



Acknowledgement

This development work has been informed by the research of Dr Terry Maguire 'Engendering Numeracy in Adults Mathematics Education with a Focus on Tutors: A Grounded Theory Approach (2003). It is also informed by subsequent follow on research she completed in partnership with NALA, Doing the Maths: the training needs of numeracy tutors in Ireland, 2013 and beyond. NALA would like to acknowledge and thank her for her significant contribution to the development process.



Message from Minister

I am delighted to welcome this publication, which outlines a National Framework for Meeting the Professional Developments Needs of Numeracy Tutors in Ireland. It will make an important contribution to the debate about excellence in the teaching of adult numeracy and mathematics. The time is right to enhance the quality and quantity of provision in these areas, and I believe that the Framework can make a significant contribution to achieving this.



International research acknowledges the importance of numeracy and mathematics in the 21st Century, where science, technology, engineering and mathematics have ever increasing roles in all our lives. The recent Survey of Adult Skills Report (PIAAC)¹ ranked Ireland 19th out of 24 participating countries for numeracy. In response to this, the Department of Education and Skills, in its 2014 review of adult literacy provision, called for numeracy to be an integral part of the range of learning options offered by the Education and Training Boards to adult literacy and numeracy learners. In order for adult learners to be able to gain the skills they need, it follows that those who teach them should be competent and confident not only in their subject itself but also in teaching their subject. They need qualifications and training to enable them to give their learners the highest quality learning experience they can.

This Framework is crystal clear in its intentions to improve the teaching and learning of numeracy in Ireland. It sets out ten components it considers vital for ensuring that professional development (whether in terms of formal qualifications or non-accredited training) shapes tutors who are not only competent and confident, but who are able to give learners the support they deserve.

¹ OECD: Programme for the International Assessment of Adult Competencies (2013): http://www.oecd.org/site/piaac/Ireland.pdf

I believe the Framework will make a significant contribution to the development of a Professional Development Strategy by the Department of Education and Skills and SOLAS for the Further Education and Training sector. All agencies and providers should use the Framework actively in designing qualifications and training for future and practising tutors of adult numeracy.

A considerable amount of work has gone into developing this Framework, and I wish to thank the members of the Numeracy Working Group, and all other individuals involved, for their dedication. I also express my appreciation to the National Adult Literacy Agency (NALA) for convening the Numeracy Working Group, hosting its work and publishing this document.

Jan O'Sallier



Foreword

The importance of adult numeracy in the 21st century has been well captured in seminal research on the topic and Ireland for the first time has statistical evidence that one in four adults has a low level of numeracy competence. This can have significant consequences for them as individuals in terms of getting employment, career progression, earning potential and participation in further education and training. There is also the loss of this individual's full potential to our society.



With this knowledge, it is important to ensure there is a sufficient quality supply of adult numeracy tuition options for people to take up in their local community. The development of these services is now part of the Further Education and Training Strategy, building on a number of research and policy publications which have recommended the development of adult numeracy practice for over a decade. There is widespread acknowledgement that adult numeracy is a neglected area relative to adult literacy, itself an area requiring further investment.

Against this challenging backdrop, NALA convened a working group to devise a framework for continuous professional development for adult numeracy practitioners. The members of this group consisted of internationally recognised academic and practitioner experts in this field as well as representatives of management of the main adult numeracy provider and funder. Together they worked to arrive at this publication which is hoped will be key to the development of much needed on-going professional development in adult numeracy.

I am very grateful to all who were involved in putting this framework together and look forward to working with all the relevant partners to bring its core components to fruition.

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Background

The need to raise the numeracy skill levels of adults in Ireland is well documented. While numeracy is an integral part of literacy policy and practice in Ireland, it is also a subject area in its own right. Research suggests that there is concern in the adult and further education sector that there is a shortage of staff who are suitably qualified and trained to teach numeracy and mathematics to adults (DES, 2013; Vorhaus et al, 2011).

In 2013, the National Adult Literacy Agency (NALA) and the Institute of Technology Tallaght (ITT) published **Doing the Maths: The Training Needs of Numeracy Tutors in Ireland 2013 and beyond**. The report identified training needs among tutors providing numeracy tuition to adults nationally.

The findings from this report highlighted that:

- A little over a quarter of tutors surveyed indicated that they had received some form of continuing professional development in the previous six months. Thirty-two percent had training in the past two years and 40% in the last five years;
- Over 60% of tutors reported that they did not have enough training in teaching mathematics to adults and 15% reported that they had no training at all;
- The majority of tutors expressed a need for a training programme and indicated that it should be accredited, delivered part time and supported by technology;
- In terms of accredited training available to numeracy tutors there was little change between 2012 and 2001. The Waterford Institute of Technology (WIT) offer two numeracy modules as part of its modular qualifications, NALA provides up to date training and hosts annual numeracy events for adult numeracy tutors. Three of these events have been co-hosted by the Institute of Technology Tallaght.

The main recommendation coming from the report was that NALA convene an expert working group to examine the findings from the report and address the following issues:

- The definition of adult numeracy;
- The identification of how best the professional development needs of numeracy tutors in further education can be addressed.

The Working Group

In response to these recommendations NALA invited organisations and individuals working in the area of adult numeracy to be part of this working group. In February 2014 the working group was established. The group was comprised of the following:

- Tina Byrne and Gretta Bermingham, National Adult Literacy Agency (NALA);
- Siobhan McEntee, Education and Training Boards Ireland (ETBI);
- Rosemarie McGill, Education and Training Boards Ireland (ETBI);
- Mary Reilly, Adult Literacy Organisers' Association (ALOA);
- Dr John O'Neill, An tSeirbhís Oideachais Leanúnaigh agus Scileanna (SOLAS);
- Pat Hoban, Waterford Institute of Technology (WIT);
- Dr Terry Maguire, Director, National Forum for the Enhancement of Teaching and Learning in Higher Education;
- Daniel Sellers, an educational consultant specialising in adult numeracy and mathematics.

The terms of reference of the group were to:

- I. Agree a working definition of numeracy for the purpose of making recommendations based on training needs as outlined by the research.
- II. Re-examine and/or adapt the Maguire Model of accredited professional development for numeracy tutors (2001) in light of changes of provision in the sector.

The working group considered at length the best way to present its vision coherently and in a way that stakeholders would comprehend and see it's immediate application. It examined *A Model of Professional Development*, presented by Dr Terry Maguire in her PhD thesis (unpublished, 2003) and concluded that, with some development, this Model could meet the requirements as outlined.

The Maguire Model (2003)

The Maguire Model (2003) was developed and presented as part of Maguire's PhD, entitled Engendering Numeracy in Adults Mathematics Education with a focus on tutors: A grounded Approach. The Model has a central underpinning philosophy that views numeracy as a broad, dynamic concept and understands the practice of numeracy teaching as professionally challenging, complex and worthwhile in its own right.

The Model addressed the five "roles" occupied by the adult numeracy practitioner:

- the student of numeracy
- the tutor of numeracy
- the collaborator with other practitioners
- the "modulator" of change, and
- the lifelong learner.

It identified the importance of tutors having or developing what is described as 'mathematical eyes.' This involves the ability by tutors to observe and value mathematics in learners' everyday lives.

This model advocates that development programmes should be built on adult learning principles, and recognise that tutors themselves are adult learners in the context of professional development: ultimately, the Model seeks to ensure that tutors should experience learning in ways that fit, or mirror, how adult learners of numeracy should experience learning of numeracy.

Finally, it aimed to challenge tutors to examine the beliefs, attitudes and values they take with them to the classroom, and set tutors the task of evaluating their current practice and setting goals for their professional growth.

Rationale for selecting the Maguire Model (2003)

The working group saw much value in the Maguire Model (2003), in particular:

- the fact that it did not set out or prescribe a curriculum for tutors of adult numeracy to undertake;
- its strong holistic approach to developing professionals that could remain relevant in changing policy and practice contexts, and which could be relevant to practice in a range of settings, whether in community-based non-formal learning or in employability training;
- its 360° conception of the tutor of adult numeracy as more than a manager of learning activities and resources, but as a collaborative, developing, engaged practitioner;
- its emphasis on the importance of tutors' own relationship with mathematics in everyday life, illustrated through the concept of 'mathematical eyes';
- its reinforcement of the importance of tutors challenging their own beliefs, attitudes and values, as a crucial means to professional development and personal goal setting.

In order to maximise the potential impact and relevance of the Model for contemporary use in 2015 the group felt that it should reflect the professional development needs of tutors in an increasing digital world and extended the Model to incorporate more explicitly:

- the development of digital literacy to enable tutors to harness the potential of technology in their teaching and learning;
- the importance of reflection and reflective practice for ongoing professional development.

This Framework is specifically designed to meet the professional needs for those teaching adult numeracy and mathematics in the Irish Further Education and Training sector.



Policy context

The publication of this document is timely for two important reasons. Firstly, in light of Ireland's participation in OECD Programme for the International Assessment of Adult Competencies (PIAAC) and the results on the numeracy proficiency levels among adults aged 16-65 years. The numeracy results for Ireland show that just over 25% of Irish adults score at or below Level 1 for numeracy compared to a 20% average across participating countries. This score ranks Ireland 19th out of the 24 participating countries. Males score higher than females by 12 points. Adults aged 25 – 34 have the highest score for numeracy while adults aged 55 – 65 have the lowest score. This mirrors a trend across participating countries which show a decline in numeracy proficiency for older age groups. 30% of those aged 16 – 24 are at Level 1 compared to 18% for those aged 25 – 34 and 36% of those aged 55 – 65 (OECD, 2012). Secondly Ireland is going through the most extensive reform of further education and training in the history of the State, presenting a key opportunity to change and improve our practice.

In 2013, the Department of Education and Science (DES) published its review of adult literacy provision in Ireland. The review set out 32 recommendations to improve adult literacy and numeracy provision. The Review highlights the lack of hours dedicated to adult numeracy programmes. It states, amongst other things, that numeracy should be an integral part of the range of learning options offered throughout the Education and Training Boards (ETBs) Adult Literacy programme and that learners should be offered an opportunity to gain accreditation at National Framework of Qualifications (NFQ) Levels 1-3. In order to achieve these ETBs should ensure that staff has access to in-service training for numeracy teaching, including non-accredited and accredited provision. The Review recommends that ETBs should strongly promote numeracy as an option for Adult Literacy participants and seek to increase participation in both standalone and integrated numeracy options. Following on from the Review, the Government enshrined an Adult Literacy and Numeracy Strategy in the Further Education and Training Act.

During 2014 two major publications were launched that focus on the development of further education and training in Ireland. Further Education and Training in Ireland: Past, Present and Future (ESRI, 2014) and the Further Education and Training Strategy 2014-2019. The ESRI report sets out the historical evolution of further education

and training provision in Ireland. It details patterns of provision in terms of overall distribution of places and the balance between full-time labour market programmes and part-time provision with a more community education and adult literacy focus.

The Further Education and Training (FET) Strategy 2014-2019, accompanied by implementation plans, aims to develop a high quality integrated system of further education and training in Ireland. The FET Strategy aims to deliver a higher quality learning experience leading to better outcomes for all those who engage in further education and training. The two broad objectives of the FET Strategy are that it will meet the needs of citizens and promote economic development (SOLAS, 2014).

The overarching implementation plans sets out each strategic objective which is broken down into a number of actions. For example, Strategic Objective 2.2 sets out to devise and implement a strategy to promote literacy and numeracy across FET. Action 2.2.2 provides further detail on how this will be achieved.

Support FET staff through continuing profession development to attain the necessary knowledge, skills and competence to respond effectively to the literacy and numeracy needs of learners and provide intensive literacy provisions (SOLAS, 2014, pg:136)

The FET Strategy includes a literacy and numeracy strategy with twelve elements including:

- Prioritise numeracy more strongly and increase the amount of numeracy provision offered as integrated and stand-alone options;
- Support staff through CPD and review existing CPD structures and conduct audit of appropriate skills within the ETB sector relating to literacy and numeracy (SOLAS, 2014).

There is strong evidence of the critical importance of generic skills, in particular numeracy, for the labour market and for life. Numeracy is a key factor that contributes to individual life chances and its impact is critical for the labour market in terms of employment, earnings and training expenditure (Kelly et al. 2012a; Kelly et al., 2012b). Therefore, there is a need to ensure that the new further education and training system and its staff are appropriately positioned to support the numeracy development needs of learners.



Definition of adult numeracy

Within the research literature there is no evidence that highlights agreement in terms of any one singular definition of numeracy (O'Donoghue, 2002). A number of studies in recent years have examined literacy and numeracy and these studies have used specific definitions of what is meant by numeracy. These include the International Adult Literacy Study (IALS, 1995), the Programme for International Student Assessment (PISA, 2000) and Programme for the International Assessment of Adult Competencies (PIAAC). PIAAC collected and analysed data to assist governments in assessing, monitoring and analysing the level and distribution of skills among their adult populations.

The National Strategy to Improve Literacy and Numeracy Among Children and Young People, 2011-2020 (DES, 2010) provides the following definition of numeracy:

Numeracy is not limited to the ability to use numbers, to add, subtract, multiply and divide.

Numeracy encompasses the ability to use mathematical understanding and skills to solve problems and meet the demands of day-to-day living in complex social settings (DES, 2010, p8).

This definition emphasises the need for learners to develop the ability to apply mathematical skills, knowledge and competence in the resolution of problems that they will encounter in their daily lives.

However it is supported by research that competence in Adult Numeracy can be viewed as learners moving along a continuum beginning with mastery of functional skills, as part of literacy and equivalent to Levels 1 - 2 on the NFQ, and leading to more complex mathematical skills, equivalent to Level 3 and above on the NFQ. The ability of an individual to apply mathematical skills, knowledge and competence in the resolution of problems encountered in every day life is an accurate indicator of how numerate that individual is.

Therefore in that context the working group recommend that providers of professional development programmes, in teaching adult numeracy, adopt a definition which reflects that emphasis such as that developed by the OECD and used in PIAAC 2013

the ability to access, use, interpret and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life' (OECD, 2009).

This definition builds on the numeracy framework developed for the Adult Literacy and Life Skills Survey (ALL)². Within PIAAC, numeracy is broadly defined and complemented with a definition of 'numerate behaviour'. Numerate behaviour involves managing a situation or solving a problem in a real context, by responding to mathematical content/information/ideas represented in multiple ways (OECD, 2009 pg.21).

The key facets and components of numerate behaviour as described by PIAAC are outlined in Table 1³.

Following a review of how numeracy has been defined internationally, Kaye (2010) highlighted the dichotomy in how the term has been interpreted. 'Small' numeracy which is bounded by low levels, a part of mathematics strongly linked to school mathematics and limited in its reach. On the other hand 'big' numeracy includes all levels, mathematics 'plus' experiential and context. The concept of numeracy described in the PIAAC framework fits a 'big' view of numeracy.

² ALLS was an international study that measured the literacy and numeracy skills of adults in participating countries.

³ Please refer to OECD 2009 for a more detailed discussion of numerate behaviour

Table 1: Numerate behaviour – key facets and their components

Numerate behaviour involves managing a situation or solving a problem.



1. In a real context

- Everyday life
- Work
- Societal
- Further learning



2. By responding

- Identify, locate or access
- Act upon, use, order, count, estimate, compete, measure model
- Interpret
- Evaluate/analyse
- Communicate



3. To mathematical content/information/ideas

- Quantity & number
- Dimensions & shape
- Pattern, relationships, change
- Data & chance



4. Represented in multiple ways:



- Objects & pictures
- Numbers & mathematical symbols
- Formulae
- Diagrams & maps, graphs, tables
- Texts
- Technology based displays

Numerate behaviour is founded on the activation of several enabling factors and processes:



- Mathematical knowledge and conceptual understanding
- Adaptive reasoning and mathematical problem-solving skills
- Literacy skills
- Beliefs and attitudes
- Numeracy-related practices and experience
- Context/world knowledge

(OECD, 2009: p22)



Key components of professional development for tutors of adult numeracy in Further Education in Ireland⁴

What is professional development?

Professional development has been described as 'formal courses and programmes in professional education and ... the formal and informal development of professional skill that occurs in the work-place' (Dall'Alba and Sandberg, 2006, p.384). Professional development can involve the completion of accredited modules or programmes, non-accredited activity for example, participating in a workshop, presenting at a conference, or undertaking research. A professional development framework for numeracy tutors in further education must recognise the uniqueness of the role they have in supporting adult numeracy learning. A professional development framework would normally incorporate some form of professional recognition for an individual's assessed achievements. In order to meet the needs of this diverse group of tutors it is essential that any professional development framework incorporates core components to support the professional, personal and ongoing needs of numeracy tutors.

Teaching adult numeracy is a complex, multidisciplinary process which requires that tutors develop the specialised knowledge and skills to be able to meet the needs of their learners effectively. It must take account of the reflective and iterative nature of teaching. Professional development is not a once off activity, it should enable numeracy tutors to remain in good standing and to continue their development as tutors in a holistic way throughout their careers.

⁴ Adapted from Maguire 2003

Professional development of numeracy tutors in a national context

Meeting the needs of professional development of numeracy tutors in Ireland must be situated in an overall national professional development framework for those that are teaching in the further education sector in Ireland. Tutors in this sector work with adult learners who have not always experienced success in their earlier engagement with education. These tutors have different and often quite specific roles, for example, literacy tutors, vocational specialists and numeracy tutors and consequently have a range of varying professional development needs that must be met by any national framework for professional development for the sector. In light of these differences the model of accreditation and professional development in place for primary and second level teachers through the National Teaching Council may not necessarily meet the needs of this sector. The National Forum for the Enhancement of Teaching and Learning in Higher Education (www.teachingandlearning.ie) have recently competed a national and international review of approaches to professional development for those who teach and have identified a range of models and approaches in use (National Forum, 2015). Currently the National Forum is consulting with the Higher education sector to determine, from stakeholders, what model of a national professional development framework would best meet their needs now and in the future. A similar approach in the further education sector may also be appropriate.

Core components of professional development

Any national professional development framework must incorporate the core components of professional development for tutors of adult numeracy outlined in Figure 1 and discussed in more detail in the following section.

Figure 1 Ten core components of professional development for adult numeracy tutors in further education.

Core Components of Professional Development for Tutors of Adult Numeracy in Further Education in Ireland



Must be underpinned by a broad definition of numeracy (as outlined in PIAAC, 2009)

Underpinning broad definition of Numeracy that is internationally recognised

Professional development for numeracy tutors must be underpinned by a broad and dynamic view of numeracy as described by PIAAC (OECD 2009). It must incorporate a vision of the practice of numeracy teaching as being professionally challenging, complex and meritorious in its own right.

Component 2

Develop an excellent understanding in elementary mathematics

In order to teach adult numeracy, tutors must know mathematics. They must have an excellent understanding of elementary mathematics to a level well above that which they are delivering to their learners.

Component 3

Recognise the different dimensions of a numeracy tutor as they engage in professional development

During professional development activity the numeracy tutor is concurrently:

- A student of numeracy;
- A tutor of numeracy;
- A student of teaching;
- A collaborator with other tutors;
- A modulator of change working within a particular socio-political environment;
- A lifelong learner.

Professional development of adult numeracy tutors must consider and address each of these different dimensions.

The tutor as a student of numeracy

Tutors through professional development build their skills and knowledge and increase their own understanding of numeracy and numerate behaviour.

The tutor as a tutor of numeracy

Tutors are required to 'teach' mathematics to other learners and must develop both their own mathematics knowledge and skills and what excellent teaching of mathematics means in practice. In the adult numeracy classroom tutors must have the confidence to cope with a truly student centred approach in their mathematics teaching with all the 'lack of control' that that brings.

The tutor as a student of teaching

Numeracy tutors must be given the opportunity to develop their teaching practice and theoretical understanding of what constitutes excellent teaching in the adult numeracy classroom.

The tutor as a collaborator with other tutors

The tutors should be working in a collaborative environment interacting with other tutors in a process of continuous improvement that shares experience and captures best practice.

The tutor as a modulator of change working within a particular socio-political environment

Tutors are modulators of change at two levels. Firstly, as part of an integrated service approach which includes managers, programme coordinators and adult education guidance services, tutors have to interpret ongoing developments and implement these changes in their own classroom. Secondly, tutors must recognise the particular socio-economic circumstances from which their students are drawn in any given situation, and having done so, facilitate progressive change within their adult learners as appropriate.

The tutor as a lifelong learner

The whole process of professional development is set in the context of 'lifelong learning'. Professional Development for tutors is not once-off affair but will require an ongoing process of continuous development and learning.

Develop Mathematical Eyes

Improving a tutor's ability to deliver adult numeracy requires that a tutor 'develop their mathematical eyes' (www.haveyougotmathseyes.com). With successful professional development, tutors will move from a view of mathematics as decontextualised, abstract skills and formulae, to a view of mathematics as an integral part of their own and their learners' lives. By developing their mathematical eyes tutors will be better equipped to make numeracy teaching and learning relevant to their learners.

Component 5

Develop digital literacy

Tutors need to be given opportunities to develop their digital literacy to enable them to harness the potential of technology to enhance their teaching, learning and assessment in an increasingly digital world.

Component 6

Build on adult learning principles

The numeracy tutor must be recognised as being an adult learner themselves. Thus professional development must consider and take cognisance of the following principles of adult learning described by Knowles (1990):

- 1. The need to know adults (tutors) need to know why they need to learn something before undertaking it;
- 2. The learners self-concept Adult (tutors) have a self-concept of being responsible for their own decisions, for their lives. Once they have arrived at that self-concept they develop a deep psychological need to be seen by others and treated by others as being capable of self-direction. They resent or resist situations in which they feel others are imposing their wills on them;

- 3. The role of an adult's experience The difference in the quality and quantity of individual adult (tutor) experience has several consequences for adult (tutor) education including: heterogeneous groups, experience as a resource, closed mind set in ways that can act as a barrier to new ideas;
- **4. Readiness to learn** Adults (tutors) become ready to learn those things they need to know and be able to do, in order to cope effectively with their real life situations;
- 5. Orientation to learning- Adults (tutors) are motivated to devote energy to learn something to the extent that they perceive that it will help them perform tasks or to deal with problems that they confront in their life situations. Adults (tutors) learn new knowledge, understandings, skills, values and attitudes most effectively when these are presented in the context of application to real life situations (i.e. in their classroom);
- **6. Motivation** While adults (tutors) are responsive to some external motivators (better jobs, promotions etc.) the most potent motivators are internal pressures (the desire for increased job satisfaction, self-esteem, quality of life, etc.).

Develop the understanding of programme design, development and assessment

The changing landscape of further education in Ireland requires that tutors need to develop a clear understanding of programme design, learning outcomes, and assessment to inform their work in the context of the national framework of qualifications.

Challenge their own beliefs, attitude and values

Every individual, without necessarily being aware of it, carries with them all kinds of preconceived opinions and attitudes, which they have picked up in their own life experience and of which they may be more or less aware. It is important that the professional development of numeracy tutors should encourage them to consciously question and examine these issues so that they have an appropriate level of self-understanding, which they can then bring to bear in how they interact with their learners.

Component 9

Incorporate a process for reflection and goal setting

Professional development of adult numeracy tutors is not a once off activity and must incorporate a process of continuous improvement and updating of skills and knowledge. To that end professional development should include opportunities for evaluation and goal setting to encourage tutors to reflect on and evaluate their current practice and to set further goals for their professional growth.

Component 10

Delivered in the way numeracy tutors should approach their own teaching

If adult numeracy tutors are to demonstrate teaching excellence in their own classroom it is essential that the professional development opportunities that tutors engage with should through its delivery demonstrate teaching excellence.



Conclusion

The improvement of the quality and quantity of adult numeracy teaching and learning is a key area of interest for NALA. In bringing this working group together it was our intention to work towards developing a framework of continuing professional development that meets the need of those teaching adult numeracy and mathematics in the FET sector in Ireland. This work also supports and contributes to achieving Objective 2 in FET Strategy 2014-2019:

Support FET staff through CPD to attain the necessary knowledge, skills and competencies to respond effectively to the literacy and numeracy needs of learners and provide intensive literacy and numeracy provision (SOLAS, 2014, pg:136)

It is hoped that the Framework outlined in this document can contribute to positive change in adult numeracy education. It could make a significant contribution to informing the type of CPD that needs to be put in place to meet both the needs of the adult numeracy tutors and any future legislative requirement. If adopted, it could contribute to positive change in adult numeracy education in Ireland. Its adoption could assist in the development of autonomous, confident tutors who are professionals in the field of adult numeracy.

Bibliography

Department of Education and Skills, 2010. The National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020, DES, Dublin.

Department of Education and Skills, 2013. Review of ALCES funded Literacy Provision, DES, Dublin.

Kaye, D., 2010. Defining numeracy, the story continues, ALM Conference, 2010.

Kelly, E., McGuinness, S., & O'Connell, P.J. 2012a. Literacy, Numeracy and Activation among the Unemployed, *Research Series Number 25*, Economic and Social Research Institute, Dublin.

Kelly, E., McGuinness, S., & O'Connell, P.J. 2012b. Literacy and Numeracy Difficulties in the Irish Workplace: Impact on Earnings and Training Expenditures, *Research Series Number 27*, Economic and Social Research Institute, Dublin.

Knowles, M.S., 1990. The adult learners: a neglected species, (4th edition), Houston, Gulf Publishing.

McGuinness, S., Bergin, A., Kelly, E., McCoy, S., Smyth, E., Whelan, A., Banks, J. 2014. Further Education and Training in Ireland: Past, Present and Future. *Research Series Number3*, Economic and Social Research Institute, Dublin.

Maguire, T., 2003. Engendering Numeracy in Adults, Mathematics Education with a Focus on Tutors: A Grounded Approach, (unpublished PH.D thesis), University of Limerick, Ireland.

Morgan, M., Hickey, B., & Kellaghan, T., 1997. Education 2000, International Adult Literacy Survey: Results for Ireland, Dublin, Dublin Educational Research Centre/Department of Education.

National Adult Literacy Agency, 2013. Doing the Maths: the training needs of numeracy tutors in Ireland, 2013 and beyond, NALA, Dublin.

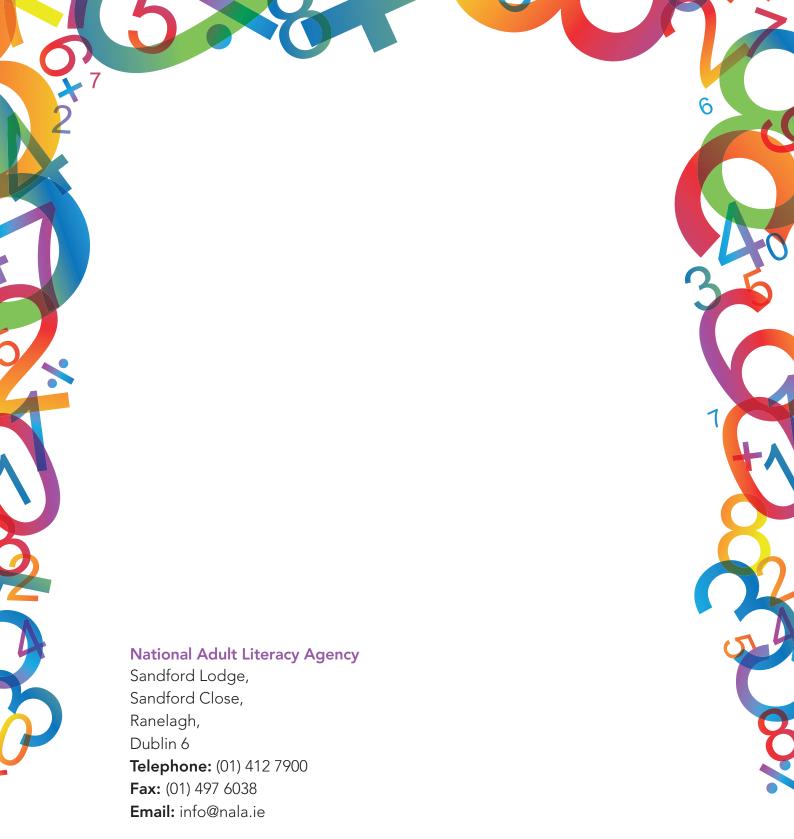
O'Donoghue, J., 2002. *Numeracy and Mathematics*, Irish Math. Soc. Bulletin 48 (2002), 47-55.

OECD, 2009. PIAAC Numeracy: A Conceptual Framework, 2009. OECD Working Papers, No.35, OECD Publishing, OECD.

OECD 2012. PIAAC 2012, Survey Results for Ireland from the OECD's Programme for the International Assessment of Adult Competencies, Central Statistics Office, Stationary Office, Dublin.

SOLAS, 2014. Further Education and Training Strategy 2014-2019, Department of Education and Skills, Dublin.

Vorhaus, J., Lister, J., Frearson, M., Johnston, S. 2011. Review of Research and Evaluation on Improving Adult Literacy and Numeracy Skills, *Review Paper Number 61*, Department for Business Innovation and Skills, London.



Freephone support line:

1800 20 20 65

NALA website: www.nala.ie

Literacy learning websites:

www.writeon.ie www.helpmykidlearn.ie

