatively unsophisticated.

Similarly, the specific software used in CAI varies considerably and there is considerable turnover in their currency. The studies in the review involved an extensive variety of software packages. While some programmes such as PLATO are mentioned in a number of studies, others appear to be 'one-offs' or have since disappeared. This rate of turnover is one of the reasons that pre-1990 studies were not included in this review.

As yet, there is not much information about the extent of usage. One study in 1994 (Hopey, Rethmeyer & Harvey-Morgan quoted in Lavery et al., p. 182) reported that two-thirds of all adult literacy programmes in the US were using computers for instructional purposes, but Rosen (2000) reported only one-third of ABE teachers were using CAI. Stites (2004) reports that few LNL practitioners incorporate the Internet into their CAI approaches as yet. An English study (Mellar, Kambouri, Sanderson, & Pavlou, 2001) reported that:

- The predominant pattern of activity was for learners to use a desktop computer on their own with the tutor either talking to the whole class, or involved in discussion with groups or individuals.
- Half used office software and half used direct teaching materials.
- The ICT was mainly directed towards practice.

- Patterns of use varied in literacy, numeracy and ESOL contexts, but most teaching followed a demonstrate/independent practice model, with little discovery learning encouraged.

The NRDC has just published an observational study (Mellar, Kambouri, Sanderson, & Pavlou, 2004) which provides useful insights into how eight experienced tutors actually go about using ICT into LNL teaching The eight tutors were observed working with 11 different classes; in total there were 24 class observations and 12 observations looking specifically at learners. The researchers categorised tutors usage in four ways: technology as curriculum (i.e. learning about keyboards, Internet, search engines); technology as a delivery mechanism (i.e. using individualised learning programmes); as complement to instruction (i.e. learners worked on one aspect of their skills through specific educational software or application); or technology as instructional tool (i.e. the computer was used as appropriate in the same way that a white board or piece of paper might be). The findings seem to be similar to Mellor's earlier study with most work being directed to practice. They did see 'instructional tool' use, where literacy and numeracy objectives were closely integrated with ICT and the 'complement to instruction' approach. However, tutors' ability to integrate ICT into their teaching was very dependent on their own skills. The report recommends a number of ways to increase tutors' ability: effective ICT training for LNL tutors, incorporating more strategies for getting learners to work independently; considering the changing nature of literacies in the digital age and the new genre of writing that is demanded; encouraging more learner control and a wider range of teaching styles.

While computers and related technology have undoubtedly been an increasing source of motivation for adults to seek help with LNL, they have also been a valuable means for decreasing the social stigma of seeking help 'Learning to use a computer' is far more socially acceptable than 'getting help with my reading or spelling'. Furthermore, CAI is seen as having a number of distinct qualities that make it appropriate for LNL including for example: the active engagement of learners; participation in groups; frequent interaction and feedback; and connection to real-world contexts.

As Stites (2004, p. 114) points out, these qualities are consistent with what adult learning theorists such as Malcolm Knowles have long advocated.[44] Rachal (1995, p. 251) also lists qualities of CAI, although the research evidence is scant to verify them: reduced attrition; greater self-confidence; privacy, feedback and faster learning.

Research reviews

CAI studies appear to be the most common category of research studies in LNL. Our search identified two reviews of American CAI literature; the first covered studies up to and including our 1990 cut-off date (Rachal, 1993) and then Berger (2001) covered studies not listed by either of Rachal's reviews.

Rachal's 1993 review of experimental or quasi-experimental studies found 21 studies that met his criteria of adult programmes below 12th grade that included post-tests. Ten of the 21 studies found no statistically significant differences between CAI and traditional methods, five failed to indicate significance, two showed mixed results,

[44] Wrigley 2001 contains a very useful list of general principles and indicators to assist in the development and evaluation of technology-based materials.

three favoured CAI and one favoured traditional methods. Not surprisingly, Rachal (1995, p. 239) concluded that "CAI is a very useful tool with the undereducated adult, but it is no panacea."

Berger's (2001) review examined 23 studies carried out from 1983 to 2000 and was less stringent on criteria (use of computers, used in ABE setting and "reported on effectiveness"), but it is distinctive in that he groups the studies according to the software package used. Again, less than half of the studies reported positive results for CAI and Berger makes a cautious conclusion similar to that of Rachal (1993). Like Rachal, Berger also severely critiqued the studies he has included, concluding (p. 180) that "the literature base is tainted."

In light of the lack of clear results from the adult LNL CAI related research about effectiveness, we looked at the wealth of research available on the effectiveness of CAI in other educational sectors. Stites (2004, p. 112) reports on several meta-analyses of hundreds of studies from kindergarten to higher education. One aggregation of 12 meta-analyses of over 546 studies by J. A. Kulik concluded:

> … that students in the computer-based groups on average scored higher on achievement tests than control groups whose members did not use computers, learned more in less time, and had more positive attitudes towards their classes.

A more sceptical view is that of Parr (2003) who carried out a review of the research literature in terms of relevance to New Zealand schools (kindergarten to Year 13, with an emphasis on Years 1-8). Her conclusion is that:

> … overall, the effectiveness of computer-assisted learning has not been conclusively demonstrated. To date, it has been shown to be less effective, on average, than other forms of intervention in education (p. 2).

In particular, Parr points out that research comparing CAI with other interventions in relation to cost effectiveness is lacking. In other words, even if CAI is shown to be more effective than conventional teaching, its financial cost may well make it an unrealistic option. Her review also concludes that there is considerable variability in the results achieved with CAI (due to the diversity of contexts where it has been used and with studies that are independent of the companies involved tending to be more critical) and that results tend to be better for basic skill acquisition in maths than reading. Parr also reports that achievement using CAI is "inversely related to instructional level… student gains are greatest in primary schools … somewhat less in secondary school and lowest at the tertiary level" (ibid. p 7). However, the picture is complicated by the additional observation that CAI may be more effective for learning-disabled students, which makes it difficult to make a simple conclusion from her review, because some LNL students may have a degree of learning disability.

Individual CAI studies

Research on CAI and LNL is totally dominated by quantitative studies, probably because it lends itself more readily to controlled trials than other interventions. For example, of the 36 RCTs and CTs in the NRDC review (Torgerson et al., 2004), more than a third were on CAI. However, we discarded more than half of these studies because they were carried out pre-1990 (and used technology/software that has long disappeared), were unobtainable, seriously flawed and/or involved learners with intellectual disabilities. The ones we have selected show somewhat mixed results

and highlight issues that need to be taken into consideration by any New Zealand researchers interested in pursuing studies in this area.

Two of the studies (Batchelder & Rachal, 2000, 2000a; McKane & Greene, 1996) were randomised controlled trials. The former studied 75 male prison inmates, divided into two groups; one group received 80 hours of GED instructional material on computers for one hour a day over a four-week period, while the control group received the same amount of tuition using traditional instruction methods. While the CAI group results were higher than the control group's, the differences were not statistically significant (effect size: .17).

The authors report concluded:

> It should be noted that there were no statistically significant gains in either subject area made by either the experimental group or the control group during the 4-week time (p. 130).

The authors prefaced their article with critiques of other CAI studies' methodologies (such as high rates of attrition), which they sought to rectify in the design of their study. Despite their efforts, they later admit that lack of enthusiasm by the participating prisoners, their strong resistance to testing and the daily realities of prison life all made it extremely difficult to achieve the ideals expected of RCTs. The authors cautioned about generalising the results of CAI studies because of the varying quality of the programmes available, but still venture the observation that teacher enthusiasm may be the "single most important aspect of an effective CAI programme" (p. 132). This latter point is also made in a CAI study of learners with an intellectual disability (Nicol & Anderson, 2000).

The second RCT (McKane & Greene's 1996 study) initially involved 150 prisoner volunteers, which resulted in 51 learners in the CAI group (who also received traditional instruction) and 43 learners in the non-CAI group. Again, there were small gains for both groups, but the results were not statistically significant (effect size .16). As with Batchelder and Rachal's study, the realities of prison life interfered with the project, meaning "the generalisability of these data is questionable due to the vast attrition and problems getting the information from the correctional centers" (p. 341).

A study of 488 learners (238 in the CAI intervention group and 250 in the control group) in three US community colleges (Gretes & Green, 1994) involved 44-66 hours of tuition over 11 weeks.[45] The CAI group used a programme called READY (Reading to Educate And Develop Yourself) in an interactive CD-ROM format aimed at intermediate level readers, while the control group were taught using traditional ABE instruction (workbooks and conventional classroom instruction). The CAI group demonstrated statistically significant gains over the control group, with an effect size of .97. Black and Hispanic students made the greatest gains, about three times the gains made by those in the control group.

A New Zealand study (Lavery, Townsend, & Wilton, 1998) of 12 learners in a Training Opportunities (TO) programme for unemployed workers (six in the intervention group and six in the control group) showed a similar effect size (.86). The CAI group undertook 18 one-hour sessions of Computer Curriculum Corporation (CCC) software, while the control group received a 'textbook and lecture' method over the same period. The authors reported (p. 188) that "in less than two months the

[45] This study is the only CAI study to meet the criteria for inclusion in Condelli & Wrigley's (2004) major study of ABE/ESOL literature reported on in Section 3.6.2).

adults involved in computer training gained almost three years on the Burt reading test and more than one year on both measures of the Neale reading tests. Similar gains were apparent in numeracy skills, with the gain being 16 months in overall mathematical performance." The control group made no improvement in their reading skills and a slight decline in their maths performance. The study was not able to randomise the learner group because of the organisational requirements of the programme.

A study of 40 learners in a Canadian community college (Wilson, 1992) had three groupings of learners: 15 received an average of 151 hours of CAI that used INVEST software, covering reading (59.24 hours on average), writing (9.74 hours), maths (59.34 hours) and life skills (23.44 hours) over 11 weeks. Two control groups were used; one completed an 18-week course and the other a 44-week programme. Positive gains were made with the intervention group in all areas of reading and maths, with gains of 1.5 years in maths. However, when the results were re-calculated to match the length of the three programmes, the comparison groups made greater gains in reading skills, but the INVEST group made greater gains in maths (especially problem solving).

The intervention group rated the CAI instruction more positively than the non-CAI groups rated the workbook activities. The authors reported that the CAI reduced the teacher's role in motivating students and keeping them on-task, the students felt they had more control and responsibility over their learning and that the teacher had better information about the learners' progress compared with traditional teaching. This positive rating of the CAI instruction is also reflected in the higher attendance rate of 93% vs. 79% of comparison Group 1. Interestingly, while the CAI group rated the programme very positively, they also requested additional direct instruction from the teacher, which confirms the frequent observation that CAI is an invaluable supplementary form of instruction but cannot stand on its own without a teacher.

Another Canadian study evaluated the use of the *Autoskill Reading Programme* and *PLATO* over a two-year period using quantitative and qualitative data (Howard Research & Kysela Consulting (1997). The study included 43 learners in the treatment group and 40 learners in the control group; time on the computer ranged from two to 48 hours, with most spending 15-20 hours. Again, the report showed that there were no statistically significant differences between the reading performance of the intervention group and those receiving conventional instruction. The CAI was rated positively and this group "appeared more highly motivated to complete their academic tasks" (p. 8).

Discussion

Of all the factors considered in this review, computer aided instruction appears to encompass the greatest diversity of interventions under a single umbrella term; they range from the use of simple typing programmes through to sophisticated, multi-media-linked programmes with refined assessment and feedback components.

While the number of studies in this area is greater than most, the evidence upon which conclusions can be drawn is still sparse and limited by the methodological flaws in the studies. It appears CAI may be marginally more effective compared with conventional instruction, although much better verification is still needed to strengthen this conclusion. Additionally, the studies often contrast CAI interventions with 'traditional' curriculum, the nature of which is not spelled out clearly and may be different from conventional teaching in New Zealand.

CAI may be more effective in maths and with learners at basic levels. There is some evidence for gains in reading (including reading achievement generally, as well as specific elements of the reading process and word recognition).

Teachers are central to making CAI programmes work. The programmes work best as a supplement to other forms of instruction, rather than as a stand-alone option.

Irrespective of its effectiveness compared with other modes of instruction, CAI is consistently reported as valuable for motivating reluctant or hesitant learners. While enjoyment is not necessarily synonymous with gains in LNL skills, it is an essential consideration when participation in programmes is still predominantly voluntary. Its increasing usage in programmes probably points to refining the research questions in this area. Which specific CAI programmes are effective? How is CAI best used and with what types of learners? How does CAI compare to using learner-centred curricula in our context? To what extent does learning transfer from CAI programmes into real life literacy activities?

3.3.4 Learning disabilities and dyslexia

Approximately 20% of children do not respond to the teaching and learning methods used in schools, many of whom later present for LNL provision describing themselves as having a learning disability or report having been diagnosed as 'dyslexic' at school (Benseman & Tobias, 2003). Chapman, Tunmer and Allen (2003) state that "the term 'learning disabilities' (LD) has never formally existed in New Zealand." Nonetheless, these terms are used by many people – amongst parents, teachers, and educational professionals and not the least, by learners themselves.[46] Chapman et al. argue (p. 94) that "continuous neglect of the LD concept along with inadequate and inappropriate general and remedial instruction" are fundamental to the poor showing in the IALS study in regard to adults who self-identified as having learning difficulties.

This review provides a timely opportunity to consider what the latest research offers by way of guidance about more effective LNL practice for these learners. We have drawn heavily on a recent NRDC report *Developmental Dyslexia in Adults: a Research Review* (Rice & Brooks, 2004). The review discussed key questions, such as: are there grounds for the condition *dyslexia* and can it be defined satisfactorily? Does dyslexia cover all adults who have difficulty with learning to read? Do adults with learning difficulties/dyslexia require different teaching materials, methods and contexts from other adults? Can different treatments of learners be justified, when there is no agreement as to its definition, when research into the causes of dyslexia are inconclusive and when there is not agreement about how dyslexia might be identified?

Explanation for difficulties in learning to read has been developed from a range of perspectives, from socio-cultural through to physiological and genetic – each of which then usually point to a range of corresponding strategies or teaching methods.

[46] The federation of Specific Learning Disabilities Associations (SPELD) lobbies to have the terms recognised, and there is a general acknowledgement in schools of the existence of learning difficulties.

The latter categories of explanations are most often couched in terms of *learning disabilities (LD)* or *dyslexia*. [47]

Chiappe (2002) argues for the importance of the concept:

> Understanding the mechanisms that underlie dyslexia can have important implications for the intervention provided to individuals who suffer from it. Unsupported theories may lead to inappropriate interventions that may be ineffective or harmful. Because we found that adult dyslexics' difficulties were restricted to literacy and language tasks, interventions that specifically address these skills would be appropriate. More specifically, programmes that do not explicitly address literacy and language skills should be avoided. For example, sensory-motor training has been found to enhance sensory-motor skills, but has no effect on literacy skills. More success is likely with traditional programmes that focus on word recognition, spelling and comprehension strategies.

A British review of the dyslexia literature (Rice, 2003) challenges brain-imaging evidence that is often claimed to show a biological difference between brains of dyslexics and ordinary poor readers. Whilst morphological differences in areas associated with reading and activational differences during reading activities do exist, Rice explains how at this point we do not know if the difference is what *causes* difficulties in reading, or if it is the *result* of those difficulties. There is as yet no explanation as to *why* there are differences.

Rice and Brooks' (2004) review of research argues that the statistical findings do not present irrefutable evidence for differences in either kind (categorically) or degree (dimensionally) between dyslexic and non-dyslexic people (p. 34). They conclude:

> There is no evidence from research to support a policy of differentiating dyslexic from non-dyslexic students in adult literacy, numeracy and ESOL. We offer five main reasons for our conclusion:
>
> 1. Both dyslexic and non-dyslexic students need to acquire the same knowledge and skills in literacy and numeracy.
> 2. Structured and explicit tuition is appropriate for both groups.
> 3. Individual differences between students occur along many dimensions, while all classification schemes entail overlapping categories.
> 4. Diagnostic protocols for dyslexia in adults cannot be used with any confidence either to ascertain the causes (as opposed to the symptoms) of literacy or numeracy difficulties or to predict the outcomes of interventions.
> 5. The construct of developmental dyslexia is insufficient for a systematic and thorough appraisal of learners' difficulties in adult education. With respect to adult literacy, we also conclude that successful teaching is informed by the tutor's understanding of 'normal' language and literacy acquisition (p. 9).

The review suggests that what is effective teaching for 'normal' readers will be effective for people with LD/dyslexia. This point is reinforced by educational psychologists in Northumberland (Northumberland Educational Web Site, 2004) who

[47] The term 'reading' rather than LNL is used here as the bulk of the literature refers to reading. The comparable term to dyslexia in maths is *dyscalculia*.

list approaches on their website that "a growing body of professional opinion informed by properly accredited research" have identified as "well worth trying,"[48] but acknowledge that most would be known to LNL tutors as effective teaching strategies for all learners.

> High quality teaching of literacy skills by well-informed, sensitive teachers who take account of the sometimes delicate self-esteem of the dyslexic will help enormously. Good teachers are far more influential than specialist schemes. The most effective educational interventions will be characterised by all the positive features of a quality individual education plan (p. 88).

A Canadian literature review (Corley & Taymans, 2002) states that there is a paucity of research on teaching adults with LD, and also issues around applying K-12 research to the adult context. However, they set out criteria for providing effective services for adults with LD:

- assessment of learner's needs, interests, skill levels, learning strengths and challenges
- planning appropriate teaching interventions and selecting "accommodations or assistive technologies" (such as readers, tape recorders, computer software) which help to compensate for a disability
- professional development of tutors and administrative support people to ensure they understand and employ best practice
- people understand current reading research.

Their description of best practice as a mix of teaching meta-cognition and learning strategies, with direct tutoring of sub-skills and specific learning tasks, appears not so different from the best practice described in Section 3.1.

Screening learners for dyslexic is not likely to be a standard part of initial assessment in LNL programmes. Rice and Brooks (2004, p. 88) emphasise the need for all tutors to be skilled in assessment of reading difficulties:

> The screening of adult literacy students for 'dyslexia' is difficult to justify on either theoretical or practical grounds. By contrast, the psychometric assessment of reading-related skills is essential and every adult literacy teacher should be competent in it.

Assessing learning difficulties is seen as something different. The University of Auckland Learning Assessment Centre psychologists suggest that assessment of learning disabilities is a specialized area of psychology and requires years of training and experience at the post-graduate level. The assessment process normally requires several hours of direct work with the client, as well as additional time spent with parents, collecting information from schools, and analysing and integrating all

[48] "These include: phonological awareness (emphasising the constituent sounds that make up spoken words), letter/sound correspondence (e.g. the sounds usually associated with individual letters and groups of letters), phonically regular words (e.g. 'on', 'at', 'madam', etc), sight vocabulary (useful for learning 'by sight' words which are phonically irregular, e.g. 'the', 'of', 'women', etc), reading to them (often underused - an additional copy of the text may prove a helpful optional extra), listening to them read (requires more skill than may at first be realised): paired/shared reading approaches are worth trying) and enhancing confidence and motivation (difficult to overemphasise its importance - low stress - no blame)."

the information into a coherent assessment of the problem.[49] This is certainly beyond the scope of a 'normal' literacy assessment process in most contexts.

The conclusion of the NRDC literature review states (Rice & Brooks, 2004, p. 88):

> In our present state of knowledge, it does not appear to be helpful for tutors to think of some of their students as 'dyslexics' and of others as 'ordinary poor readers'.
>
> Telling a tutor that a student is 'dyslexic' may elicit a number of inappropriate assumptions about the student's problems and abilities.
>
> The research does not indicate that a different curriculum should be followed for 'dyslexics'; the curriculum will depend very much on the needs of each individual student.
>
> The research does not indicate that 'dyslexics' and 'ordinary poor readers' should be taught by different methods; however, the methods promoted as specialist interventions for dyslexics are well-suited to be mainstream methods of reading instruction, which is how they originated.

Discussion

The literature we reviewed suggests that there may not be a great deal to distinguish learning disabled adults with other adults with poor literacy skills and stresses the need for adult LNL tutors to be highly skilled in how to assess reading and how to teach reading to meet the diverse needs of students, irrespective of the causes of the difficulties.

In the light of this cautious approach, it is interesting to note that in England a practitioner-focused website 'A framework for understanding dyslexia' has just been launched by the Department of Education and Skills.50 The website provides information about recognising learners with dyslexia, and explanations of a wide range of appropriate teaching strategies and resources that teachers may wish to draw on.

The findings of the NRDC study may have been more tentative than some of those working with learning-disabled students expected and at a workshop that accompanied the launch of the NRDC study, Brook took care to emphasise what the report does and does not say,[51] giving greater emphasis to practitioner wisdom.

"The report does *not* say that there is no such thing or condition or problem as dyslexia. It *does* say that no two researchers or experts agree on how to define it.

The report does *not* say that there are no such people as people with dyslexia. It *does* say that no two researchers or experts agree on how to identify them.

The report does *not* say that nothing is known about how to help adult learners who have dyslexia or that we might as well all go home. It *does* say (pp.79-87) that there

[49] Retrieved April 29, 2004 from www.psych.auckland.ac.nz/lac/dyslexia.htm

[50] Retrieved October 28, 2004 from www.dfes.gov.uk/readwriteplus/understandingdyslexia

[51] Retrieved January 10, 2005 http://www.nrdc.org.uk/uploads/documents/doc_435.pdf

is very little even moderately reliable evidence from *research* on how to do this; perhaps much more is known from decades of practical experience.

The report does *not* say that there is no point in teaching adults with dyslexia separately from other adults with literacy difficulties. It *does* say that there is at present no warrant in *research* for this – 'there appears to be no experimental evidence comparing group outcomes between adult dyslexics and "ordinary" adult literacy learners' (p.86). But again practitioners may well have had success with teaching adult dyslexics separately.

The fact that so little can be deduced from existing research means that there is everything to play for."

3.4 READING

The difficulties of researching reading in adults must be borne in mind when reading the research. A significant percentage of learners may have learning disabilities (although as section 3.3.4 illustrated, identifying the exact nature and extent of this incidence is difficult). There are differences between native and non-native English speakers that may not be noted in research (see Section 3.6). Children and adults matched for reading abilities have different processing abilities which means that research based on what is known about children's reading has to be considered cautiously. Finally, speed and accuracy are important when studying basic reading processing but are not always included in the research design (Venezky & Sabatini, 2002).

3.4.1 Overview of reading and reading difficulties in adults

At the heart of reading is the reading process:

> The ultimate goal in reading is *comprehension*. Readers read a text in order to understand and use the ideas and information contained in it. Comprehension is improved when readers understand the key concepts or *vocabulary* in a text. Reading comprehension may suffer, however, when readers are unable to recognize individual words in a text. A reader may be conceptually ready to understand a text, for example, but will not have the opportunity to do so if he or she cannot read the individual words. To read individual words, the reader must know how the letters in our alphabet are used to represent spoken words (*alphabetics*). This includes knowing how words are made up of smaller sounds (*phonemic awareness* or *PA*), and how letters and combinations of letters are used to represent these sounds (*phonics* and *word analysis*). The ability to figure out how to read individual words, however, is not sufficient. Readers must also be able to rapidly recognize strings of words as they read phrases, sentences and longer text. *Fluent reading* is crucial to adequate comprehension (Kruidenier 2002, p. 2).

The process above is not sequential – readers must do many things at once, right from the beginning:

> They identify words by visual memory, match sounds to letters, pull word meanings from context, understand sentences as complex structures, figure out how the whole system of written language works, obtain information about content, and predict both the words and the content to come (Yatvin, 2002).[52]

Adult LNL learners do not display all of these characteristics. A number of non-impact related research studies are summarised below in order to provide a brief overview of the types of difficulties adults have when reading and to suggest some appropriate responses. Snow and Strucker (2000) described a cluster of difficulties probably experienced by LNL learners:

[52] Retrieved October 1, 2004 from http://www.pdkintl.org/kappan/k0201yat.htm.

> ABE/ESOL learners might have partial acquisition of phonological awareness (reflected in decoding problems and poor spelling); fluency lagging behind untimed silent comprehension; vocabulary lagging behind years of school completion and general knowledge stalled at [upper primary school] (p. 35).

The authors make the point that when oral reading is not encouraged in programmes because it is not seen as an 'authentic literacy act', specific reading problems may go undetected for a long time. They argue that practitioners should find out as much as possible about the childhood and literacy experiences of learners, as well as ensuring they are very informed about the reading process overall, to ensure they can identify where learners have stalled in their progress. In particular the authors stressed the need for more professional development around the teaching of reading, a point also brought out in Campbell & Malicky (2002).[53]

The *Adult Reading Component Study* (ARCS) (Strucker & Davidson, 2003) was designed to describe the various characteristics of learners enrolled in US programmes in ways that would be useful for policy makers, practitioners and curriculum designers. The study involved 676 ABE and 279 ESOL[54] learners (955 in total) from 30 literacy programmes in seven states. In a 1.5 hour-long session, students were assessed on 11 components of reading: phonological awareness; rapid naming; word recognition; oral reading; spelling; vocabulary; and background knowledge.[55]

The researchers identified ten clusters of students in three main groups for the ABE learners (low, intermediate and GED). Strucker suggests that the different characteristics of learners require different approaches. Low-level students need explicit structured teaching in phonemic awareness and word recognition. Intermediate level students need greater fluency, a higher-level vocabulary and more background knowledge in basic school subjects such as history, geography, maths and science so they can progress to post-school education. On the other hand, the more advanced GED students need content to pass their GED.

Davidson and Strucker (2002) analysed data from 216 participants who were in the low intermediate and low categories of the ARCS. Interestingly, almost 25% of this group identified themselves as non-English speakers, yet they had not been identified as such in the full study. Error patterns of 45 non-English speaking and 45 English-speaking participants were analysed further. The non-English speakers resemble normally developing younger readers, with skills developing evenly in both print and meaning, while native English speakers more resemble children with reading problems, whose print skills lag behind meaning skills. Non-English speakers made more phonetically plausible substitutions, while native English speakers made more real word substitutions. Learners can only substitute real words if they have

[53] Campbell & Malicky promoted the use of informal reading inventories (their version is *The Canadian Adult Reading Assessment*) as an appropriate tool to help learners and tutors.

[54] Almost 75% of learners were Spanish-speaking and more than 80% were reported to have reasonable literacy skills in their first language. It appeared some required teaching more oriented to English as a foreign language. It is unclear what proportion of ESOL learners in New Zealand at any one time would have similar needs.

[55] The ARCS has evolved into a website http://www.nifl.gov/readingprofiles_/FT_ARCS.htm, where practitioners can take a mini-course in reading development, download assessment tools, enter data from their students to identify their profile and use resources provided on the site to help plan appropriate teaching.

heard them, so this strategy is very vocabulary-dependent. When learners need to 'read to learn', it is more helpful to have independent decoding strategies practised to the point of automaticity. For non-English speakers it is important to develop knowledge of less familiar phonics and pronunciation patterns, to accommodate new vocabulary.

The authors suggested that when practitioners use only silent reading and oral comprehension questions as assessment tools in reading, the results might lead to students with quite different needs being inappropriately grouped together. This could mean tutors spend time teaching decoding to native speakers that non-English speakers have already mastered and teaching vocabulary to non-English speakers that English speakers already know.

Campbell and Malicky (2002) investigated the reading processes of 344 ABE students, finding that adults at all stages of literacy development are able to make effective use of their knowledge as they read. Thus, programmes should ensure that learners' prior knowledge is used from the beginning (in integrated programmes), rather than assuming that adult beginning readers need to concentrate on strategies for processing print first. There needs to be greater focus on making meaning for those who focus too much on print cues and a greater focus on processing print and getting information from text for those who misinterpret meaning.

3.4.2 Findings related to dimensions of reading

The report *Research-based Principles for Adult Basic Education Reading Instruction* (Kruidenier, 2002) is a key review of adult reading-related research, carried out for the National Institute for Literacy (NIFL) and The Partnership for Reading.[56]

The purpose of Kruidenier's review was to identify and evaluate existing adult literacy reading instruction and to develop research-based principles and practices for teaching in the ABE field. The review covered all research carried out on low-literate post-16-year-olds in a variety of contexts.[57] Experimental studies published in peer-reviewed journals were given priority. Only a few non-experimental studies met the inclusion criteria, which included having a sound analytical framework, using multiple data collection methods and triangulation of results. Approximately 70 qualifying research studies were identified in the literature search based on the criteria used. The review showed that there was a relatively small research base and only small numbers of studies on any topics.

The review is structured around the components of reading identified as essential by the National Reading Panel - *alphabetics* (phonemic awareness and word analysis), *fluency*, *vocabulary* and *comprehension*.[58] In addition, *assessment* and *computer technology* related research studies were reviewed because of their significance in

[56] The *Partnership for Reading is* a collaborative venture between the NIFL, the National Institute of Child Health and Development, the US Department of Education and the US Department of Health and Human Services to develop scientifically-based reading-related research. This review built on a similar one - *Report on the National Reading Panel: Teaching Children to Read* (NRP) - with the addition of topics of particular interest to adult educators.

[57] This review included research pre-1990, studies involving adolescents and learning disabilities.

[58] The NRP's findings were controversial, having been criticised for over-statement of the findings on phonics and an undervaluing of factors such as student motivation (Garan, 2001; Yatvin, 2002).

ABE. Within these major topics, the research considered a number of sub-headings including the settings or contexts of delivery, teaching methods and strategies, and learner characteristics such as learning disabilities, ESOL and motivation.

In recognition of the limited ABE research base currently available, and to give guidance to ABE teachers looking for ideas on how to teach adults to read where there is no research, the review makes tentative suggestions from reading-related research in the US K-12[59] schooling system. To be included, K-12 research had to refer to teaching that would be plausible for adults, be based on a strong body of evidence and relate to those K-12 students who had not followed normal-age and ability level reading development (because adult beginning readers are more similar to children who are poor readers). The review points out that K-12 and ABE differ in ways that may be significant in learning to read – for example, the respective age differences of participants, the voluntary (and sometimes less consistent) attendance of adults; fewer hours of teaching for ABE students and the different interests and motivations of children and adults. Therefore the K-12 research can only be used to indicate useful lines of inquiry for the future.

Findings of different strengths were identified from the results reported in these studies: Eighteen emerging research-based principles and related practices for ABE reading teaching were identified, each of which had to be established by at least two experimental studies. Thirty-two additional trends in the ABE research were identified, related to findings from only one experimental study. Twenty-two specific ideas that might be used to supplement the ABE research were derived from the K-12 research.[60]

When reading the findings from this study in full, a striking feature (already referred to) is the atomisation of research – that is, how little has been replicated and how studies have often concentrated on only one small aspect of the reading process.

In each of the following sections the principles are summarised, followed, where applicable, by trends and comments that stem from K-12 research.

Assessment of reading

While there has been very little research about the relationship between assessment and LNL learner improvement, professional wisdom leads LNL tutors to believe it is an essential part of the teaching process. In the same vein, Kruidenier's review assumes that accurate assessment of a learner's ability in all aspects of reading (both initial and on-going) is important for effective and efficient teaching.

The limited research findings say that when measures of achievement are obtained for each crucial aspect of reading - alphabetics, fluency, vocabulary, and comprehension - literacy learners (including ESOL and reading-disabled learners) show diverse ('spiky') profiles, with different strengths across the different aspects. These profiles are useful for planning teaching.

[59] Kindergarten through to Grade 12

[60] Not all the principles and trends are relevant to our review, so not all are discussed in this section. In some cases, the findings have been re-written to make them more understandable and applicable for the New Zealand context. For a full copy of the report, see

http://www.nifl.gov/partnershipforreading/publications/adult_ed_02.pdf

The diversity of learner profiles suggests that one assessment measure of reading may not be sufficient to identify the strengths and needs of all learners. For example, the common practice of silent reading with oral comprehension questions will not elicit enough detail about learner's reading strengths and skill gaps for the development of an effective teaching plan.[61]

Alphabetics - phonemic awareness and word analysis

Phonemic awareness (PA) is the knowledge of the sounds in spoken language, while word analysis is a broad concept including phonics (the relationship between sounds and the letters that represent them), sight recognition of words, the use of context, knowledge of prefixes and suffixes and dictionary skills.

A relatively large number of studies conducted over 20 years showed that adult non-readers have virtually no phonemic awareness ability and are unable to consistently perform, on their own, almost all phonemic awareness tasks. Similarly, adult beginning readers perform poorly on phonemic awareness assessments. The number and complexity of phonemic awareness tasks learners can complete increase as learners' reading levels increase.[62]

Participation in ABE programmes increased learners' PA and word analysis, and this gain in turn may lead to improvement in other aspects of reading such as fluency. Word analysis can be taught, but requires direct teaching – participation in a programme per se will not improve ability.

Trends and ideas from the K-12 literature tentatively suggest:

- systematic phonics teaching[63] may be more effective than incidental teaching; it may be better to provide explicit teaching on one or two PA skills than on a mixture. Teaching blending and segmenting may be most effective.
- teach adults how to manipulate phonemes (e.g. to blend and segment words) using both sound and letters (unlike working with pre-literate children when sounds only might be used).
- teaching phonemic awareness may help adults increase in their ability to read sight words.
- teaching to increase fluency, by repeated reading and guided oral reading, helps word recognition.
- small group teaching for PA may possibly be more effective than whole class teaching.
- Too much, as well as too little, PA instruction may be ineffective (less than five hours or more than 18).

[61] See earlier comments from Davison & Strucker (2002)

[62] Refer to Section 3.4.1 for a fuller description.

[63] We interpret this idea to mean explicit scaffolded teaching of phonics is useful when it is assessed as a specific need, not that a 'phonics' programme per se should be taught in its entirety before other aspects of reading.

Fluency

Fast, accurate decoding and prosody (reading with appropriate rhythm, intonation and expression) are important aspects of fluent reading.[64] Increasing fluency reduces the time spent decoding, thereby increasing the time available to get meaning from text. Methods of teaching fluency centre on guided oral reading (sometimes called shared reading) and frequent independent reading.

The very limited amount of research said fluency was an issue for adult literacy learners at both beginning and higher levels. Teaching fluency through repeated reading strategies may lead to improved reading achievement.[65]

Trends and ideas from the K-12 literature tentatively suggest:

- repeated reading with feedback from teachers and peers may help with fluency and comprehension
- systematic phonic instruction may help fluency
- oral guided reading procedures may lead to greater fluency.

Vocabulary

A large enough reading vocabulary is crucial for getting information from written text.[66] There has been very little research about vocabulary in the ABE sector and what has occurred has produced mixed results. It appears that participation in itself in literacy programmes may not necessarily increase ability on vocabulary-related assessments but the reasons for this are unclear.

Trends and ideas from the K-12 literature tentatively suggest:

- teaching new words from contexts important to the learners
- encouraging wide reading, so that learners are exposed to new vocabulary; however whatever is read independently should be at an appropriate reading level so the learner can read it fluently.
- pre-teaching vocabulary before exposure to a text improves vocabulary acquisition.[67]

[64] Fluent reading is not the same as skimming and scanning; fluent readers take in more text at each fixation of the eyes on the text and move backwards or skip words less than poor readers.

[65] Also discussed by Sabatini (2002) who compared the speeds of college and ABE students. His findings were that slow laboured reading even when accurate was less efficient because it meant less reading occurred and less automaticity (accuracy and rate) developed.

[66] This is a bind for LNL learners; they have difficulty reading new texts because of vocabulary but in order to acquire new vocabulary they need to hear unfamiliar words and read a wider variety of texts. These learners need high quality vocabulary development and frequent exposure to new types of texts and vocabularies (Besser et al., 2004). This is even more an issue for ESOL learners.

[67] Our professional experience suggests that of all aspects of LNL work, tutors probably focus on the vocabulary-related aspect of reading more than others. Besser (2004) suggests that computer technology can help vocabulary development and that a variety of strategies have to be developed for vocabulary development.

Comprehension

A number of studies showed that usually, but not always, participation in ABE increases students' reading comprehension. However, very little research has focused on how to understand changes in comprehension or what specific factors mean some programmes and learners achieve better results than others. Assessment measures of reading comprehension have been highly variable and the results of studies to determine whether general participation in LNL programmes lead to improved reading comprehension learners have been variable also.

ABE learners have poor functional reading comprehension achievement. They can often recall ideas from simple texts and locate single pieces of information, but not combine information from longer or more complex texts. They are more likely to view reading as decoding.

Explicit (as opposed to incidental) teaching of comprehension strategies may improve comprehension levels. There is some evidence that addressing comprehension within multi-component reading teaching, including PA and word analysis instruction may lead to improved skills. However, identifying what elements make the greatest impact on learning is difficult because of the large number of components within a study on comprehension. For example, the diagnostic-prescriptive approach that appeared to lead to improvement involved assessment to identify strengths, needs and interests, an individualised teaching programme, contextualised content, and the explicit teaching of reading processes.

Students may improve their comprehension when there is additional teaching support through the presence of assistant teachers or volunteers.

Briefly, but explicitly, dealing with self-efficacy and motivation may lead to improvement as may using contextually relevant adult appropriate material.

Spending at least 70% of time in class practising reading and writing, including deliberate discussions on reading strategies may lead to improved meta-cognitive abilities.

Reading comprehension may increase in longer programmes, with programmes of more than 50 hours (where learners attended regularly) showing greatest gains in comprehension. However, some studies of the links between length of programmes and gain show mixed results.

Staff with more experience or training may do better at improving the comprehension levels of learners.

Trends and ideas from the K-12 literature point tentatively to teaching comprehension strategies as part of a multi-component approach including PA, word analysis and vocabulary. Effective comprehension strategies from K-12 that, when used in combinations, have an impact on learning include:

- teaching learners to monitoring their comprehension and understanding as they read
- collaborative learning where people learn strategies together

- using graphic and semantic organisers[68] to help readers draw meaning from the text
- using story structure, so readers learn to ask standard questions of the text - who, what why when – and map out events, times etc
- question asking where learners answer questions from the teacher
- question generation where learners pose questions about the text
- summarising.

3.4.3 Specific reading research studies

There is more research on reading than on any other aspect of LNL research and the discussion above stresses how fundamental it is that LNL practitioners have a sound grasp of the reading process and related pedagogies. We have outlined a small number of studies to illustrate some of the issues involved in reading-related research with adults. The first study was selected because of the quality of its methodology; the second because it considered contextual literacy teaching; and the third because it involved the diagnostic-prescriptive approach that is purportedly common practice in New Zealand provision. The fourth example shows findings from a just completed set of case studies of how LNL tutors approached the teaching of reading in the UK.

Rich & Shepherd (1993) was identified as the most robust RCT in the NRDC (2004) review (with an effect size of 1.14) and was also identified in the study by Condelli and Wrigley (2004) as having the strongest methodology of the studies they analysed. The study investigates the effects of explicitly teaching two components of reciprocal teaching to enhance comprehension - self-questioning (making up a question on the main idea) and summarising information.[69]

The study involved 90 adults enrolled in two adult education programmes in New York City (a business school and an ABE programme). Participants were randomly assigned to one of five groups, a group to receive tuition in self-questioning, or in summarising or in both (full condition), plus a control group that received teaching materials only and a second control group with pre- and post-assessments only.

The participants in the study were taught the strategies in small groups for six 45-minute sessions spread over 18 days. Thus the intervention lasted only 4 ½ hours in total. The materials were taken from primary level science and social studies textbooks. In the self-questioning group, students were taught to pose one to three questions about each passage, while in the summarising group, students read two paragraphs of text and then made summarising statements. Initially the teacher modelled the strategy and then over subsequent sessions students were encouraged to take over and work collaboratively practising the strategy.

Participants were post-tested by reading a passage and recalling it orally, and answering multiple-choice comprehension questions. Participants from the total

[68] For example, recognising the use of varied headings, or using different conjunctions to show cause and effect (because, since, if) or time sequencing (after, since, until, before).

[69] The other usual components of reciprocal teaching are clarifying ideas in the text and predicting what might happen next.

condition group (summarising and self-questioning) did better on comprehension and recall than the control groups. On the question task, participants in the full condition and self-questioning groups did better than the control groups but on the recall task the full condition group showed more improvement. Therefore, self-questioning appeared to lead to more improvement in comprehension than summarising.

Rich and Shepherd make other important observations. First, this study showed that direct teaching improves comprehension. Secondly, reciprocal teaching's efficacy as a method has been noted in other child-based research.[70] Thirdly, there are some indications that summarising strategies may take longer to learn. Despite improvements from pre- to post-test, participants' scores improved overall, scores on average were low on completion of the training. Finally, the study probably did not allow enough time either for learning the strategies or for consolidation of the skills involved.

The value of Rich and Shepherd's study is to demonstrate that a teaching strategy that is well-established in the teaching of children may also be applicable and effective in teaching adults and that further research is warranted.

Dirkx & Crawford (1993) aimed to assess the value of contextualised content in reading teaching in a prison (the authors noted the difficulty of finding a meaningful and educationally relevant context in prisons). The study participants were 18 male prisoners; the control group of nine continued with their current studies while the contextualised programme replaced the existing adult education programme for those in the experimental group for part of each instructional day. A commercially available science programme was adapted to include areas of specific interest to inmates such as an experiment showing the effect of acid rain on plant life, conducting a recycling programme, growing an indoor garden and studying the five senses of the brain.

The programme ran two hours daily for eight months (although total hours were not stated, this may have meant approximately 320 hours). Data on reading was collected from pre- and post-testing of reading, observations of reading behaviours and semi-structured interviews with participants.

The study reported that both the control and experimental groups made modest improvement in their reading, but the NRDC analysis says the effect sizes were not clear because not enough data was provided. Nonetheless, the study reports dramatic differences in behaviour between the two groups with the experimental group engaging in group-based active learning strategies and with a much higher attendance rate than the control group.

While the prison context may not be readily applicable, the research approach is interesting because it grapples with integrating literacy into another body of knowledge which is a key consideration for TO and YT programmes.

Cheek & Lindsey (1994) compared the effects of using a diagnostic-prescriptive approach to teaching reading (based on initial assessment information and using an

[70] In the recently published New Zealand handbook on effective literacy practice (Ministry of Education, 2003b) reciprocal teaching is described as effective in improving the comprehension and critical thinking of fluent child readers, rather than as a general teaching strategy.

eclectic range of strategies including language experience[71] and individualised teaching) compared with a 'traditional' programmed approach that involved predominantly structured commercially available teaching materials and computers.

In the study 71 learners were randomly assigned to either the diagnostic/prescriptive or control groups. Five participants did not complete the programme, leaving 33 in the experimental and 38 in the control groups. Participants were taught one hour daily for two months, with the amount of provision being therefore approximately 40 hours in total.

Two versions of a standardised diagnostic test were used as pre- and post-tests for phonetic analysis, structural analysis, literal comprehension, inferential comprehension and total comprehension.

Compared to those taught using the traditional programme, adults taught using the experimental method had significantly higher inferential and total comprehension scores, but statistically similar word identification and literacy comprehension scores. It may be that the experimental scheme focused more on meaning making, while the traditional programme emphasised repetition, word analysis and literacy comprehension.

The fourth study (Besser et al., 2004) involved 27 two-hour observations of teaching and learning in 21 sites from six providers. This project also involved 54 tutor interviews, and detailed analysis of the work identification, comprehension and phonological awareness skills of 53 learners.

As a group study participants had difficulties in word identification, comprehension (both explicit and implicit), phonological awareness, decoding and spelling. Learners had spiky profiles – with fewer difficulties on word identification and more on spelling. Errors did not correlate necessarily i.e. large numbers of oral reading errors did not necessarily correlate with poor comprehension.

The learners' reading profiles fell into three categories (complementing Strucker and Davidson's findings): competent readers who may have been attending to improve their writing and who may have needed an 'English' course; a larger group having problems with phonological awareness and spelling and who might have benefited from close attention to those components specifically (in a 4-6 week focused course); a third and larger group with 'spiky' profiles – not all were having difficulties in all areas and may have responded to specific teaching across all sub-skills.

The researchers observed that not a great deal of intense, focused reading teaching took place and suggest that learners may make more progress if more quality teaching of reading went on. They also observed that although many learners had difficulties with phonological awareness, most phonics teaching was done on the spur of the moment and tutors did not always have an adequate grasp of phonetics themselves, leading to inaccurate teaching. Teachers were teaching word identification and decoding strategies but not intensively and the strategies taught did not cover the range of difficulties demonstrated by learners.

[71] An activity where the teacher acts as transcriber of a learner's speech in order for the learner to then be able to read their own words. The process empowers learners to express themselves, as it frees them from having to focus on spelling, grammar etc.

3.4.4 Discussion

There is a strong body of evidence from research, backed up by the judgement of researchers and practitioners, that tutors need to be well trained in the reading process. Specifically, tutors need to be skilled enough to observe learners reading and understand what they are seeing and to know how to teach to overcome the difficulties they observe. This is congruent with the first recommendation of the New Zealand Literacy Experts Group Report (1999), which called for more attention to be paid on the development of word-level skills and strategies in beginning reading instruction in schools It also aligns with the findings of the trials of the draft Adult Literacy Achievement Framework, which highlighted the need for literacy tutors to have more skills and knowledge about teaching reading.

Another strand of findings points to the need for explicit teaching of all components of the reading process, in order that learners might make gain. This requires both tutors skilled at teaching, plus programme structures that enable 'deliberate acts of teaching' to take place.

In relation to research related to the components of reading, the strongest individual finding appears to be the efficacy of reciprocal reading. However, this is only from one study. There are a number of other strategies identified in the reading section that are worth investigating as research projects, including comprehension strategies, ways to develop fluency and automaticity and the place of oral reading in LNL programmes.

Learners need different types of teaching, depending on the needs identified through robust assessment processes, which need to include oral reading.

LNL practitioners have been very cautious in looking to school-based research for guidance. However, it would be useful to consider the tentative suggestions here regarding the potential usefulness of K-12 findings in the light of New Zealand school-based research. In addition, school based researchers could be drawn on to improve the quality of LNL research methodologies.

Despite the number of studies on alphabetics, it is important not to over-emphasise the significance of their findings in the absence of research into other components, for example comprehension and the importance of motivation and context in enabling learner achievement. It is particularly important to emphasise that any teaching of phonics must relate to an identified need.

It seems that most of the research reviewed has been undertaken in programmes that have explicit structured LNL teaching as their prime focus; therefore it is not clear to what extent these findings will translate into programmes where literacy gain is but one of the outcomes sought and where tutors may not be literacy specialists. More research is required about how reading skills can feasibly be enhanced in integrated programmes here in New Zealand.

3.5 WRITING

This section begins with a brief overview of the writing process, before considering the very limited outcome-related research available into how adult literacy learners develop as writers, and what teaching methods are effective in developing writing skills in LNL learners.

3.5.1 The writing process

Traditionally, teachers of writing were concerned with the end product. From the 1970s on, research began to concentrate on understanding the cognitive process of writing. Flower and Hayes, early proponents of this approach (quoted in Gillespie, 2001, p. 66) theorised that the writing process has three key components: *planning* - deciding what to write and how to say it; *text generation* – turning plans into written text (through handwriting, word processing or scribing); *revision* - improving existing text.

These three processes do not take place in a linear fashion but are iterative, changing as required by the writer. *Publishing* is sometimes seen as a fourth stage of writing (Ministry of Education, 2003b). In the LNL context, this might mean presenting a finished product to the intended audience (e.g. sending a letter to a child's teacher) Student writing may be a key publishing activity in some programmes - to both have their 'voice' heard, and also to provide authentic, adult-appropriate reading material for themselves and other learners.

Process writing has been very influential but subsequent theorists have focused more on the significance of social, political and cultural factors outside the individual that impact on the relationships involved that are prompting the writing, the purposes of writing and ultimately what is written. These newer theories place the context of writing more centrally than the process. Genre based pedagogy offers learners a more 'explicit and systematic explanations of the way language functions in social contexts (Hyland, 2003, p. 18) and argues that what is considered 'good' writing will vary from one community context to another. These approaches pay more explicit attention to teaching the structure of target text types than process writing.

3.5.2 Issues raised by research

A comprehensive discussion of research on writing related to adults is found in Gillespie's chapter in the second *Annual Review of Adult Literacy and Learning* (Gillespie, 2001). She provides an extensive overview of the study of adult writing, including selected findings from child-based writing research, writing in ESOL contexts, as well as a small number of studies on adult writers.[72]

[72] Including quite a few studies of individual learners only – perhaps reflecting the fact that there is very little organised provision focused solely on writing. Most writing is taught alongside other LNL components, making it difficult to locate reasonable numbers of subjects for research in this area.

Gillespie discusses a number of issues that could have a significant impact on the effectiveness of any given teaching strategy. These are: the degree of frustration learners experience when they are unable to express themselves in writing; the negative association of schools with writing; the links to reading and spelling (most poor writers do not have phonological awareness, for example), the concern of learners with lower-level processes (such as grammar, punctuation, handwriting and spelling) ahead of the high-level processes of constructing or composing text.

In June 2004 the NRDC published a review of research and practice about teaching and learning writing (Kelly et al., 2004).[73] In it, the authors present three reviews: of theories about how learners develop as writers, of empirical research into what factors enable learners to develop, and of current teaching, learning and assessment approaches used in the UK.

They summarise the theoretical issues (their first review) in terms of the conceptualisations of writing (writing as a process, as a stimulus for cognitive development, as a political activity and as connected with identity); the relationship between reading and writing; and adult versus child learners. The implications for practice that Kelly et al draw from this are presented in the final section of this chapter, on professional wisdom.

In their review of primary research, the authors identified 20 studies, only nine of which "were rated to have at least a moderately sound methodology" (p.26). The two large-scale studies had already been identified as being significant studies through our search process (G. Brooks et al., 2001; Purcell-Gates et al., 2002), and they are discussed below). Considering all nine studies, the authors speculate that success factors include:

- teaching process-based writing, using authentic practices and ICT
- a programme that fosters collaboration and participation, varied practice, and authentic tasks
- certain student factors (high levels of qualifications and general knowledge, their goals matched those of the course, being young, and having little work experience).

Gillespie warns that there is relatively little known about how adult learners develop as writers, compared with children, or how adults develop and change as writers within different contexts. Kelly et al concur, stating that we are not yet able to determine to what extent findings from research with children can be applied to the adult learner.

[73] This report arises from phase one of a project into effective approaches to the teaching and learning of writing, which was completed in December 2003. The Learning Skills and Development Agency (LSDA) NRDC's partner organisation, is currently undertaking phase two of the four-year research project.

3.5.3 Large-scale research studies

A study by Brooks *Progress in Adult Literacy: Do Learners Learn?* (2001) included a writing dimension.[74] The authors reported that many students appeared to have distinctly poorer writing than reading skills and that their attainment in writing (and reading) was uneven from one occasion to another (examples of 'spiky' profiles). A few students were described as "quite prolific writers" (p. 64) while more than half (56%) produced 20 words or fewer in the pre-test. The study found that while there were very small (but statistically significant) improvements in the students' length of script and quality of handwriting, there were no improvements in the reduction of errors or the complexity of writing (both higher level processes that would rate as more important in terms of gains).

Unfortunately, Hamilton's (2001) critique of this study is particularly critical of the writing component. She describes the writing 'test' as "trivial evidence" (p. 7) and dismisses its validity, although acknowledging the difficulty of testing this skill. It is not clear whether the high non-response to the single question on writing in this study was due to problems with interpreting the question or where the non-response is indicative of students not attempting to answer because of their difficulties in this area. Putting this criticism aside for a moment, the key point to be made is that no student or tutor factors were found in relation to progress in writing (Kelly et al, 2004, p. 27).

The only other study of note on writing was that of Purcell-Gates, Degener, Jacobsen & Soler (2002),[75] which looked at the influence of collaboration and authenticity (using 'real life' material) on changes in learners' reading and writing practices. The authors concluded that while the degree of collaboration between students and teachers made no difference, the use of authentic curriculum did.

> "…writing letters that get sent to real people in the lives of students, … writing notices and accounts for a newsletter that gets printed and read by real people … all of these types of activities can, according to the findings of this study, lead to substantive changes in the ways that students create literate lives outside the classroom" (p. 91).

3.5.4 Professional wisdom

Given the dearth of sound large scale research into effective strategies for the teaching and learning of writing, we have attempted to identify the professional wisdom embedded in the two key reviews of writing research undertaken by Gillespie, and by Kelly et al.

Gillespie identifies "a number of journal articles" that "have chronicled adult literacy practitioners' efforts to experiment with new ways to teach writing" (p. 87). These articles are too limited in scope and size to be considered here, but may prove a useful starting point for other researchers who want to set an agenda for research. Tutors have written about the effectiveness of journal writing, dialogue journals, the

[74] The major components of this study (the quality of programmes and teachers) have already been discussed in Section 3.1.2.

[75] Already fully discussed in Section 3.3.1

language experience approach, families writing and illustrating their stories together, goal-setting through personal writing, incorporating learning styles, and from the ESOL context: using native language for writing, photo stories and oral histories.

In what appears to be an analysis largely confined to the US, Gillespie advocates greater use of writing based on expressing learners' experiences and opinions (especially in project-based instruction focused on issues of common interest) in preference to more rigid topics and requirements (predominantly with an eye to passing the GED). She also discusses three 'promising trends' - project-based instruction, Equipped for the Future (EFF)[76] (both of which encourage writing for authentic purposes), and technology-based communication (using the Internet).

Kelly et al derive implications for the writing curriculum from their review of theories on writing. They suggest that it ought to take into account the non-linear nature of the process, the links between literacy skills (integrated nature of language) and the significance of context. They also include The New London Group's advice that a curriculum be based on situated practice[77], explicit teaching and scaffolding[78], and praxis[79].

They go on to recommend a number of activities for teaching and learning, including language experience, semantic mapping as a pre-writing activity,[80] narrative and personal writing and research projects. They suggest that teachers encourage fluency rather than competence, reading aloud to discover and correct errors, critical discussions on the conventions of writing, collaboration and interaction between learners. They stress the importance of using authentic materials, and authentic activities such as writing for real-life purposes for a real audience, student publishing and journal writing. The role of the teacher should be that of a facilitator, who encourages and provides positive feedback, and who collaborates with their learners on writing tasks. They recommend that reading and writing be integrated, as they are often done together in everyday life. For example, teachers could use student writings for learning reading.

From their analysis of the eleven studies originally excluded because of poor methodology, they suggest the following teaching strategies are worth further investigation: encouraging beginner writers to make "meaning-based revisions to the content of their writing rather than restricting their revisions to surface features", intergenerational approaches, and encouraging learners to draw on their own learning experiences from other contexts "in particular by taking the risk of making mistakes and by 'active thinking-trying' "(ibid. pp. 32-33).

Commenting on the use of ICT, both in terms of what can be implied from theories and the excluded studies, they state that it holds potential especially for revising and

[76] EFF is an initiative to develop adult learning standards based on the knowledge and skills adults need in order to carry out their roles as parents, citizens, and workers in the 21st Century. These skills include strong reading, writing, and maths along with other broader foundation learning-type skills. See http://www.nifl.gov/nifl/eff.html

[77] Situated practice: a learning environment where learners, with different levels of skill, are immersed in practices that have personal meaning to them.

[78] Scaffolding: explicit explanation of a strategy or skill, modelling of that element, a discussion of how and when it is useful and guided practice to use it in an variety of contexts

[79] Praxis: critical reflection informing practice.

[80] A visual strategy for vocabulary and knowledge expansion, when words are displayed in related categories.

editing, encouraging peer learning, finding inspiration, and creating real purposes for writing (e.g. emailing).

They also comment on issues regarding theories about writing in the workplace; that there is a need to teach to the specific writing demands of particular duties, and to teach conceptual knowledge that enables the transference of general writing skills to the job context.

Finally, from their own research into current teaching and learning approaches in the UK, Kelly et al add that learners' goals need to coincide with programme objectives, and that learners should be provided with a variety of tasks and types of activities, and a range of opportunities to work in different modes.

3.5.5 Discussion

Writing is a widely researched field but there has been very little research focusing on writing with adult LNL students and even less that investigates the outcomes from particular teaching interventions with those students that might inform this review.

IALS and most of the common assessment tools such as the TABE and the ABLE do not include any writing tasks and where they are available (such as in CASAS), they are used infrequently. Even studies mapping learners' actual behaviours and perceptions of writing tasks are few and far between (Russell, 1999) and would be an appropriate topic for action research projects with practitioners.

The main implication of the very limited amount of research located, much of which is very small scale, is that using 'authentic' everyday, learner-related content is likely to help improve writing practices of adults. Another thread of the discussion on writing considers that teachers need to encourage learners to think beyond surface features of text. A third seems to be that teachers need to promote a range of writing activities.

Beyond this point, the main recommendations are to monitor studies currently underway, such as the large scale NRDC study described below, and to encourage exploratory studies – an area that may be particularly appropriate to practitioner-led research.

Without a research agenda however, scarce resources could be wasted. Therefore it is further suggested that stakeholders in the field (teachers of writing, LNL researchers, writing experts from various LNL contexts including ESOL and policy makers) be brought together to discuss appropriate research designs that will build on existing research in identified areas of priority.

3.6 ENGLISH FOR SPEAKERS OF OTHER LANGUAGES (ESOL)

Within the parameters of this literature review (which excluded second language acquisition research), very few studies were identified that considered the learning outcomes of adult ESOL learners from particular teaching interventions. The research that was identified tended to relate to adults who were pre-literate or had low levels of literacy in their first language.

3.6.1 Overview of ESOL

At one time, the fields of adult literacy and ESOL, although both on the margins of tertiary education, were considered quite independent of each other (Suda, 2002b). With the advent of the concept of foundation learning, language and literacy are increasingly seen to be related parts of the whole and have become important components in the general tertiary sector. However, while ESOL and literacy provision are related, they are not the same and there are important differences between the fields that should not be overlooked (Manwaring, 2001; Ministry of Education, 2003; C. Roberts et al., 2004; Suda, 2002a).

Differences occur because the language profiles of ESOL and adult literacy learners do not correspond, particularly when people are just beginning to learn English. ESOL learners are focused on acquiring appropriate forms of spoken English, vocabulary, patterns of English grammar, and the nature and cultural significance of various forms of spoken and written genres of English. They also want information about social and cultural practices of their new community (Manwaring, 2001). Adult literacy learners will have greater spoken fluency and an innate knowledge of how the English language works but may also have limited reading fluency, poor reading comprehension and limited writing skills (see Section 3.4.1)

The educational profiles of ESOL and adult literacy learners may differ also. Some ESOL learners may have no experience of schooling and be pre-literate in their mother tongue.[81] Others (both migrants and refugees) may have excellent levels of literacy (and general education) in their first language, positive experiences of schooling, tertiary qualifications and professional backgrounds. Some may have had exposure to formal English teaching and others may be multilingual.

Conversely, while a significant proportion of adult literacy learners also had many years of schooling, many have not achieved either school or post-school qualifications. Some will have a history of educational failure, which may affect their motivation to learn. Others may have had incomplete schooling so lack general knowledge and higher order literacy skills.

Some ESOL learners with refugee backgrounds may be affected by past trauma, which impact on their ability to learn. Others with an ESOL background may have lived in New Zealand for a long time and have a reasonable degree of spoken

[81] Pre-literate learners either use languages that have an oral/aural tradition or their schooling has been interrupted or did not occur because of political or social upheaval (Shameem et al., 2002).

English language fluency but also have 'fossilised' errors of grammatical form, where they have stopped short of competence in the new language.

3.6.2 Findings about the dimensions of ESOL teaching

A recent report *Identifying Promising Literacy Interventions for Adult ESL Literacy students: a Review of the Literature* (Condelli & Wrigley, 2004)[82] provided a synthesis of existing research on Adult English Second Language Learners (ESL)[83] (usually immigrants and refugees) who lack literacy in their first language and spoken English language skills. They need to acquire both literacy and English language skills at the same time. This review was intended to inform a research project investigating promising literacy interventions for teaching ESL learners that could be tested out by an experimental design. The authors describe Adult ESL literacy as "existing on the nexus of adult literacy, second language acquisition, first language literacy development and second language reading studies" (p. 2).

Condelli & Wrigley first looked at the adult basic education (ABE) literature to identify studies that used literacy-related outcome measures (i.e. reading, writing, speaking and listening), identifying 17 studies that met their rigorous criteria.[84] None of these provided robust useful insights into effective ESL teaching and only two studies involved adult ESL students.

The authors then reviewed the literature on second language acquisition (SLA) much of which is descriptive and not related to outcomes, together with that on ESL pedagogy research that has mainly been carried out on children. They sieved this material looking for studies using adults or addressing key ESL issues, grouping the literature into five themes, each of which is summarised below.

There is a relationship between oral communication skills and literacy

A number of studies point to a strong relationship between oral proficiency and second language (L2) reading ability.[85] That is, until learners' understanding of English vocabulary and syntax is good enough to understand basic sentences and expressions, they are not able to draw on any reading strategies they have in their first language (L1). Adult ESL literacy students who had higher oral proficiency in English at pre-testing showed greater gain in literacy than students with lower oral ability.

These findings suggest that programmes for adult ESL students need to emphasise building oral competence and face-to-face communication skills before, or at least alongside, basic literacy skills.

[82] Already referred to in Section 2.3

[83] Referred to in New Zealand as ESOL students.

[84] Ten of the 17 studies were also incorporated into the Torgeson review, three are theses we cannot access, two are outside our date limitation and we were not able to find information about the other two.

[85] The inter-relationship between language proficiency and literacy skills is known as the Linguistic Interdependence Hypothesis.

Connecting literacy learning to real world tasks

There is evidence (just as there is in general adult education research) that learners benefit from contextualised learning. SLA research compared teaching that focused on oral communication and reading and writing tasks that reflect real-world challenges with that using a structured curriculum that focused on syntax, vocabulary and the morphology of a language.[86] The findings of several studies supported the view that a balanced curriculum of real communications tasks and structured grammar together with open-ended conversation are likely to result in the greatest gains in language for learners. Additionally, a recent study by the review authors (Condelli, 2003; Condelli & Wrigley, 2004)[87] showed that students in classes where teachers connect teaching and communication tasks to the community and real work materials showed greater increases in basic reading skills than those in classes where those things did not happen.

Working in groups in project based learning and cooperative-learning approaches appears to bring about positive results, with cooperative learning being effective when there are group awards and individual accountability.

These findings suggest that ESOL learners would benefit from programmes that maximise the opportunity learners have to connect what is learned in the classroom with community life and that encourage language use outside formal provision. Many learners only attend part-time and structures that help them communicate in L2 between sessions are important. Given the length of time it takes people to acquire fluency in another language, ESOL learners need to build the confidence and language competence to interact with English speakers and engage with various forms of print, so they can continue to engage with learning over time.

Introducing computers and multi-media into literacy teaching

CAI appears to offer some benefits to adult literacy learners (See Section 3.3.3) and there is some evidence that the use of video (whether stand alone or in multi-media) in language instruction has particular promise because it is not print dependent. Skill and drill software with its structure, repetition and immediate feedback can also be very helpful.

The authors make the point that other multi-media approaches such as CD-ROM or on-line technologies that enable self-access learning may be worth further research. Other approaches using technology, such as ‘virtual visits’ or ‘key-pal’ relationship (email pen-pals) and shared stories and pictures may also be worth exploring.

Using the first language (L1) to support learning the second language (L2)

The need for learners to have sufficient L2 language in order to read in L2 has already been discussed. However, when learners who have literacy skills in L1 are ready to begin to transfer what they know about reading and writing across to L2, they may apply rules of their first language inappropriately. Some learners may have to be taught how to transfer. In some cases, this could mean literacy instruction in L1, particularly those languages with regular spelling patterns.

[86] The rules and conventions that underlie spelling patterns, for example word endings (‘ing’, ‘ed’), the use of apostrophes in contractions or adding ‘s’ for plurals.

[87] Discussed more fully in Section 3.6.3

There is a substantial body of research (although primarily related to children) illustrating that dual immersion or bi-lingual programmes are effective. Two studies specifically on ESL populations found greater gain for those in programmes that taught literacy in their native language than those in standard ESL programmes, although both studies had major problems. Nonetheless, there is some research that suggests it is easier to become literate in a language one knows, rather than trying to acquire both language and literacy at the same time.

Improving ESL literacy through a focus on reading

The review's authors make the point that learning to read in a second language is complex, with success dependent on oral proficiency in L2, literacy ability in L1, motivation, personal goals, cultural attitudes towards literacy and the various purposes learners bring to reading.

While there is a significant body of research about how learners acquire literacy in L2, very little of it has been undertaken with low literate ESL adults. However, there are two areas for consideration: studies show that extensive exposure to print improves both vocabulary and comprehension; and specific teaching of strategies related to vocabulary acquisition and reading comprehension (as already discussed relating to LNL learners generally in Section 3.4.2) appear to enhance learner gain.

What is not clear is at what point of language proficiency those strategies would have applicability to L2 learners, because the research has been based on more intermediate level learners. It may be that teaching a strategy in L1 and then guiding learners on how to apply it in L2 may be possible because the strategies assume a reading ability that ESOL literacy learners may not have. It may also be possible to develop extensive reading in L1, which may have beneficial effects on L2 reading.

Condelli and Wrigley then propose that it would be worth researching whether an ESOL programme that "focused explicitly and systematically on both higher and lower level reading processing skills" (p. 41) combined with exploration of a wide variety of texts might result in more gain than conventional programmes that focus on life skills

An NRDC publication *Adult ESOL pedagogy; a review of research* (Barton & Pitt, 2003) reviewed the limited SLA research that specifically considered the types of adult learner found in an ESOL classroom in the UK as well as studies into ESOL teaching practices and some aspects of ESOL programme organisation. The studies reviewed were not necessarily outcome focused and the quality of the studies was not reported on. However, the findings reported in this review offer useful insights that augment the discussion above. Findings that were referred to include:

- A study of 133 ESOL learners found that success in language learning was not simply a question of attitude. The age learners entered the UK (and started learning English) was important.
- A study of 41 ABE/ESOL learners in three different contexts found that participation in collaborative learning activities enhanced learning. The group provided emotional and psychological support and also challenged learners to broaden their perspectives.
- A small study tracking 5 ESOL learners over 6 months including out of class found that everyday conversation made people fluent but that not all learners were able to access social networks to have that conversation outside class.

- Another study of 40 adult migrants in five European countries found that each first language trained learners to pay attention to different features and events that transferred to the additional language and was difficult to overcome. The same study found that learners often had to use their new language in tense and emotional situations where there were asymmetrical power relations and posed the question how teaching situations took this into account.
- A small study of 13 students in a teacher centred grammar class found that uptake (what had been learned from a particular class) was highly idiosyncratic with most items being taken up by no more than 3 learners; learners were more likely to learn from topics raised by other learners not the teacher.
- A study of learners in two New Zealand adult ESOL classes found a positive relationship between learners initiating discussion about a language form and subsequently incorporating that form into their talk.
- Studies of classroom participation suggested that social relationships in classes play an important part in whether and how learners participate in class.
- Several studies considered how ESOL learners communicated in pairs or small groups or in formal learning tasks, suggesting that the language forms needed for these different contexts had to be explicitly taught.
- A number of studies indicated there may be a gap between teacher and learner expectations (for example, with learners wanting more systematic teaching). Moves to make classes more participatory were affected by learners' prior educational experience and were variable in impact and quality.

The review then looked at ESOL literacy research studies, most of which does not distinguish between those with and without first language literacy. The findings that appear relevant to New Zealand included:

- One comparison of an English as a Foreign Language (EFL) and ESOL course found that neither course met the needs of learners; the teachers were not trained to help those with little literacy in the first language while the EFL course was too basic. Furthermore, the EFL course also assumed a certain level of higher education among learners but not all learners had it.
- A number of studies looked at aspects of bilingual teaching. Studies showed that family literacy programmes were effective for the development of English literacy, with some of the programmes successfully using bilingual assistants. Bilingual teaching is complex and many factors influence what will be transferred between languages.
- A number of studies considered the training of ESOL teachers. A comparison of ESOL and adult literacy pedagogical practices in Australia found that literacy teachers drew more on adult learning theory and whole language approaches (including process writing), while ESOL teachers drew more on linguistics, including genre theory and systemic functional linguistics. Both used authentic text but ESOL trained teachers modelled text more and taught grammatical features more explicitly. A UK study suggested that ESOL

learners might need literacy support in both first and second languages but ESOL teachers were not necessarily trained in literacy pedagogy.[88]

- Studies around the intensity of provision found that learners wanted more hours of tuition than was available, that there was less drop out from more intensive courses and one study found that progress took longer than one intensive six month course. Another recent study found that the general level of provision on offer catered for beginning to intermediate learners but was not sufficient to increase learners' skills to move into work or further education.

3.6.3 Specific ESOL research studies

The *What Works Study in Adult Literacy ESL students*[89] (Condelli, 2003; Condelli & Wrigley, 2004a; H.S Wrigley, 2003) was a major mixed-method research project to identify effective teaching practices for ESOL learners. Over two years the study involved 530 detailed classroom observations in 38 classes from 13 organisations in seven states in the USA.

The second component of the research involved following 495 learners in two cohorts for nine months after they started in their ESL programme. Students attended classes for approximately 16 weeks – the mean of actual teaching was 129 hours.

Learners were assessed pre-, mid- and post- teaching, regardless of whether they had continued with the programme, on both reading and writing tests. In order to ensure learners understood the tasks that were required, instructions were given orally in their first language. In addition, learners had a face-to-face 'literacy practices interview' that asked how they used spoken English and their reading and writing in any language in their every day lives. Also, learners undertook a reading demonstration test, which rated how they read and understood functional print material that ranged in difficulty from food labels (easy), flyers (moderately difficult) to newspaper articles (more difficult).

The longitudinal observational data was analysed using latent growth modelling to relate the teaching measures to literacy gain as measured through learner assessments. The modelling incorporated measures of attendance and student variables. Findings from the latent growth modelling showed:

Growth in basic reading (including letter-word identification and phonics)

- Older students learned more slowly; younger ones who started with less reading and writing overcame that disadvantage by learning faster.
- Students with more formal schooling started at a higher rate and learned faster (which appears to support the supposition that literacy skills in L1 help

[88] Conversely, in New Zealand adult literacy programmes may have to cater for ESOL learners who have progressed on from ESOL specific classes. It is unclear how many adult literacy teachers have the language teaching skills to meet their needs.

[89] The full and final report on this study is not yet available on the US Department of Education website. However, this research is being seen as influential and is informing other research projects underway in both the USA and UK.

in learning L2). However, years of formal schooling became less important over time.

- Students' oral skills were positively related to reading (albeit with marginal significance) – therefore, some oral language proficiency may assist in learning to read.
- Students in classes where teachers used 'connections to the outside' by using real world materials and examples, field trips and speakers in their teaching had more growth in basic reading skills.
- Students with longer scheduled classes showed less growth than those with fewer hours.

Growth in reading comprehension

- The reading comprehension of students with better reading skills at the start grew only slowly at the beginning, but then accelerated. In contrast, students with little or no skills showed initial growth and then failed to improve.[90]
- Rate of attendance appeared to matter more than the actual hours of class; students who attended regularly improved their reading comprehension, regardless of how many hours they attended. Student attending more hours per week showed more growth in comprehension.
- The more teachers used L1 to do such things as explain concepts and provide directions about class activities, the faster students' comprehension grew.
- Overall, the growth of reading comprehension was very steep when students entered with higher reading skill, attended regularly and when teachers enhanced instruction by using the students' native language.

Growth in oral English

- Younger students acquired skills slightly faster than older ones.
- As with reading, students with regular attendance learned oral skills more quickly than those who attended less. Also, longer classes promoted faster growth in oral language.
- Students in classes where more time was spent in oral communication (e.g. pronunciation practice, conversation practice and dialogue drills) made more progress than those where those things happened less.
- The use of L1 as instructional support also helped students learn faster
- Where teachers taught concepts in a variety of modalities (e.g. reading, writing, hands on activities, talking about what they were reading) and encouraged learners to interact with each other, students made faster growth in oral communication.

[90] There was no analysis of this finding in the interim report we were using.

Growth in writing

- Changes in students' writing were not statistically significant. The authors speculate that progress in writing may take longer to emerge than their study allowed for, or that their assessment instruments may not have been sensitive enough to measure subtle gains in early writing development.

Some of the findings surprised the authors. Although programmes were supposed to be literacy-focused, 60% of time was spent on language acquisition rather than literacy. Teachers in adult ESL literacy were not trained to teach literacy, so used material they would use in ESL classes for more literate students. Also, the alternative reading demonstration assessment they devised did not show significant growth. One reason for this could have been that the instruction they observed generally did not link to real-life materials (as in the assessment), but instead stressed basic skill development or general comprehension. However, older students tended to perform better over time in this assessment than younger, perhaps showing their familiarity with 'real-world' material.

The teachers in the study were very homogeneous, without enough variation in education or teaching credentials for any variables to be analysed.

NRDC has recently published *English for Speakers of Other Languages (ESOL) - Case Studies Of Provision, Learners' Needs And Resources* (C. Roberts et al., 2004). While the five studies do not look at outcomes, they examine aspects of provision in great depth, thus providing a very rich description of current ESOL practices in Britain and some of the distinctive features of ESOL learners there. The scope of the case studies include:

- The role of educational provision in orientation and pastoral support for asylum seekers; the demands on the teacher to be the main advocate and support for learners as they seek to adjust to the British way of life and find employment as quickly as possible.
- Heterogeneity in ESOL classes and how that diversity is produced by classroom practice, it is not just something that learners 'bring along' to class e.g. the use of L1 support in teaching, how learners can become teachers when using their own language.
- How the pedagogy and practices in ESOL and numeracy classes differ when both classes are linguistically and culturally diverse. In particular, the case study considers ESOL learners' responses to the emphasis on individual work in the numeracy classes compared with the focus on talking and interaction of ESOL provision.
- The selection and use of reading texts in the teaching of reading in ESOL; how the teaching process reflected theories of reading, the use of real life material, and whether the prior knowledge and life experience of learners is accessed through the types of texts chosen.
- Examines a pre-employment course for advanced ESOL learners with professional backgrounds, which integrated advanced language teaching and subject knowledge. While the ESOL teachers took a multi-strand approach and worked with pronunciation, word meaning and taught institutional knowledge, subject teachers made no allowance for gaps in linguistic or cultural knowledge.

This report makes a number of key points about the nature and structure of ESOL provision that may be of relevance to the New Zealand context:

- An emphasis on individualised teaching and learning that is emphasised in some adult literacy delivery may not support the needs of adult ESOL learners. 'Talk is work' in the ESOL classroom and the most significant mode of learning for ESOL learners is through group interaction and opportunities to practice speaking and listening (accompanied by explicit teaching of grammatical form).
- Effective teachers of ESOL employ a series of measures to support the needs of ESOL learners in the classroom. Mainstream teachers need to learn from these approaches to better support the needs of ESOL students in their classrooms.
- There is a need for more pro-active cross-agency support for refugees and asylum seekers. ESOL teachers in most classes were juggling a number of advocacy and support roles to assist learners in addition to teaching, and lack institutional support and specialist knowledge to do so.
- The use of everyday, culturally-specific situations to contextualise maths problems may act as a barrier to attainment for ESOL learners in numeracy classes, when they don't have either sufficient language knowledge or contextual experience.
- Learners use their other languages in concrete and strategic ways to help them to learn English. Teachers can facilitate this in many ways with strategies to encourage the use of learners' other languages within teaching and learning English.
- It may be that the involvement of learners in the planning and reviewing of their learning through individual learning plans is not meaningful, as language learners appear unable to reflect on and predict their language development, even when they have an advanced level of English.

A recent New Zealand study *Through Language To Literacy: A Report On The Literacy Gains Of Low-Level And Pre-Literate Adult ESOL Learners In Literacy Classes* (Shameem et al., 2002) examined the use of bi-lingual tutors for ESOL literacy learners in our local context. The findings align with the findings earlier in this section, that the use of bi-lingual tutors benefits learners and enhances gain.[91] The project examined the literacy gain by adult ESOL learners in one-semester specialised literacy classes. From an initial cohort of 118 students (including refugees and new migrants), 62 students took part. Classes ran for either 2 or 12 hours per week; three classes had bi-lingual tutors, three had English-speaking tutors and two had both.

Students completed three self-assessments over the semester, rating themselves on eight performable literacy functions in each scale for both reading and writing. Competency based tests that were congruent with the tasks in the self-assessment schedule were administered pre- and post-course with oral instructions by tutors. There were also 1:1 interviews (using interpreters) to establish learner profiles, classroom observations and interviews with the bi-lingual tutors. In addition, two

[91] Another recent New Zealand study (Hope, 2003) examined the roles bi-lingual tutors played in provision offered by the National Association of ESOL Home Tutors (NAEHTS) in the Waikato, through tutor interviews and observations of teaching and provides useful insights into the challenges and issues facing learners and tutors in bi-lingual classes but did not discuss learner gain.

classes were used for more in-depth case studies: a community-based programme involving refugee women who had had no previous schooling; and a mixed gender group representing a range of languages and cultures. In the latter class, all had at least six years of schooling.

The findings were in keeping with earlier discussion - those with higher literacy skills initially performed better. Students entered with more reading skills than writing and left with better reading also – i.e. there was less progress overall in writing. Students working with bi-lingual tutors made greater gains in reading than those working with English-speaking tutors. Learners in two-hour classes (40 hours in total) made progress in reading while those in 12 hour classes (240 hours in total) made gain in both reading and writing. Students said bi-lingual tutoring was useful, particularly at the start of the programme.

When the mean results of initial self-assessment and performance tasks were compared, students over-estimated their own ability. Post-testing showed greater congruence between students' self-perceptions of their ability and their results.

3.6.4 Discussion

Over the last 30 years, there has been extensive research into second language teaching and learning but this body of knowledge is not yet strongly connected with adult literacy pedagogy in New Zealand. The ESOL and adult literacy fields are related, but distinct, primarily because the language profiles of learners are not the same, and in many cases where learners have had little schooling, neither are the literacy profiles. There is more relevant outcome-related research about ESOL learners who have no or low literacy skills in their first language.

Programmes need to focus on building oral language competence before, or alongside basic literacy skills, in order to make use of any literacy skills learners have in their first language. In a major study, learners made more progress in speaking in classes where more time was spent on oral communication and when communication tasks were based on real-world situations. However, the research did not seem to make explicit what many ESOL teachers and SLA researchers also believe – that to be effective, real world communicative tasks need also to be accompanied by the explicit teaching of grammatical form.

Learners improve their reading when using real-world texts and tasks - 'bringing the outside in'. It appears computers and multi-media technology also provide useful language and literacy support.

There is evidence from a number of studies, including a New Zealand research project, that bi-lingual teaching to explain concepts and learning tasks increases learner gain. Teaching specific reading strategies such as vocabulary acquisition and comprehension also improves gain.

Longer classes also appear to help learners gain oral language skills. However, regular attendance may be as or even more important for learners than the actual hours attended. In one key study, ESOL learners who attended regularly improved oral skills and reading comprehension, regardless of how many hours of classes they had per week.

We need to know more about how these findings might apply to learners in the New Zealand context, particularly when those with still low levels of spoken language and low literacy move out into mixed mainstream provision. The skills and competencies required for the teaching of ESOL literacy students need to be better understood.

Many of the studies alluded to (but did not make explicit) the need for teachers to have a 'meta-language' for describing the structure of language, in order to make explicit to learners what they need to know and to analyse their language errors. This meta-language is more evident in the ESOL field than among adult literacy tutors. Teachers and learners might benefit from a closer relationship (in particular, those learners who over time receive teaching from both ESOL and adult literacy/numeracy teachers.

3.7 NUMERACY

Numeracy has long stood in the shadow of its dominant partner reading, and even the third partner, ESOL. Usually subsumed under the term 'literacy', numeracy advocates have increasingly argued for it to be identified separately in order to ensure that its distinctive demands and issues are given due consideration. There was for example, poor coverage of mathematical processes in the 1996 IALS, which is being rectified in the *Adult Literacy and Life-skills Survey (ALL)* currently underway in many countries,[92] including New Zealand next year.

Specialists in this area argue that numeracy warrants particular attention because of an almost total lack of training for these teachers and the extremely negative image of the subject (Dingwall, 2000; Tout & Schmitt, 2002). Many numeracy studies report a concern about the poor maths skills and understandings of the teachers teaching these skills, let alone their numeracy teaching skills (Dingwall, 2000; Schmitt, 2003). Numeracy is also distinctive in that it is mostly taught by non-specialists who are allocated the role by default rather than choice (Coben, 2003; Schmitt, 2003). At the first NRDC conference on numeracy, the NRDC Director claimed that:

> Numeracy is the most pressing issue in helping adults improve their basic skills…. Numeracy has always been the poor cousin with greater levels of need met by weaker provision and less professional capacity. Yet we live in a changing world, with uncertainty and risk increasing the need for skills in using and understanding number (U. Howard, 2004).

3.7.1 Overview of numeracy

There is no consensus over a definition of 'numeracy'. In a recent NRDC literature Coben et al (2003) set out some of the elements of the debate, without attempting to develop a conclusion, or consensus definition. In summary, there is debate over:

- The conceptualisation of numeracy – for example, as a limited proficiency in maths, or a meaningful social practice.
- Whether it is a sub-set of mathematics education, or vice-versa. For the purposes of determining what research to include in their review they interpreted the term numeracy to mean "an aspect of lifelong mathematics education" (Coben, 2003, p. 21).
- The value of a computational versus a functional definition (the former being context- and purpose-free).
- What the purpose of numeracy is (and for whom, and from whose point of view) e.g. is it to enable one to cope with life/work, or to participate as a citizen, or to be empowered, etc?

[92] For example, the English ALL study (Department for Education and Skills, 2003) showed only 25% achieved Level 2 or above, implying that 23.8million Britons are at or below Level 1; results were lower for numeracy than literacy.

- What the scope of numeracy is – what is on the list of 'abilities' required to be numerate (including areas of knowledge and skills), and at what sort of level.
- Terminology – numeracy, mathematical literacy, statistical literacy, financial literacy, quantitative literacy, matheracy, mathemacy, techno-mathematical literacy etc.

Given this report's focus on teaching strategies that may impact on numeracy gain, we sought out a description that would explain a process of becoming numerate. We do not deny the significance of context in which adults use maths, or that numeracy is a "bridge between math and the real world" (ibid. p. 157). However, a focus on naming content areas and skills seemed a pragmatic approach to take for this report given the definitional debate.[93]

To develop a description of content areas for numeracy teaching, we summarised Glass and Wallace's review of numeracy frameworks in the UK, USA, Canada, and Australia. (2001) and found common themes:

- quantity and number i.e. whole numbers, money, fractions, decimals, percentages, ratios; and skills such as computation, using calculators, estimation
- dimension and shape i.e. geometry (length, width, perimeter, area, volume, angles)
- pattern and relationships i.e. inter relationships of variables, algebra
- data and probability i.e. sampling, prediction, data analysis, likelihood and chance, reading charts and graphs.

This content is taught in relation to processes:

- the communication of mathematical information
- reasoning and decision-making
- being able to apply mathematical knowledge and skills to solve problems
- interpreting results and other forms of understanding mathematical information.

3.7.2 Findings from literature reviews

The literature search for this study identified five literature reviews that analysed adult numeracy research. Both Brooks et al. (2001) and Belzer & St.Clair (2003) were unable to locate any studies that identified specific factors associated with progress in maths. The third, by Tout and Schmitt (2002) concluded that, unlike all other maths education research literature, the literature relating to adults is, in addition to being extremely limited, primarily concerned with contextual or cultural issues. The fourth, Johnston's review (2001), although containing a section on teachers, did not reveal

[93] A broad definition of numeracy (implying numeracy as a social practice) has been published as part of the New Zealand Numeracy Strategy in schools - "To be numerate is to have the ability and inclination to use mathematics effectively – at home, at work and in the community." http://www.tki.org.nz/r/literacy_numeracy/num_practice_e.php Retrieved October 19, 2004

any studies of adult numeracy teaching that clearly set out to research effective numeracy teaching practices.

The NRDC has also published a recent review (Coben, 2003). Coben et al consider that there has been a "flowering of reviews of research on adult numeracy and mathematics education" (p. 30) mentioning twelve reviews between 1990 and 2003. Three of those have already been mentioned above (Brooks et al., Johnston, and Tout & Schmitt).[94] Only one of the remaining studies stood out as possibly being able to add to our understanding - Watson, Nicholson & Sharplin (2001) – because it was relatively recent, and Australian. Watson et al focused on literacy and numeracy in the vocational education and training sector. They claim that "consistent and clear findings have been identified in the research" (ibid, p. 35), with regard to effective approaches to provision and identified team teaching as a recommended strategy. However, the only research cited in support of that is a study in which four TAFE teachers and four literacy support teachers reflect on their practice (Black, 1996). Salter and Allen (1996) are quoted not for evidence that team teaching is effective, but to explain how it is popular with learners and teachers. Neither of these studies met the quality criteria previously established for rigorous research on effective teaching.

In addition to reviewing numeracy epistemologies,[95] Coben discussed current demands in numeracy and related issues (including the numerate equivalent of dyslexia, dyscalculia (op cit, pp. 106-109). The report also covered research on effectiveness. Interestingly, the authors found most research on adult numeracy generally was dominated by qualitative and practitioner-led studies. Their conclusion from the review (no detailed discussion is reported on individual studies) is that:

> Evidence on the impact of adult literacy tuition is sparse and unreliable. Detailed critical studies of adult numeracy teaching and learning are required, including intervention studies, before it will be possible to delineate good practice in the light of evidence rather than aspiration" (p. 116).

Both Coben and Tout and Schmitt suggest there is some value in considering the literature on children's mathematics, although it must be considered cautiously. Tout and Schmitt draw on what they consider to be significant findings from Grouws and Cebulla (2000) that relate to increased student achievement occurring where the teacher:

- encourages whole class discussion following individual and group work
- allows small group learning
- focuses on the meaningful development of important mathematical ideas
- provides opportunities for both invention of new knowledge and practice of what has already been learnt
- incorporates learner's intuitive problem-solving methods in their teaching
- uses concrete materials and calculators.[96]

[94] Another four mentioned were published outside our field of reference; and several others relating to school-based research were also presented.

[95] Theories of knowledge about a subject

[96] Tout & Schmitt do not offer a critique of this piece of work; therefore, this list should be read cautiously.

3.7.3 Specific numeracy research studies

Four of the Randomised Controlled Trials (RCT) and eight of the Controlled Trials (CT) reviewed by Torgerson et al (2004) included numeracy as a component. Most of the numeracy interventions were delivered via Computer Aided Instruction (CAI) programmes. Of the four RCTs (Batchelder & Rachal, 2000a; Nicol & Anderson, 2000; Shrum, 1985; St. Pierre et al., 1995), we excluded the Shrum study due to an inadequate explanation of the intervention and missing data. Those that remain offer little explicit discussion about numeracy and therefore do not provide guidance.

The Batchelder & Rachal (2000) study of 71 prisoners involved CAI vs. traditional instruction in General Educational Development (GED) material. There was no statistical difference between the two groups and the effect size was .17.

Nicol & Anderson (2000) randomised 24 'adults with mild learning disabilities'[97] into three groups (CAI, teacher-led, no teaching control). There was a positive effect for the CAI, but it was not statistically significant (effect size of .71).

St. Pierre et al.'s (1995) study was of 199 Even Start (i.e. family literacy) families and their controls. Again, there were no statistically significant gains (effect size .3).

Of the eight CTs in Torgerson et al, we excluded four as too dated (all CAI studies) and of the other four (Broughton, 1994; Irby, 1992; Lavery et al., 1998; Wilson, 1992) only two appeared useful.

Lavery et al. (1998) is the only New Zealand study included in the review. Twelve learners in an unemployment programme received either CAI instruction or traditional instruction ('textbook and lectures') in literacy and numeracy. They were not randomly allocated however, and there were substantial pre-test differences between the two groups. Contrary to the authors' conclusions, Torgerson argued that the researchers' effect sizes were not statistically significant. However Hattie's calculation undertaken as part of this review is similar to that of the authors - a .86 effect size. Therefore, we can give some weight to their finding that computer-assisted instruction using the Computer Curriculum Corporation programme 'Successmaker' may offer an effective way of increasing numeracy skills of adults, and of "fostering components of self-regulated learning" (p. 188).

Wilson's study (1992) also involved CAI as the intervention (15 learners) with two control groups of 10 and 15 participants using 'traditional approaches'. There was a significant positive change for the CAI group in problem solving, but also for the control groups in number operations. An effect size was calculated as .48.

During the literature review we identified two other studies related to adults. Although not statistically rigorous and outcome-focused they are useful for illustrating aspects of the research approach to numeracy. A study by Johnston et al. (1997) focused on 15 unemployed Australian youth (14-26 years); how they could learn effectively and the strategies numeracy teachers needed to work successfully with them. Data was collected through observations, questionnaires, journals kept by the researchers, and interviews with both the tutors and young people. While their conclusions should be treated as speculative, as they did not collect any verifiable outcome data, the first two points below are congruent with other findings of the significance of discussion

[97] Since some adults appeared to be living in supported accommodation, it may be that some of these adults may have an intellectual as well as a learning disability.

with peers and contextualised learning in LNL teaching and learning and all three points correspond to aspects of quality adult education:

- Class discussion of a specific situation (or critical incident) can allow a sharing of different approaches, challenge the entrenched idea of 'one right answer' and foster an understanding of the factors - both social and mathematical - that makes some responses more appropriate than others.
- Everyday practices like budgeting, learning to drive, paying taxes can be a "rich teaching resource for the excavation and development of mathematical concepts and processes" and vice-versa, to start with a mathematical concept or skill and "try to find occasions when we can weave it back into students lives."
- Gaps and misunderstanding are learning and teaching opportunities: where a learner doesn't know something the tutor has an opportunity to scaffold between concepts known and new, or to form a bridge between contexts so the learner can implement what they know and can do in different situations, for different purposes (pp. 115-119).

Colleran, O'Donoghue and Murphy (2001) developed a numeracy programme, through which learners could discover the processes they use to problem-solve and make decisions in mathematics. It was then piloted over four months with 26 long-term unemployed learners, aged 25-60 years. Data to evaluate the programme was collected through interviews during and after the pilot with the tutors, primary document evidence from the learners (such as completed worksheets and comments) and post-implementation interviews with learners. It is difficult to assess the quality of this study, as there is insufficient information in the report about learner gain.

3.7.4 Teaching numeracy to ESOL learners

No research was found linking ESOL-specific teaching practices and numeracy gains in our search of the literature. However, a number of issues were raised that are distinctive to this context.

Firstly, there appears to be a relationship between learning mathematics and a learner's linguistic skills (Southwell, 2001). For learners to be able to 'do maths' they need to know for example particular meanings of everyday words in mathematics, and technical words, to be able to form concepts.

Secondly, Baynham and Whitfield (2001) argue that there is a significant difference between a learner of numeracy and an ESOL learner of numeracy. The former can more readily use talk to support their learning and make sense of everyday maths problems, whereas the ESOL learner has to "cope with learning the register of maths in English and the cultural knowledge required to make sense of contextualised maths problems" (ibid, p. 11).

Ciancone (1996) makes the point that the ESOL tutor ought also to be aware of the possible differences between themselves and their learners in terms of understanding of mathematical symbols and methods of computation. For example, in the US the comma is used for writing numbers greater than a thousand and the decimal point for numbers as decimals, for some non-English speaking countries this

may be reversed. There can also be differences in the methods used for writing out long division computations; the operation can be symbolised in several ways.

3.7.5 Discussion

It is clear that the research evidence about the numeracy of adults to date gives no guidance about the amount of time and the nature and extent of teaching required for adults to make significant progress in numeracy.

There are some indications that computer-aided instruction may be a fruitful teaching strategy, especially in an area where many teachers themselves lack mathematical understanding, let alone appropriate skills for teaching it. However, the importance of it must not be overstated. It may simply be that CAI can more easily be set up to collect information on gain than other methods, which skews the findings. The actual variables that results in any gain may not be clear in CAI – is it the medium of workbooks on screen that makes the difference, or are different skills taught via CIA compared to face to face teaching, or does the order in which things are taught differ? Some of the other trends suggested in the literature thus far – the use of large and small group discussions and shared problem solving - may be less easily facilitated using CAI.

There are consistent, strong calls across the reviews for the development of initial training and professional development of teachers in numeracy – both in their understanding of the subject and their skills in teaching it.

There has been little formal exchange over the years between mathematics educators in schools and the LNL sector and as far as we can ascertain, no joint research projects. In the absence of a solid research base in New Zealand, it may be useful to bring together the professional wisdom of the adult LNL field and schooling sectors to discuss issues of distinctiveness and similarities and to establish a robust research programme. In addition, adult numeracy researchers may do well to acquaint themselves with the rich body of research on children's mathematical development and everyday cognition to inform their research.

Our understanding of adult numeracy is so limited that at this point rather than evaluating the impact of what does take place it may be more appropriate to undertake insight studies that consider the range and nature of adult mathematical understandings, how that understanding develops and what interventions might be effective.

3.8 LITERACY CONTEXTS

The ideal aim in reviewing research in different contexts is to ascertain their effectiveness vis-à-vis other forms of provision – for example, are workplace programmes inherently more effective than community-based programmes? There are very few studies that have considered this question and the few that exist are of poor quality. This question can only be answered by RCTs and involves difficult methodological issues such as sample sizes and equating sample subjects. Some studies have been included that compare the effects of a form of provision versus no intervention, but these do not differentiate the specific qualities of the provision that is offered.

The related question therefore is to ask which factors appear to make programmes in a particular context more effective. For example, what factors are associated with successful family literacy programmes? These studies are more common and can provide some pointers about what works that may be useful for providers.

3.8.1 Family literacy

Family literacy programmes are distinctive in that they break conventional moulds of provision by involving both parents and their children as learners.[98] The rationale for treating the family as a 'learning unit' is based on a number of assumptions, most of which are largely untested by research (Benseman, 2004).

The first assumption behind family literacy as a form of educational provision is that "greater benefits to both adult and child learners will be attained by taking an integrated family literacy approach than by independently addressing adult and child needs through separate, high quality adult literacy and child intervention programmes" (Padak, Sapin & Baycich, 2002, p. 29). The authors of this statement point out that this assumption is still largely unproven, although it is testable using a large-scale, interdisciplinary effort involving adult literacy, family literacy and early childhood professionals. In the US, family literacy has been advocated as a more effective form of provision than conventional adults-only programmes (Seaman, 1992). The predominant model of family literacy (in the US) is the Kenan model, incorporating four elements - adult education, child education, parent education and parent and child together time (PACT).

A second argument is that many children who are struggling with literacy come from homes where the parents themselves also have literacy difficulties and therefore provide a significant 'two-tier catchment area' for literacy programmes. There is evidence of a high correlation of literacy skills between generations of families. For example, a national longitudinal study in Britain showed that 72% of children whose parents had reading problems and low incomes were in the lowest score reading group (ALBSU, 1993).

A third assumption is that parents, and especially mothers (Sticht & McDonald, 1990), are not only influential in their children's literacy development, but are more

[98] Although family literacy programmes are found in many countries, they are most common in the US. The most predominant source of funding is Even Start, with a 2002 budget in excess of $US250m.

likely to exert an even more positive influence when they are able to enhance their own literacy skills (Benjamin, 1993; Henderson & Berla, 1994; Mansbach, 1993). In a discussion about the development of learning motivation in families, Smith and Spurling (2001) argue that parenthood "remoulds the parents' own awareness in such ways that their whole approach to motivational assessment can be altered" (p. 54) and that parenthood is "of central importance in the whole motivation story, and has profound effects on wider social realities". In other words, adults who may not be motivated to learn for themselves, find that the experience of being a parent not only increases their learning aspirations for their children, but through active involvement their own learning motivation increases, which in turn helps their children's motivation – thereby stimulating a positive learning spiral for both generations.

Research studies on family literacy effectiveness

Only one study has endeavoured to compare the effectiveness of family literacy programmes against other forms of provision (Philliber et al., 1996). The learning gains of two groups of family literacy participants were compared with those of what were termed 'adult-focused' basic education programmes. In both comparisons (using both the CASAS and the TABE for learning assessment), the family literacy participants' gains were significantly higher. However, the data from the two comparison programmes were totally unrelated to the family literacy programmes, with a different amount of tuition offered to control and intervention groups and very poor comparability in terms of the sample characteristics and size. For example there were 111 in the first family literacy group compared with 1,539 participants in the comparison group; in the second comparison the figures are 133 versus 'N unreported'. While the authors readily admit to flaws in their methodology, they claim that the total consistency of family literacy participants gaining more than their 'adult-focused' counterparts provides a reasonable basis for family literacy's superiority. Interestingly, they point to family literacy's higher rates of retention[99] as fundamental to its better results – a factor that they have not attempted to control for.

Two randomised controlled studies of the US Even Start family literacy programmes were included in the NRDC review (St Pierre et al., 2003; St. Pierre et al., 1995). The 1995 study evaluated the impact on participants at sites in five different states; 199 families were randomly assigned to either a family literacy programme (101) or received no instruction (98). All were pre-tested on CASAS, but only 64 family literacy and 53 control participants were re-tested on completion of the programme. The Even Start participants varied in how much instruction they received. Both groups showed gains, but these gains were not statistically significant; the effect size was .3. This study was part of a larger project involving 16,000 families, but the larger study was less rigorous in its design (St. Pierre et al., 1995).

The 2003 RCT[100] incorporated a larger and more rigorous methodology involving 18 programs in different states. Again, there was a control group (who agreed to not enrol in a family literacy programme, but about a third did seek 'some form of other help') and family literacy participants. Of the 469 adults, 417 were pre-tested and then post-tested eight months later (with a 20% attrition). This study also showed no significant differences between the two groups (no effect size available).

[99] High retention rates are seen as a consistently positive feature of family literacy programmes (Padak, Sapin et al., 2002).

[100] We were not able to locate this study; the findings reported here come from Condelli & Wrigley (2004).

Research on factors that impact on family literacy effectiveness

A series of British studies of family literacy programmes (Basic Skills Agency, 1998; Brooks, 1998; Brooks et al., 1997; Brooks, Harman, Hutchison, Kendall, & Wilkin, 1996, 1999) reported learning gains for both the adult and child participants. Although these studies did not compare the family literacy programmes with any other form of provision, they did provide a summary of the factors seen by the researchers as contributing to the parents' progress (Torgerson et al., 2004). While many of these were similar to those quality factors identified for LNL programmes generally there were several specific to this context (marked *):

- the fact that participation was voluntary
- parents' commitment to improving their children's chances*
- clear information about goals, including subsequent progression
- clear focus on literacy/numeracy development, regarding other benefits as 'bonuses'*
- nationally recognised accreditation of learning
- careful selection of courses and staff, and quality of teaching
- time-limited courses to focus achievement
- support of key personnel within institutions such as head teachers
- inclusion of talking and writing, as well as reading in literacy schemes*
- teaching sessions for parents only and children only, as well as together* (p. 16).

A literature review commissioned by the Educational Resources Information Center Clearinghouse on Adult, Career and Vocational Education in the US identified 35 research studies[101] of family literacy programmes from 1990 to 2001 (Padak, Sapin et al., 2002). The researchers identified the following characteristics of successful programmes (many elements appear generic to quality provision generally):

- Staff: appropriately qualified, committed staff whose skills match the unique challenges of family literacy and have ready access to professional development.
- Curriculum: builds self-efficacy and based on learners' immediate interests and needs ('real life' content), taught in a flexible, non-threatening manner.
- Instructional programmes and practices: identifies the value of learning journals, home visits, grounding instruction in the participants' cultures and communities and collaboration between participating groups to ensure programme integration.

Following an initial pilot programme, the National Center for Family Literacy funded 11 programs in six cities throughout the US for two years. The evaluation focused on the efficacy of using family literacy services to both help assist welfare recipients in developing their skills and find employment, as well as developing their children academically and socially (Alamprese, 2001b). The process evaluation involved extensive site visits to interview key staff, observe programs and review program

[101] Some of those are included in this review but overall the studies were of highly variable quality.

documents and participant data. The study identified a number of key factors (pp. 32-34):

- A solid organisational structure, including administrative leadership, qualified staff, adequate facilities, the availability of the target population of adults, adequate fiscal resources and an understanding of the services to be delivered.
- Programme co-ordination: the staff's capacity to co-ordinate services within the programme with external agencies and organisations.
- Integration of services, including the incorporation of work preparation activities into the adult education and parent time components.

Looking to New Zealand research, two pilot family literacy programmes in Manukau City were evaluated through participant observation, interviews with learners, teachers and other key informants such as the children's teachers, together with programme outcome data (Benseman, 2002, 2003c). The Manukau Family Literacy Programme (MFLP) evaluation listed the following factors as central to the outcomes achieved in the programme (again, there is some overlap with general elements of quality provision):

- A lead agency to plan and co-ordinate the overall project.
- A skilled adult educator who understands and copes with the multi-faceted demands of family literacy.
- A programme of reasonable duration and intensity built around the four components of family literacy – parent education, child education, adult education and parent and child time together (PACT).
- Physical proximity for early childhood and primary school partner institutions.
- Public celebration of key events and achievements (e.g. graduations).
- A 'second step' programme for the adult learners as they move on from the programme to maintain the "community of learning" built through their participation in MFLP.
- Sustained commitment from all of the partner institutions.
- Clear understanding between all participating institutions of their respective obligations and responsibilities.
- An adult-appropriate teaching space in a central location.
- Adequate funding to ensure all components of the programme are available.
- Regular professional development that involves staff at all levels of involvement.
- Regular and on-going management/operational meetings and communications to ensure smooth functioning of the daily routines.

Another evaluation of whanau literacy programmes in community settings in New Zealand (May et al., 2004) did not identify any characteristics of successful programmes beyond general statements of being learner-centred and welcoming to learners, most of whom have had negative experiences at school.

Discussion

Because of its Federal funding base, family literacy programmes in the US have been evaluated at an above average rate compared with many other types of programmes. Nonetheless, a review of all the evaluations of US family literacy programmes thus far concluded that the research base for family literacy is still in its infancy (Wasik, 2001). This review concluded that the results of the evaluations to date are generally positive, but "mixed." Padak et al.'s (2002) research review is more positive about the outcomes achieved, but also argues the need for a stronger research base, particularly from longitudinal studies.

The distinctive value of family literacy vis-à-vis other forms of provision is still largely unproven, but better retention rates and the strong motivational base of parents wanting to help their children are probably central to the positive outcomes reported in the large number of evaluations carried out, especially in the US.

Because family literacy programmes involve multiple partners, their involvement in the programme needs strong and sustained co-ordination and careful programme integration, including support services. Other key factors such as qualified staff, sustained periods of tuition, security of funding at realistic levels, curricula based on learners' needs and interests and so forth are not unique to family literacy, but common to most types of programmes.

3.8.2 Workplace programmes

Gaining access to learners through their workplaces is a form of provision that has developed very strongly over the past decade and a half, both in New Zealand and in a number of other countries. These programmes have been criticised for their functional literacy approach and the dominance of employer interests over those of the learner (Imel, 1998; May et al., 2004) in contrast to provision deemed to be learner-driven. Despite criticisms, there is ample evidence that in addition to achieving work-related outcomes, these programmes also achieve considerable 'ripple effects' in the learners' households and communities (Benseman, 1991, 1992, 2000). These outcomes in both contexts have led Sticht to claim that funding for the programmes are 'double-duty dollars' (Sticht, 2000).[102]

The evidence of the effectiveness of workplace LNL programmes is summarised in a recent British literature review (Ananiadou, Emslie-Henry, Evans, & Wolf, 2004):

> No systematic data are available for the UK on the benefits to employers of investing in basic skills training. International evidence is also very limited, but some studies have suggested that employer-provided literacy and numeracy courses may raise productivity, improve the use of new technology in the workplace, contribute to enhanced customer satisfaction, save time, and reduce costs (see Bloom et al. 1997; Pearson, 1996; Hollenbeck, 1996; Krueger and Rouse, 1998). However, these results are

[102] The same may be said for other forms of provision and needs to be tested in research; we do not know the extent to which effects are limited to provision context.

> based on a handful of research studies and must therefore be treated as extremely tentative, and in need of corroboration (p. 10).[103]

Two other British reviews that included research into workplace basic skills (G. Brooks et al., 2001; Torgerson et al., 2004) found no substantial studies of the effectiveness of these programmes versus other forms of provision. None of the CTs or the RCTs in Torgerson's review for example was workplace-related.

Torgerson's review (2004, p. 17) identified factors "related to progress," noting that they appeared to be based on participants' and researchers' judgements, rather than evidence. They included consultation between and commitment of all stakeholders and in particular the commitment of the company; subsidised costs; time allowances; and a suitable training ethos. They pointed out that none of these factors is related to pedagogy.

A British study of 17 employers (Basic Skills Agency, 1995) across a range of companies developed a typology of the variety of ways in which companies were involved in workplace training, in order to make qualitative assessments of their effectiveness. The report suggested that a 'company strategy' model where training is an intrinsic component of its operations (as opposed to a problem-centred approach that focuses only on an immediate issue) is the most cost-effective model because both the company and the learners benefit from the programme. Contrary to the popular belief of programmes leading to 'poaching' by rival companies, participants valued the opportunity for learning and felt more loyal to the company providing the programme – factors also reported in other studies (Ananiadou et al., 2004; Benseman, 1995).

There are several reviews on workplace provision that list factors judged to determine effectiveness – often couched in terms of 'best practice'. The sources are:

- a Workbase (1999) report, based on their experience as New Zealand workplace providers
- a seminar of British experts reported in Payne (2002)
- Taylor's (1995) study of key stakeholders at eight worksites
- Mikulecky & Lloyd's (1997) study of two worksites
- Belfiore's (2002) report of Canadian practitioners' findings.

Below is a summary of their findings. None of these sources rates highly in terms of research quality, but they represent a reasonable summary of practitioners' accumulated wisdom in this area.

[103] The authors point out that there is a large research literature on the effectiveness of general workplace training, but these studies are not on LNL per se.

Table 1. Summary of key factors in workplace literacy programmes

Factor	Workbase (1999)	British experts seminar (Payne, 2002)	Taylor (1995)	Mikulecky & Lloyd (1995)	Belfiore (2002)
Intense teaching of skills			X	X	
Supportive environment/culture of learning	X		X	X	
High levels of commitment from company		X	X	X	X
Support services			X		
Adequate funding & time allocation	X		X	X	
Flexible structures	X		X		
Curriculum related to context ('real life')	X			X	X
Working within 'the grain' of climate		X			
Program tailored to local situation	X		X		X
Basic skills integral to workplace training	X		X		
Involvement of workers/unions	X	X			X
Needs analysis done	X				X
Clear, 'non-stigmatised' advertising	X		X		X
Provision free, voluntary & in work time	X	X			X
Clear planning & guidance for learners		X		X	

Discussion

Despite its growing role in LNL, workplace provision does not have a large research base on its distinctive features in relation to effectiveness, irrespective of the outcomes being measured (Payne, 2002). The research available points to key factors being company commitment, an environment supportive of learning, adequate time and funding, a real life curriculum, a programme tailored for specific needs; employee involvement, and in-work time provision. There is no guidance as yet about teaching methodologies.

3.8.3 Community-based programmes

LNL programmes grew out of a voluntary, community base and this form of provision dominated the sector for many years. Since then there has been a steady increase in the number of paid teaching and administration positions in many community-based LNL organisations, although voluntarism remains an essential element of their operations. More recently some have diversified into contractual provision (such as in the workplace, for Work and Income (WINZ) and in prisons). Nonetheless, these organisations remain the backbone of provision in towns and smaller centres and their needs-based, learner-centred philosophy is still a strong influence on the sector's operations.

Despite the importance of community-based programmes, the research base on their operations is notably thin.[104]

An NRDC exploratory study of 11 providers (Hannon & Pahl, 2003) concluded that this form of provision was 'distinctive' in relation to three main issues: vision, development and particularly, delivery (with a holistic view of learning, concern about learning situations, quality, integrating basic skills without making them too apparent and achievement and progression). The study offers no evidence of the validity of these claims, but appears to be the preamble to a follow-up study – although its specific aims are not clear at this stage.

A New Zealand study of community-based whanau literacy programmes (May et al., 2004) included some observations about their distinctive features, including "a holistic approach to literacy that differs from many functional literacy work-based/vocational programmes, a client group that might not otherwise be reached by other literacy programmes and a more flexible and formative approach to assessing learner outcomes" among its conclusions (p. 1). Apart from their emphasis on providing a learning environment that is fundamentally un-school-like and non-threatening, the report does not offer any substantial evidence for these claims. There is certainly no basis for making claims of community programmes vis-à-vis workplace programmes as the study did not include any of the latter, nor are there any references to studies of them.

3.8.4 Vocational provision

Vocational provision (sometimes called unemployment or pre-employment programmes) is yet another area where methodologically rigorous research on effective practice appears not to have been done.

An longitudinal study of vocational education and training effectiveness in rural Australia (Guenther, 2001) included a sub-analysis of literacy and numeracy provision. Based on ten detailed case studies, the research involved 541 structured interviews and 570 questionnaires of a range of stakeholders such as training providers, employers and community members. The study concluded that delivery of these services in small towns and regions is more effective when:

[104] Brooks et al.'s (2001) study of literacy learners in England and Wales is sometimes quoted as a study of community-based provision, but the majority of the subjects were from Further Education colleges rather than Local Education Authority programmes. It is questionable whether FE provision could be truly categorised as 'community-based'.

- there is a supportive and continuing structure and infrastructure (including quality measures, adequate funding and professional development)
- the content of training is targeted to meet individual and community needs (relevant to 'real life' and tailored to individual learning needs).
- there is community ownership of programs and resources
- there is trust and collaboration between providers and communities.

Discussion

Despite their centrality in terms of provision and philosophy, community-based programmes have been the focus of very little research. There are significant methodological challenges associated with researching in a community context: programmes that have multiple facets; part time or voluntary staff; a lack of research experience, skills or culture among staff; limited access to research funding; relatively small student numbers making sampling difficult; and the limited hours of provision per week they are able to offer.[105]

The search criteria we used did not identify outcome-related studies that robustly identified effective teaching practices in vocational education.

What little research is available in this area is methodologically weak and is rather vague in identifying elements that contribute to programme effectiveness.

3.8.5 Prison programmes

There is a common perception of a link between LNL difficulties and crime - poor LNL skills cause people to turn to crime. There is certainly considerable evidence of a link (Smith 1994), but not of causation. Although prisoners were excluded from the 1996 IALS study, there is some evidence of LNL issues in New Zealand prisons (Mudford, 1993), although the study is now dated and was of questionable quality because of its poor sampling and administration procedures. LNL teaching does take place in prisons but may be less visible than other contexts, possibly because it comes under the Department of Corrections rather than educational structures.

While quite a few of the RCTs and CTs in the Torgerson review were set in prisons (Batchelder & Rachal, 2000a; Diem & Fairweather, 1980; McKane & Greene, 1996; Meyer, 1983; R. E. Roberts & Cheek, 1994; Shrum, 1985), these studies focused on some aspect of LNL teaching such as CAI rather than prison programmes per se. Similarly, there are studies that report prison programmes achieving learner gains, but that do not specify particular elements of those programmes (G. Brooks et al., 2001).

A key question for prison programmes is whether participation in educational programmes (including LNL) helps reduce recidivism. One American review of research on this issue (Jancic, 1998) concluded that it does. Jancic focused his

[105] It is no accident that many LNL studies are set in prisons, where organisational variables are thought to be more easily controlled.

review primarily on educational programmes (ranging from basic skills to post-secondary level), rather than social or non-academic programmes such as drug and alcohol issues. While there are specific studies on GED preparation, post-secondary programmes and vocational programmes (all positive), there is none specifically on basic skills programmes. The value of completing a GED while incarcerated is positive, although those completing a post-secondary qualification (i.e. well beyond ABE or GED levels) have the highest success rates.

Discussion

Again, the evidence relating specifically to the distinctiveness of prison LNL programmes is lacking, and what is available, lacks rigour. Participating in these programmes appears to be more beneficial than not, but substantive evidence is yet to be produced.

3.8.6 Bridging education

Bridging education aims to teach learners "the requisite academic skills to a level sufficient to enable them to enrol in other tertiary programmes to which they would not otherwise be able to gain entry" (Benseman & Russ, 2003, p. 43). In New Zealand bridging education has developed in an ad hoc manner rather than as the result of government policy so it varies considerably between individual tertiary institutions. It is assumed that bridging education includes some elements of LNL teaching but little is known as yet about the nature and extent of that provision.

We have located only one study on bridging education[106] effectiveness (Boylan & Bliss, 1997). This article is based on the on-going *National Study of Developmental Education*, which set out to assess the efficacy of developmental education across the US. The study first identified programme components associated with student success in these programmes from a literature review. The study then analysed data from 6,000 students who had completed courses at a random selection of 160 institutions against these factors. This causal-comparative method enabled the study of relationships between multiple variables. The authors concluded that three characteristics identified from the literature were strongly associated ($p>0.05$) with student success in these programmes:

- centralised programmes and especially their co-ordination (rather than where programmes are run in individual academic departments)
- tutoring services that have tutor training
- regular and systematic programme evaluation (although only 14% of programmes do this), leading to programme improvements (p. 6).

The authors acknowledge that other factors are also associated with programme success, but these have only a weak association or were not found in sufficient numbers of programmes to assess.

[106] The term b*ridging education* tends to be used in New Zealand, *developmental education* in the US and *access education* in Europe.

4 CONCLUSIONS

The purpose of this literature review is to provide a critical evaluation of research evidence about effective practices in adult LNL teaching and programme provision, to inform the development of foundation learning policy and LNL teaching practice. This review has sought original research studies that relate specific aspects of teaching and programmes' operations to learning outcomes – especially demonstrable changes in the literacy skills of learners.

4.1 Findings

The findings of this review need to be considered as tentative, due to the limitations of the research base from which they are drawn. The difficulties of researching adult LNL have already been described; research to date has been of variable quality and much of it has involved such small sample size that it is difficult to generalise from the findings. Therefore, we cannot present a list of factors that will definitively ensure effective teaching of adult literacy, numeracy and language learners and result in learners' gaining LNL skills.

However, an analysis across the strongest studies and reviews found some congruency of findings, which enables us to group those findings and have some confidence that the particular factors identified are likely to contribute to learner gain.

Factors that appear likely to enhance learner gain include:

- *Appropriately skilled teachers who can identify the strengths and weaknesses learners have in speaking, reading, writing and numeracy*.[107] Findings from two studies suggest that full-time teachers are more likely to enhance learner gain, and that learners benefit when there is assistance from teacher aides or volunteer tutors. Findings also suggest the importance of teachers having adequate non-teaching time for planning and professional development (Basic Skills Agency, 2000; Benseman, 2001; G Brooks et al., 2001; Fitzgerald & Young, 1997; Kruidenier, 2002b; Padak, Sapin et al., 2002).
- *Deliberate and sustained acts of teaching, clearly focused on learners' diagnosed needs.* All LNL learners, including those who have learning disabilities or dyslexia, would benefit from teachers who are able to offer a range of teaching strategies. Many studies commented that the actual amount of deliberate teaching in LNL programmes was often not very high. (Basic Skills Agency, 2000; Condelli, 2003; Condelli & Wrigley, 2004a; Kruidenier, 2002b; Rice & Brooks, 2004; H.S Wrigley, 2003)
- *A curriculum that is linked to the authentic literacy events that learners experience in their lives.* An authentic curriculum appears to lead to gain for learners in family literacy, for ESOL learners and for mainstream LNL learners (supported by more tentative findings that an authentic curriculum assists in achieving learner gain in workplace and prison programmes). (Condelli, 2003;

[107] This finding resonates with the research on effectiveness in New Zealand schools (Hattie, 2002a), where "what teachers know, do and care about" is recognised as one of the greatest influences on student learning (p. 7).

Condelli & Wrigley, 2004a; Kruidenier, 2002b; Padak & Padak, 1991; Purcell-Gates et al., 2002)

- *Programmes that allow for high levels of participation, probably more than 100 hours of tuition*. Learners with low levels of skill need more tuition for longer, as do ESOL learners. It should be noted that the research reviewed had a mix of findings. Three studies (including one ESOL study) found learners made gain when receiving over 100 hours teaching (with one study suggesting learners would need 300+ hours to move between levels). Two other findings suggested fewer hours might also be effective; one of these found learners improved when learners had more than 50 hours provision; while in another the greatest level of improvement occurred when learners had 51-60 hours between pre- and post-tests. Researchers commented that, regardless of the exact number of hours before learners made gains, for many LNL participants the total hours of teaching received were likely to be considerably less than the figures suggested above. While most of the research focused on total amount of provision, the intensity or regularity of tuition is probably also important. For example, one study suggested that learners made less gain once they received more than nine hours teaching per week. Intensive courses may be particularly important. For some ESOL learners, regular attendance was a more significant variable in achieving skills than the actual hours per week. (Basic Skills Agency, 2000; Boudett & Friedlander, 1997; Comings, 2003; Kruidenier, 2002b; Shameem et al., 2002)
- *Explicit teaching of reading, by teachers who are well trained in the reading process, and who are skilled in identifying reading difficulties and using appropriate teaching strategies to address them.* Findings suggested learners are more likely to make gain when there is explicit, structured teaching of alphabetics, fluency, vocabulary building and comprehension. ESOL learners gain when there is explicit teaching of comprehension and vocabulary. Reciprocal reading was identified as an effective teaching strategy; others what warrant further investigation include oral reading, strategies to increase comprehension and fluency-related strategies. (Besser et al., 2004; Kruidenier, 2002b; Rich & Shepherd, 1993; Sabatini, 2002; Snow & Strucker, 2000)
- *On-going assessment that takes into account the variation in learners' skills across the dimensions of reading and writing*. Assessment processes need to incorporate measurement of all four components of reading: alphabetics, fluency, vocabulary and comprehension. The assessment of reading needs to use more than silent reading and oral comprehension questions as assessment tools. A study of learners' perspectives also identified the importance of on-going assessment. (Besser et al., 2004; Davidson & Strucker, 2002; Kruidenier, 2002b; Ward, 2003)
- *ESOL programmes structured to maximise oral communication, discussion and group work*. Findings suggest learners make gain, particularly in comprehension, when there are bi-lingual tutors who teach concepts and explain learning tasks and instructions using learners' first languages and when they attend regularly. (Condelli & Wrigley, 2004; Condelli & Wrigley, 2004a; C. Roberts et al., 2004; Shameem et al., 2002)
- *Programmes that deliver clearly structured teaching using a range of methods*. Provision needs to occur in a range of contexts that: meets learners' needs; that allows for learning plans for every learner; and where those plans are related to regular assessments and reviews with learners. Most of these factors are not necessarily unique to LNL teaching – they

should be components of any quality adult education provision. (Basic Skills Agency, 2000; Boudett & Friedlander, 1997; G Brooks et al., 2001; G. Brooks et al., 2001; Comings et al., 1999, 2000; Condelli & Wrigley, 2004a; Eldred, 2002; Yaffe & Williams, 1998)

- *Writing programmes that use writing based on expressing learners' experiences and opinions.* Programmes that include project-based instruction that focus on issues of common interest, on authentic tasks and materials and that encourage a variety of writing activities are more likely to promote gain. (Gillespie, 2001; Kelly et al., 2004; Purcell-Gates et al., 2002)
- *Making efforts to retain learners, including pro-active management of the positive and negative forces that help and hinder persistence.* Findings suggest that childcare, transport assistance, and access to social services make a difference, as does building self-efficacy and self-confidence in learners and ensuring that learners receive personalised attention. (Comings et al., 1999; Eldred, 2002; B. A. Quigley & Uhland, 2000; Yaffe & Williams, 1998)
- *Family literacy programmes that have parents committed to improving their children's chances*. Programmes that have an impact have a clear focus on literacy/numeracy development; have teaching sessions for parents only and children only, as well as together; have home visits; collaborate with other participating groups, to ensure programme and services integration; and have staff whose skills match the unique challenges of family literacy. (Alamprese, 2001b; Benseman, 2002, 2003c, 2004; Padak, Rasinski et al., 2002; Philliber et al., 1996; St Pierre et al., 2003; St. Pierre et al., 1995)

There are some factors that may enhance learner gain, but for which there has been only limited research and where findings are even more tentative:

- Programmes that have an awareness and management of critical periods in the programme (when learners were susceptible to failure and/or withdrawal); provide pastoral care in times of need and crisis; have adequate fiscal resources and facilities; have administrative leadership.
- Teaching staff who undertake regular professional development; praise and encourage learners; are open as people to their students and have both credibility in their field and a passion for their subject.
- Assessment that includes self-assessment by learners, and constructive, verbal feedback from the tutor.
- Teaching that creates a positive and supportive learning environment; is able to balance challenge and support for learners; encourages peer support in the form of sharing skills and ideas and friendships; accentuates learners' strengths. Again, these attributes appear to be aspects of good adult education practice.
- Computer Assisted Instruction may be more effective in teaching mathematics and other aspects of LNL in comparison with 'traditional' teaching and with learners with low levels of skill; however, it does not replace skilled teachers; it may motivate learners and develop self-confidence.
- Reading programmes that ensure learners' prior knowledge is used from the beginning rather than assuming that adult beginning readers need to concentrate on strategies for processing print first; that include various strategies related to teaching alphabetics, fluency, vocabulary and

comprehension as suggested in K-12 research; that teach learners to monitor their comprehension and understanding as they read; and that are at least 70% on-task (i.e. that the majority of time is spent on reading and writing tasks).

- Family literacy programmes that: have public celebrations of key events and achievements; and that have a 'second step' programme for the adult learners as they move on from the programme to maintain the "community of learning".
- Community-based programmes that: have community ownership and resources; and where there is trust and collaboration between providers and communities.
- Bridging programmes that: are centralised, especially their co-ordination (rather than being run in individual academic departments).
- Workplace literacy programmes where there is commitment from the participating company, where tuition occurs during work time and where curriculum is related to real-life demands.
- Prison-based programmes that: incorporate a community-building process into their reading programme; and where there is contextualised content in reading teaching, as this increases attendance rates and levels of engagement.

Fourthly, there are factors that are *not* supported by research evidence at this time.

- There are no clear findings that one form of delivery (1:1/small group/class) or context is better than any other. There were a number of studies with very small numbers of learners saying 1:1 is effective, as well as others saying that participation in small groups is what makes programmes 'not like school'. There was evidence that a range of factors impact on effectiveness in any form of delivery or context including, for example: students' motivations to attend and their life stages, the language and literacy diversity of students within a group, strategies used to retain students, the extent programmes use authentic contexts and materials, the intensity of instruction and the skill of the teachers.
- The research evidence on numeracy does not provide guidance on the time and the nature and extent of teaching required for adults to make significant progress.
- There is no evidence to support a policy of differentiating dyslexic from non-dyslexic students in adult literacy, numeracy and ESOL.

Finally, we were not able to identify any research that met the criteria for our study on the following subjects listed in the research brief.

- integrated or embedded provision
- any socio-demographic characteristics of tutors
- strategies related to teaching te reo Maori or Maori programme provision
- factors associated with progress in numeracy
- assessment and its effect on learning outcomes.

4.2 Developing a cycle of research that informs practice and policy

This review has illustrated the limitations of the available LNL research, limitations reiterated in all of the international literature reviews we have encountered for this project (Beder, 1999; G Brooks et al., 2001; G. Brooks et al., 2001; Campbell, 2003; Condelli & Wrigley, 2004; Torgerson et al., 2004; H.S. Wrigley, 2003). We already know that we lack quality LNL research specific to New Zealand (Benseman, 2003a), especially research that can provide useful findings to inform future policy directions and the development of good quality provision.

We have to improve the quality of the research that is undertaken - again, this has been an issue worldwide. Beder (1999) has described the limitations in American research completed prior to 1999, including for example: inaccurate or incomplete data; over-reliance on self-report data; lack of adequate controls; lack of valid, reliable and appropriate tests; poor quality research reports and a lack of relevant standards. His review identified how the nature of the environment in which foundation learning takes place makes research particularly difficult (factors that are also found in New Zealand) - open enrolment, high dropout rates, intrusion of events and crises arising from adults' daily lives and responsibilities and sporadic attendance. The lack of capacity in local programmes to collect accurate and timely data to monitor provision is another issue, given the low budgets, high staff turnover and reliance on part-time staffing in many programmes (again, all factors common in the sector in New Zealand).

In his paper on establishing an evidence-based system, Comings (2003, p. 9) proposes a process that follows a set of recurring cycle of steps in order to improve the links between research and practice:

- a review of existing research and professional wisdom to inform the design of baseline models for teaching and support services that conform to the best available evidence
- evaluation of these baseline models to establish outcomes and impact
- practitioners using the results to inform and make decisions about their practice
- practitioners' experiences of putting the models into practice are shared
- based on this review, additional research is undertaken, thereby leading to a constant revision of the model(s).

He argues that this process can not only lead to refining existing models of practice, but also allows new alternative models to be explored and provides a sharper focus for professional development.

Beder (op cit) argues that successful research in future will require budgets adequate for the size and complexity of the task, multi-skilled research teams, including technical experts skilled in research (both quantitative and qualitative) and experienced researchers and practitioners who understand the particular nature of the adult literacy context.

Future LNL research for adults in New Zealand therefore needs to take into account a number of factors that have emerged in undertaking this literature review:

increasing the availability of the research that is being done, keeping in close touch with overseas research programmes; maximising the usefulness of local research and ensuring ready incorporation of research into professional practice.

4.2.1 Availability of existing research

In the process of undertaking this review, we found reference to a number of studies that have been undertaken in New Zealand, but that have not been made publicly available for a range of reasons. If we are to develop an evidence-based system of LNL for adults, it is essential that funding agencies release these studies into the public arena, even when they have weaknesses, in order to stimulate professional debate, not only about the LNL elements concerned, but also the research methodologies and processes involved. Ready access to research is an important component of encouraging debate and discussion between researchers, policy-makers and practitioners; and the present paucity of research (together with the smallness of the field generally, which will limit the research undertaken) makes it imperative that what is carried out is readily available in the public domain.

4.2.2 Tracking overseas LNL research

A considerable number of substantial, intervention studies are currently underway overseas that are highly relevant to the aims of this review. Most of this new generation of studies is related to the national research programmes of the National Research and Development Centre (NRDC) in Britain (www.nrdc.org.uk) or the National Center for Study of Adult Learning and Literacy (NCSALL) in the United States (http://www.gse.harvard.edu/~ncsall/). Unlike much of the research discussed in this report, the current studies are often the result of national, co-ordinated research programmes run by collaborations of organisations rather than individual researchers' studies or localised evaluations. The results of these studies are likely to be very useful to us in the future. Examples of studies underway include:

- NCSALL is studying the effect of sustained silent reading, based at the National Labsite for Adult ESOL; a report is due on 2005.
- NCSALL's National Labsite for Adult Literacy Education is undertaking a range of projects including:
    - identifying the factors that engage and/or disengage learners and the relationships between engagement and dropout
    - identifying and testing best practices for managing mixed level/ continuous enrolment classes
    - studying the relationships between classroom instruction and literacy acquisition in learners' homes, workplaces, and communities
    - investigating the relationship between teachers' beliefs about how instruction should be conducted and how teachers actually teach
    - a longitudinal outcome study that measures learner progress over time
- A major experimental study, *Building a Knowledge Base for Teaching Adult Decoding* involving a structured reading intervention that focused on decoding and fluency, is being tested over three years in the USA, involving approximately 23 ABE programmes in 12 states. The project is being funded by a collaboration of US government departments and literacy organisations.

Information about the programme can be found on http://www.abtassociates.com/presentations/Proj_ADULTREAD_5-04-04.ppt

- An NRDC project *Effective approaches to the teaching and learning of writing* is due to be reported on in 2005. The project aims to provide an overview of what is known about the development of writing skills in adults up to level two. It will investigate the correlations between classroom practice and the progress of learners in the development of the skills of writing and their confidence as writers.
- An NRDC study entitled *Numeracy: Effective Teaching and Learning* is due for completion in 2006, exploring the correlation between different pedagogical practices and learners' progress in a range of settings.
- Another NRDC study is considering initiatives intended to improve the literacy, language and numeracy skills of adults through workplace-linked tuition. Adadiadou et al (2004) details the methodology they have developed and their plans to sample 400 workplace LNL learners. The project is due for completion in 2005.
- An in-depth set of case studies of embedded LNL research projects is underway in the UK and is due to be reported on late during 2005, which may give more guidance on how best to provide effective integrated teaching. Information may be obtained from NRDC or NIACE (www.niace.org.uk).
- The National Council for Vocational Education Research (NCVER) in Australia (www.ncver.edu.au) has also recently commissioned case study research, including observations of what teachers actually do in the Australian context that will be useful to consider.

Many of the studies above have preliminary publications available that discuss methodologies and issues that have arisen in the scoping of these projects. Researchers in New Zealand would benefit from considering these as part of preparations for undertaking research here.

4.2.3 Maximising usefulness of local research

It is important to stress that we are still unable to state that particular LNL strategies and techniques do, or do not, lead to learner gain with the degree of confidence that is possible in many aspects of schooling. Rather, the 'jury is still out' – there is not a sufficiently large research base as yet from which to draw strong conclusions, even though this situation is clearly undergoing substantial change at present. In two-three years time, a similar review should be able to produce more useful research findings.

As funding arrangements, provision and practice in foundation learning evolve in New Zealand over the next few years and new research projects come on stream, in keeping with Comings' model we need to look more closely at the quality of the methodologies. While we are unlikely to ever replicate the size of large international studies, we do need to look at qualities of overseas studies to see what we can usefully replicate and expand on in contexts specific to New Zealand.

For example, there is a need to move beyond exploratory, small-scale studies with limited sample size to research with sampling frames of sufficient size and methodologies of substantive enough quality that findings can be more readily generalised than has been the case to date. It may be more useful to limit the overall

number of studies being undertaken and broaden their insights and degree of applicability beyond specific contexts.

It is essential that all research builds on what has been carried out previously – in this way, researchers contribute to the accumulated wisdom of other researchers (even if it is to avoid the same errors) by 'standing on their shoulders'. It is essential therefore that research funders explicitly stipulate that all projects include a literature review and its findings are fully integrated into the main study.

The number of LNL researchers in New Zealand is very small. There would be benefits in collaborating with LNL researchers internationally to grow our pool of expertise and to look for expertise from other components of education to enhance the technical quality of our methodologies.

4.2.4 Utilising research in provision

Research counts for very little unless it ultimately contributes to improved professional practice. There is an urgent need to consider and plan ways to disseminate research findings, to encourage practitioners to review their teaching against these findings and to then modify their practices as Comings (2003) advocates. Simply publishing research is not enough. It is particularly important that research findings be incorporated into the planning of both initial training and on-going professional development for practitioners.

There are no refereed foundation learning-related journals in New Zealand at present, which means it is difficult for studies to get peer review through the traditional academic process.[108] This difficulty is exacerbated by the lack of an overarching body for the foundation-learning sector, which makes it difficult to achieve ready dissemination of research findings.

While the peer review process is valuable in helping to improve the quality of research, journals are seldom the most appropriate mechanism for ensuring that findings are read and utilised among practitioners, because very few practitioners will be in a position to access them. To be effective, dissemination of research findings has to be actively managed. It is interesting to note for example, that the NCVER in Australia tags a considerable proportion of its budget to active dissemination of their research studies' findings using a range of strategies for this purpose. NRDC run a programme of seminars to disseminate research findings after each study.

In New Zealand the Literacy Portal has potential to further develop its dissemination role in relation to research. For example, the large number of research reports identified and sourced for this study (both electronic and hard copy) could be publicised, promoted and disseminated using the Literacy Portal as well as offering full copies of completed research reports. At present there is no repository for the paper-based material and no systematic means of cataloguing any of it to make it available for other researchers.

[108] The *New Zealand Journal of Adult Learning* is the only local refereed publication that has published any number of studies related to adult LNL, although its focus is on adult learning generally rather than LNL. Other, more ABE practitioner-focused publications, such as *Literacy Works* by Workbase could possibly be extended for this function. Australian publications such as *Australasian Journal of Vocational Education* and *Fine Print* may be more appropriate, but are probably read by a limited number of New Zealand-based readers at present.

Immediate consideration should be given to the dissemination of this review and all other LNL-related research studies currently being completed.

4.3 Recommendations

In keeping with these general comments about future LNL research directions in New Zealand, we believe that a number of studies should be undertaken over the medium term. This list does not constitute a strategic research programme, but rather draws on key findings in the research in order to productively focus some future research.

1. **LNL teachers**: this review has showed how central LNL teachers are in achieving learner outcomes and yet we know remarkably little about who these people are, the contexts and nature of their employment and the organisation of their work, their motivations and aspirations, training, issues and philosophies of teaching and the impact of professional development they undertake etc. A large-scale survey would provide useful baseline information for the future expansion of both initial and on-going professional development programmes. Any study should encompass whether tutors work with ESOL learners and/or teach numeracy. When investigating numeracy information would be useful on what they teach, what their professional development needs are; and their beliefs and perceptions of self-efficacy related to their own numeracy.

2. **Specific teaching methods for reading**: New Zealand has had a long history of research into child-related reading that has never been tapped into by the LNL sector. There is scope to take some of the methods identified as potentially useful in this review and construct research to test their effectiveness in New Zealand LNL contexts. Some aspects that warrant attention include: reciprocal reading, which the research indicates is an effective means for teaching adults, oral reading, and strategies to develop fluency and comprehension.

3. **Authentic curriculum:** it would be very useful to identify to what extent authentic curriculum is being incorporated into teaching across the variety of contexts of LNL provision in New Zealand, and analyse issues around its use and the opportunities this approach offers us.

4. **Learner-focused longitudinal research**: a longitudinal, intensive study of approximately 20-30 learners over two years (with the expectation of 5-10 dropping out over that period) could provide information about what learners believe they learn, how their LNL skills progress and what they believe has helped and hindered them. A case study approach would also provide a rich description of additional programme factors, for example, effective recruitment, attendance patterns, barriers to participation, and learner progression on to other outcomes in work and education.

APPENDIX A – PROFESSOR JOHN HATTIE'S ANALYSIS OF STUDIES IN TORGERSON ET AL. (2004)

Torgerson et al. (2004) identify 26 studies from a total of 4,555 potentially relevant papers reporting evaluations of interventions in adult literacy and/or numeracy, and published between 1980 and 2002. Only those studies that used randomised controlled trials (RCTs) and controlled trials (CTs) were selected, hence only 29 studies were included in the final report. We were able to locate 21 of these studies, which is sufficient to demonstrate the difficulties of reviewing by choosing only studies that met a certain set of design specifications.

It is noted that a major contribution of meta-analysis is to include *all* possible studies and then ask the question whether the nature of the design (and many other features of the study) makes a difference. It may be that the nature of the design is not related to the size of the effects and thus a stronger conclusion can be made about more critical and educational attributes. To decide on only including certain types of designs, before such an analysis, presupposes that the studies using only the specified designs are best representative of the population estimates. This is speculation, and using meta-analysis, subject to verification.

Moreover, choosing specified designs, no matter how defensible, assumes that studies using these designs are necessarily somehow superior to studies using other designs. What is striking about the 21 studies we located from Torgerson et al. is their variable quality – with most of low quality. Using randomised or controlled designs clearly does not lead to high quality studies. The median sample size is only 52, and given there are at least two groups (experimental and control) the "typical" study has only 26 people in each group. The average attrition rate is 66%, so two-thirds of each sample did not complete the study. It would have been more defensible to include all possible studies, code them for the nature of the experimental design, and for the quality of the study and then use meta-analysis techniques to address whether the effects differ as a consequence of design and quality. The aim should be to summarise high quality studies, regardless of their design – if quality is a moderator to the final conclusions.

Randomised design

The usual design is a pre-post test with experimental and control groups, but for many studies it is very evident that the randomisation into these two groups failed to ensure pre-test comparability. One of the major purposes of randomisation is to "equate" the experimental and control groups – but it is noted that randomisation is a "method" aimed to ensure that the two groups are not too dissimilar, it does not guarantee it. The ultimate criterion is "no difference" in the pre-tests, and randomisation is one way that *may* lead to this criterion. In one-third of the studies we located it was most apparent that this was not the case: the pre-test means for the experimental and control groups were markedly different, indicating that random assignment did not lead to "representativeness" (Dietrich, 1994; Dirkx & Crawford, 1993; Lavery et al, 1998; MacLay & Askov, 1988; Nicol & Anderson, 2000; Shrum, 1985; Thuy, 1992).

For example, Dietrich (1994) "randomly assigned" each individual to one of two instructional conditions – a traditional meta-cognitive approach, and the experimental phonological skills approach. Despite such random assignment, there are major differences in the pre-test means: the auditory concept (ES=.37) word attack skills

(ES=1.60), and word identification means (ES=.13) were lower in the control groups, questioning the power of random assignment. The sample size in each group is only about 10, and even then one missing score in the control group was “replaced by the mean for that student.” Further, despite such attention to randomisation, the author stated that “my instincts as a teacher interfered with my knowledge as a researcher of the need to achieve randomness in my groups. Instinctively, I encouraged those students most in need of phonological help to participate in the experimental group” (p. 12).

Thuy (1992) assigned adults into two groups: an experimental group that received a CAI course and a control group which received the same course without the computers. It is clear from the means (see below, standard deviations were not provided) that there were substantial pre-test differences even between the control and the experimental group with the lower beginning scores. It is difficult to imagine this was possible if random assignment was used.

Table 1. Pre-test means for Experimental and Control groups on Vocabulary and Comprehension after “randomisation” for Thuy (1992)

	Vocabulary		Comprehension	
Reading measures	Experimental	Control	Experimental	Control
Paper Bag Princess	3.19	3.13	46.00	9.13
Thomas' Snowsuit	16.23	3.00	20.33	12.17
Classified Ads	3.40	5.20	.00	2.87
Christmas Season	11.71	8.42	1.86	3.83

MacLay and Askov (1988) did not use randomisation, but used a convenience sample of those “interested in and eligible for using the courseware but because of scheduling problems, transportation, and child care were unable to participate at this time” (p. 24). Further, the effect-sizes reported in Torgerson et al. for the pre-test means across the two groups are in some cases considerable (.26, .24, .73, .16), questioning the comparability of these groups. Thus, the post-test means between the control and experimental groups (.63, 1.31, 1.55, 1.02) suggests that these pre-test differences should, at least, be subtracted to ensure some comparability. In our meta-analysis we used the difference between the experimental and control at post-test minus the pre-test differences (.37, 1.06, .81, .85).

Askov et al. (1986) used 12 students in a time-series design, and then compared these students’ pre-and post-test gains with a group of 27 inmates. There is no evidence that the prisoners were assigned randomly to the experimental and control groups. They seemed a convenience sample and it is difficult to see how it could be classified a “Controlled design”. Certainly the time series part of the study could have been so designated, but it was not this part that is used in Torgerson et al. Further, the pre-test mean for the Experimental group was .08 and for the Control group .40 – hardly comparable groups. If it is reasonable to assume a constant sd for the pre- and post- means for the control and experimental groups of about a quarter of the means (given a normal distribution of ability), then the effect-size difference of the experimental and control groups at pre-tests is 5.33, and at post-test is 4.07, showing a gain of 1.27.

These studies illustrate that a randomised or controlled design does not necessarily equate with high quality and, at minimum, Torgerson et al. should have coded for the quality of the study and allowed for this moderator in their interpretations and conclusions.

Effect-sizes

Torgerson et al. (2004) calculated the effect-sizes for each study, and it is clear that in many instances they did not attend to any pre-test differences. It seems that they calculated an effect-size as the difference between post-test means of the experimental and control groups divided by the pooled standard deviation. The correct effect-sizes should have been based on an analysis of covariance with pre-test scores as the covariate (but such data were not available to Torgenson et al.). It seems important to allow for pre-test differences between the groups and thus, where available, we used the differences between the experimental-control groups post-test differences and subtracted the differences from the pre-test differences ($[Exp_{post}\text{-}Cnt_{post}] - [Exp_{pre}\text{-}Cnt_{pre}]$). We should have also allowed for a correction due to their being a positive correlation over time in the dependent variable. This has the effect of reducing the standard deviations by $(1\text{-}r^2)$, where r is typically about .8 for achievement tests.

Notwithstanding, there are discrepancies between the effect-sizes we calculated from many of the articles and those reported in the Report. In most cases the differences is because of the above noted effect-size formulae. We cannot, however, ascertain how Torgerson et al. (2004) arrived at their estimates of effect-sizes for Dietrich (1994) even allowing for these different formulae (they have .85, -.63, ad -1.03 for LAC, Word attack, and Word identification, respectively whereas we calculate 1.34, .70, and .49). In Lavery et al. (1998) Torgerson claimed that the effect-size for the Burt, for example, is -1.24, and that "contrary to author's claims" there were no differences. We find it difficult to see how they can make this claim: the pre- and post-means for the control groups are 95.33 and 98.17, and for the experimental groups are 50.00 and 80.17; certainly the effect-size cannot be negative, and our estimated effects of .29 for pre and 1.44 for post are quite substantial. Similarly we calculated .43 compared to .70 for Shrum (1985); .24 vs. .77 for Bean and Wilson (1989), and .71 vs..50 for Nicol and Anderson (2000). The latter two are probably because Torgerson et al. did not consider the pre-test differences. We could not replicate the effect-size of 23.93 for Roberts et al. (1994) for the "Gain mean".

Results

The following table presents the mean effect-size per study from the Torgerson et al. (2004) report, from our calculations, the best estimate from either, and comments where there are major discrepancies. It is noted that one study, Thuy (1992) had an extremely high effect-size (6.96). As noted above, this is primarily because of major differences in the pre-test means between the experimental and control groups but we were unable to locate this study to make any adjustments.

Table 2. Mean effect-size calculations from Torgeson et al (2004)
Table 3.

Author	Design	Report	Ours	Best estimate	Comments
Askov et al.	CT		1.26	1.26	
Bean & Wilson	RCT	.77	.24	.24	Report ignores pre-test differences
Batchelder & Rachal	RCT	.29	.17	.17	
Broughton	CT		.20	.20	
Broussard	CT				
Burtoff	CT				
Cheek & Lindsey	RCT	.46	.44	.44	
Culclasure	CT				
Diem & Fairweather	CT	.01		.01	
Dietrich	CT	-.27	.84	.84	Cannot be –vs when means higher for Exp at post
Dirkx & Crawford	CT		.53	.53	
Gretes & Green	CT	.97	.98	.97	
Indiana	CT				
Irby et al	CT				
Lavery	CT	-.08	.86	.86	Report ignores pre-test differences
Lehigh	CT		-.36	-.36	
MacLay & Askov	CT	1.13	.77	.95	
Macmurdo	CT				
Martinson& Friedlander					
McKane & Greene	RCT	.20	.16	.16	
Morrow	CT		.66	.66	
Myer	CT	.22		.23	
Nicol & Anderson	RCT	.50	.71	.71	Report ignores pre-test differences
Nurss	CT	-1.65		-1.65	
Rich & Shepherd	RCT	1.14	.86	.86	
Rio Salade	CT		.40	.40	
Roberts	CT	1.06	.38	.38	
Schrader	CT				
Shrum	RCT	.71	.43	.57	
Smith & Dalheim	CT				
St Pierre et al.	RCT	.29	.30	.30	
Thuy	CT		6.96	6.96	
Wadsworth & Frasier	CT				
Washington	CT				
Wilson	CT		.48	.48	
Wisher & O'Hara	CT				

The average effect-size from the Torgerson et al. (2004) report is .35 (sd = .69), from our calculations .82 (sd=1.45). When the Thuy study is omitted (as it needs to be), then the means are .35 (sd=.69) from Torgerson et al., .51 (sd=36) from our calculations, and the best estimate is .40 (sd=.38). The best estimate of effect size is between .40 and .51, which indicates that an adult undertaking a program to enhance literacy outcomes increases their proficiency by about .4 to .5 a standard deviation. Hattie (1992, 1999) has estimated the typical effect-size from about 300,000+ studies covering many interventions (school, teacher, student, home, etc.) aimed at school-aged students to be .40. Thus, relative to other educational interventions, the effects of adult literacy programs can be classified as an "average" intervention.

The following stem-and leaf diagram presents all effect-sizes, and it can be seen that they are centred around .3 to .8, there is a positive skew, and there are two outliers (which if removed, make little difference to the messages although dramatically reduce the variance).

Effect	No.
-1.2	9
-0.3	4
-0.2	
-0.1	7
0	3
0	25
0.1	2225577
0.2	1
0.3	4566799
0.4	3359
0.5	23336679
0.6	2
0.7	359
0.8	1556
0.9	28
1	6
1.1	45
1.2	6
1.3	4
1.7	3
6.9	6

The effect-sizes from journals, where there is a degree of peer quality review (.57, No. = 32) and from theses (.20, No. =4) were much lower than from Reports (.74, No. = 19). Similarly, the means from the randomised control trials (.43, No.=20) are lower than for Controlled trials (.71, No. = 35). The overall mean is more likely to be at the lower end of the best estimates of .40 to .51.

The effects were higher in Reading (.67, No.=45) than in Numeracy (.31, No. = 9). Adults in the programs had a somewhat higher effect (.68, No. 35) than younger adults (16-25 years, .48, No. = 7), or in a prison (.49, N=13). The correlation between the number of participants and the effect-size was zero (-.06, No. = 55), but very high with retention (.88) indicating that the programs with the highest retention rates had the greatest overall effects. There was a low correlation between the number of hours of the intervention and the effect-size (-.06, No. = 55).

Concluding comments

This collection of articles clearly points to the delimitations in making a *method* of assignment (randomisation) the major consideration in deciding on the quality of studies. It is difficult to imagine a more unconvincing collection of studies – with low sample size, high attrition, low statistical power, and so many pre-test differences. As well, there are so few studies that critical moderators cannot be investigated in any meaningfully generalisable way to evaluate their potential influences on the effect-sizes. Most important, if more studies had been included then the key assumption, that the effect-sizes from RCT and CT are different according to the design of the study, could have been evaluated.

As Scriven (2004) has argued a more critical criterion for all scientific conclusions is "beyond reasonable doubt (BRD)", and in some cases randomised studies do not come close to BRD. "It seems more appropriate to think of 'gold standard' designs in causal research as those that meet the BRD standard, rather than those that have certain design features. … The existence of more threats to internal or external validity in quasi-experimental designs does not entail a reduction of validity for well-done studies below BRD levels". Scriven notes one of the advocates, Cook who claimed that "Interpreting [RCT's] results depends on many other things—an unbiased assignment process, adequate statistical power, a consent process that does not distort the populations to which results can be generalized, and the absence of treatment-correlated attrition, resentful demoralization, treatment seepage and other unintended products of comparing treatments. Dealing with these matters requires observation, analysis and argumentation." (Cook, 2004) The last sentence opens up the possibility that so many other research designs may deal with these issues.

Perhaps the most marked criticism of the Torgerson et al. review is that they provide few implications for adult literacy – other than comments about research design. Undertaking a review, such as a meta-analysis, is fundamentally about inferences, implications, and conclusions about the substantive topic – adult literacy. They conclude "it is difficult to make any recommendations as to the type of adult education that should be supported" (p. 12)! Thence, they ask for more RCTs – surely not of the quality so far produced.

It is recommended that either a more substantial number of quality articles be included in a meta-analysis or a substantial review of adult literacy programs as then the more important moderators could be evaluated.

John Hattie
June 2004

APPENDIX B – LIST OF DATABASES AND WEB-PAGES SEARCHED

ERIC
http://www.eric.edu
Expanded Academic
Education Complete
Psych Info
Psych Lit and Behavioural Sciences
Dissertation Abstracts
ProQuest Social Sciences
Literacy Research Centre - University of Sheffield – School of Education
http://www.shef.ac.uk/literacy/
National Research and Development Centre for Adult Literacy and Numeracy
http://www.nrdc.org.uk
Lancaster Literacy Research Centre
http://www.literacy.lancs.ac.uk/
Research and Practice in Adult Literacy Group (RaPAL)
http://www.literacy.lancs.ac.uk/links/rapal.htm
NIACE
http://www.niace.org.uk
Basic Skills
http://www.basic-skills.co.uk/site/page.php?cms=0
European Basic skills network
http://www.eurobasicskills.org/default.asp?site=1&lng=1&rgn=0&cat=0
National Adult Literacy Agency(Ireland)
http://www.nala.ie/search/index.tmpl
Community Learning Scotland
http://www.communitylearning.org/
Communities Scotland
http://www.communitiesscotland.gov.uk/Web/Site/cl/al_main.asp
The Danish Research and Development Centre for Adult Education
http://www.cvustork.dk/ufv.asp
VOCB (Flemish Support and Development Centre for Adult Basic Education)
http://www.vocb.be/vocb_eng.html
Latvian Adult Education Association (LAEA)
http://home.parks.lv/laea/en/default.htm
Federacion de Asociaciones de Educacion de personas Adultas (FAEA)
http://www.faea.net/
OECD
http://www.oecd.org
National Centre for Study of Literacy and Learning
http://gseweb.harvard.edu/~ncsall/index.html
National Centre for ESL Literacy Education
http://www.cal.org/ncle/
National Lab-site for Adult Literacy Education – Rutgers University
http://ncsall-ru.gse.rutgers.edu/research.html
New Zealand Literacy Portal
http://www.nzliteracyportal.org.nz/NZ+Research/
Bureau of Adult Basic and Literacy Education
http://www.able.state.pa.us/able/site/default.asp

Pennsylvania Action Research Network - Learning from practice
http://www.learningfrompractice.org/paarn/default.htm
Pennsylvania Adult Literacy practitioner Inquiry network (PALPN)
http://www.learningfrompractice.org/palpin/default.htm
National Institute for Literacy
http://www.nifl.gov/nifl/publications.html
National Center for Family Literacy
http://famlit.org/
Literacy Exchange: World Resources on Literacy
http://www.literacyexchange.net/
UNESCO Institute for Education
http://www.unesco.org/education/uie/publications/index.html
Kluwer Academic Publishers
http://www.kluweronline.com/issn/0020-8566
International Review of Education
Literacy in Africa
http://portal.unesco.org/education/
Centre for Literacy of Quebec
http://www.nald.ca/litcent.htm
ACTCAL -ACT Council of Adult Literacy
http://www.acal.edu.au/actcal/index.htm
Literacy and Numeracy Studies
http://www.education.uts.edu.au/lns/about.html
Alpha Plus Centre
http://www.alphaplus.ca/eng.asp
Professional Complete Collection database
Psychology and Behavioral Sciences Collection database
Centre for Language and Literacy - University of Technology Sydney
http://www.education.uts.edu.au/centres/cll/publications/index.html
JSTOR database
Web of Science
Sociological Abstracts
King's College London
http://www.kcl.ac.uk/depsta/education/
Adult Education Research conference
http://www.edst.educ.ubc.ca/aerc/proceed.htm
Canadian Association for the Study of Adult Education (CASAE)
http://www.oise.utoronto.ca/CASAE/maineng.html
European Society for Research on the Education of Adults
http://www.esrea.org/
Australian Education Index Database
Digital Dissertations
Google
US Dept of Education
Office of Vocational and Adult Education
http://www.ed.gov/about/offices/list/ovae/pi/AdultEd/index.html
National Centre for Educational Research
http://www.ed.gov/about/offices/list/ies/ncer/index.html
Comprehensive Adult Student Assessment Scheme (CASA)
http://www.casas.org/
Division of Adult Education and Literacy (DAEL
http://www.ed.gov/
National Assessment of Adult Literacy (NAAL)
http://nces.ed.gov/naal/resources/resources.asp

Centre for Literacy Studies - University of Tennessee
http://cls.coe.utk.edu/
Centre for Adult Learning and Literacy - University of Maine
http://www.umaine.edu/call/pubs/pubs.html
Center for the Study of Adult Literacy - University of Georgia
http://education.gsu.edu/csal/site/pubs.htm
National Center for Study of Adult Learning & Literacy - at Rutgers University
http://ncsall-ru.gse.rutgers.edu/research.html
DEW Research Group - Portland State University
http://www.cedu.niu.edu/~smith/Adultlitpage.htm

APPENDIX C – DESCRIPTORS USED IN LITERATURE SEARCH

1. Adult literacy OR adult reading OR adult reading programmes OR literacy education OR illiteracy (sic) OR adult basic education OR adult basic skills OR basic skills
2. Reading instruction OR reading skills
3. Adult numeracy OR numeracy skills OR remedial maths
4. Writing skills
5. Oracy OR oral language OR second language instruction OR English skills OR ESOL OR TESOL
6. Workplace literacy OR worksite education
7. Correctional education OR prison education
8. Impact analysis OR outcomes of education OR educational outcomes OR instructional outcomes OR learner outcomes OR results of education OR student outcomes OR
9. Programme effectiveness OR teacher effectiveness OR instructional effectiveness
10. Programme evaluation OR instructional evaluation OR pre-tests OR post tests
11. Teaching OR training OR instruction
12. Computer-assisted instruction OR educational technology
13. Teaching techniques OR teaching methods OR teaching practices OR educational methods
14. Teacher characteristics OR educational environment
15. Teachers OR tutors OR adult educators
16. Teacher effectiveness OR teacher characteristics OR teaching conditions
17. Curriculum OR programme design OR delivery systems

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