



Estyn

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a Hyfforddiant yng Nghymru

Her Majesty's Inspectorate
for Education and Training in Wales

Numeracy for 14 to 19-year-olds

July 2011



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- ▲ learner referral units;
- ▲ independent schools;
- ▲ further education;
- ▲ adult community learning;
- ▲ youth support services;
- ▲ local authorities;
- ▲ teacher education and training;
- ▲ work-based learning;
- ▲ careers companies; and
- ▲ offender learning.

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Summary

GCSE results and international comparisons show that performance in numeracy is lower in Wales than that in the other home nations and below the average for OECD countries. Standards of numeracy as judged in school inspections are also lower than for communication in English and information and communication technology.

The number of learners in schools, colleges and work-based learning providers who gain application of number qualifications has increased substantially over the last five years. However, too many of these learners gain qualifications at too low a level relative to their ability. These learners do not improve their numeracy skills by taking qualifications at too low a level.

Only a minority of schools plan to develop numeracy systematically across the curriculum. Only a few schools track the progress of pupils in numeracy well enough, including the pupils who previously received support for numeracy in key stage 3. Around a half of the schools surveyed do not provide specific support for learners with poor numeracy skills in key stage 4. Although schools assess pupils' numeracy skills, they do not share this information well enough when their learners attend courses at college or other providers.

Further education colleges and work-based learning providers assess the level of learners' numeracy skills at the start of courses. They generally use this information well to identify whether learners need basic support. As a result, many learners have individual learning plans and benefit from a range of support strategies. However, providers often enter learners for key skills qualifications only at the level needed to complete their framework qualification aim and do not challenge learners to achieve beyond this level.

Main findings

Standards in numeracy

- 1 Since 2005, there has been a gradual increase in the percentage of learners achieving GCSE grades A* to C in mathematics in Wales to 55%. However, this figure is below that in England and Northern Ireland.
- 2 In the PISA 2009 survey, the mean score in mathematics for Wales was significantly lower than the mean scores for the other UK countries.
- 3 Since 2004, standards of numeracy judged in school inspections have improved only gradually in secondary schools. In key stage 4, standards in numeracy are lower than in communication in English and in information and communication technology.
- 4 Over the last five years, there has been a significant increase in the number of candidates achieving key skills qualifications¹ in application of number at all levels. More and more providers have introduced the numeracy qualification as part the Welsh Baccalaureate. However, too many learners continue to be enrolled for key skills awards at too low a level in relation to their ability.

Assessing and tracking learners' progress

- 5 Only a few secondary schools track the progress of pupils in numeracy well enough. Identification of learners with weak numeracy skills is initially undertaken in Year 7, and these learners usually receive support during key stage 3. But the main reason for assessing numeracy skills in key stage 4 is to allocate learners to mathematics sets. The progress of learners in numeracy is not usually tracked during key stage 4, including the progress of pupils who have previously received support in key stage 3.
- 6 Although schools assess pupils' numeracy skills, they do not share this information well enough with others when their learners attend courses at other education providers. For example, where groups of key stage 4 learners attend a college or other provider for part of a week, liaison between school and college numeracy staff is not good enough.
- 7 Further education colleges and work-based learning providers routinely assess learners' basic skills on entry to identify those learners who would benefit from in-class or additional support. They then use a variety of suitable strategies to monitor and track the progress of these learners. However, not all learners identified as having weaknesses in their numeracy skills take up the support on offer or continue to seek support once they have reached the basic level needed for achieving their qualification aim.

¹ In September 2010, the Welsh Assembly Government introduced Essential Skills Wales, which brought together the previous key skills of communication, application of number and information and communication technology (ICT), and the Adult skills qualifications in literacy, numeracy and ICT, to provide a single ladder of progression from entry level 1 to level 4.

Curriculum planning and support

- 8 Only a minority of secondary schools develop learners' numeracy skills effectively across the curriculum at key stage 4. In these schools, the mathematics department usually takes the lead and suitable opportunities to develop numeracy in other subjects are planned carefully. For example, the mathematics, science and geography departments may plan to reinforce graph-drawing at the same time and in an agreed way. Joint planning of numeracy activities between departments in this way strengthens learners' grasp of particular aspects of numeracy and they learn to transfer skills between subjects and contexts.
- 9 However, too many secondary schools do not develop learners' numeracy skills across the curriculum. They do not plan or co-ordinate opportunities for learners to practise and apply their numeracy skills in subjects other than mathematics. Where schools do not audit provision in order to identify further opportunities to use numeracy across the curriculum, learners do not get a chance to develop their numeracy skills in practical and relevant contexts. As a result, even when pupils have good numeracy skills, they often lack the confidence to use these skills in unfamiliar contexts or in subjects other than mathematics.
- 10 Support for learners in key stage 4 in schools usually takes the form of a separate class focusing on GCSE mathematics, rather than a specific intervention to improve numeracy. Only a small number of schools provide additional support in key stage 4 for learners whose numeracy skills are weak.
- 11 Many schools focus on the development of learners' numeracy skills as part of their response to the skills framework. Although teachers tell pupils that numeracy will feature in their lessons, often they pay little attention to improving numeracy skills in lessons other than in mathematics.
- 12 Colleges and other work-based learning providers generally provide a suitable variety of support strategies and resources to develop learners' numeracy skills, although opportunities to develop numeracy skills feature strongest on courses that require those skills occupationally. In some instances, there is a need to provide more Welsh-medium support and resources for learners whose previous education has been in Welsh-medium schools.

Staffing and professional development

- 13 Many local authorities have provided training on numeracy. Training on application of number qualifications is provided for school numeracy co-ordinators by WJEC. However, training has not done enough to make sure that learners are entered for qualifications at the appropriate level or that portfolios contain evidence from a range of subjects.
- 14 Many of the specialist support staff and learning support assistants who deliver or support basic skills in colleges are qualified for this work. In most colleges, many of the course tutors have also achieved basic/essential skills qualifications to support learners' numeracy needs.

Leadership and management

- 15 Most colleges and work-based learning providers give a high priority to the development of learners' basic skills in key corporate documents. Senior managers generally use a variety of strategies to evaluate basic skills provision and outcomes. However, providers often enter learners for key skills qualifications only at the level needed to complete their framework qualification aim and do not challenge learners to achieve beyond this level.
- 16 In a few schools where the teaching of numeracy across the curriculum is well developed, senior managers provide strong leadership and actively drive initiatives. These leaders seek funding for additional resources and training. In these schools, a mathematics teacher usually co-ordinates numeracy provision. These co-ordinators have good subject knowledge and inspire, support and lead colleagues. Continued impetus to develop numeracy across the curriculum is often provided by a numeracy group with representatives from all subject areas.
- 17 In a few schools, standards of pupils' numeracy skills are evaluated across all subject areas. Senior managers track the impact of initiatives by directly observing standards during learner trails as well as analysing outcomes of internal and external assessments. However, senior managers in schools generally do not monitor or evaluate sufficiently the impact of strategies to improve learners' numeracy skills.

Recommendations

Schools, colleges and work-based learning providers should:

- R1 ensure that numeracy is planned and delivered in relevant and practical contexts across the curriculum;
- R2 assess and track the progress of learners' numeracy skills across the curriculum;
- R3 ensure that suitable interventions are in place at key stage 4 to support learners with poor numeracy skills;
- R4 on shared courses, ensure that learners' prior numeracy skills are identified and the information transferred to the receiving provider;
- R5 train staff to understand how to develop learners' numeracy skills;
- R6 monitor and evaluate the impact of strategies to improve learners' numeracy;
- R7 provide support and resources in Welsh for Welsh-language learners; and
- R8 enter learners at an appropriately challenging level for essential skills qualifications and include evidence from subjects other than mathematics in portfolios of work.

Context

Introduction

- 18 This report is published in response to a request in the annual Ministerial remit to Estyn from the Welsh Assembly Government for 2010-2011. It provides an overview of standards and the quality of provision for numeracy in key stage 4 and post-16 in schools, further education institutions and work-based learning providers. However, its main focus is on how providers try to raise the standards of learners with weak numeracy skills during compulsory education.
- 19 The report builds on the Estyn survey report 'Improving numeracy in key stage 2 and key stage 3' published in April 2010.
- 20 The report is intended mainly for staff involved in teaching numeracy, for provider leaders and managers, and for local authority advisers. The appendix to the report contains case studies of good practice.

Background

- 21 Numeracy is not the same as mathematics. Numeracy is a proficiency with number that is acquired through being taught mathematics well. Although learners usually learn their numeracy skills during mathematics lessons, to be fully numerate they must be able to apply these skills in other subject areas and real-life contexts.
- 22 The revised National Curriculum, Learning Pathways 14-19 and the Welsh Baccalaureate Qualification require greater attention to skills, including numeracy skills. Developing numeracy is one of the priorities set out in the Welsh Assembly Government's School's Effectiveness Framework.
- 23 'Words Talk – Numbers Count', the Welsh Assembly Government's strategy to improve literacy and numeracy in Wales, was published in 2005 and set out the general approach for the following five years. It includes among its main aims that:
- fewer young people should leave compulsory education still struggling with basic skills; and
 - the number of adults with poor basic skills should be diminished significantly.
- 24 Basic skills are defined as the ability to read, write and speak English or Welsh and to use mathematics at a level necessary to function and progress both in work and in society. In terms of qualifications, basic skills are defined as level 1 in the Credit and Qualifications Framework for Wales (for all learners aged 14 and above). In 2001, the proportion of people with no qualification who were in employment was 50%; by 2009 this proportion had reduced to 42%. For people with higher qualifications, the proportion in employment was 87% in 2001 and 86% in 2009.
- 25 The focus of the Welsh Government's strategy is to improve literacy and numeracy levels up to and including level 1. In 2004, a survey for Basic Skills Cymru found that

53% of the population of 16 to 64-year-olds had numeracy skills at, or below, entry three, a level equivalent to the National Curriculum numeracy skills at age 11. This compares to 25% with literacy skills at entry three or below.

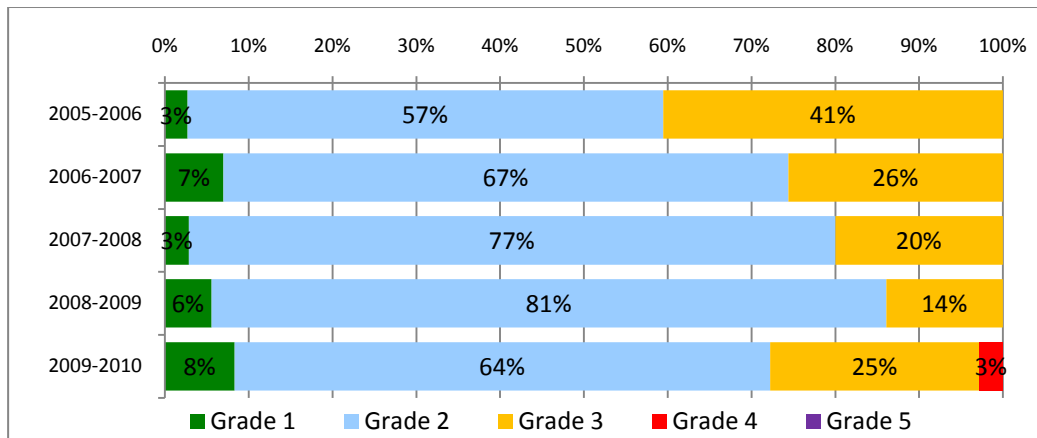
- 26 In September 2010, the Welsh Assembly Government introduced Essential Skills Wales, which brought together the previous key skills of communication, application of number and information and communication technology (ICT), and the Adult skills qualifications in literacy, numeracy and ICT, to provide a single ladder of progression from entry level 1 to level 4.
- 27 In 2008, the Welsh Assembly Government published the Skills Framework for 3 to 19-year-olds in Wales. The framework provides guidance on how to develop continuity and progression across the curriculum and between key stages in the skills of thinking, communication, information and communication technology and number. The section about developing number aims to help teachers improve learners' numeracy skills across all subject areas.

Standards in numeracy

Standards of numeracy in school inspections

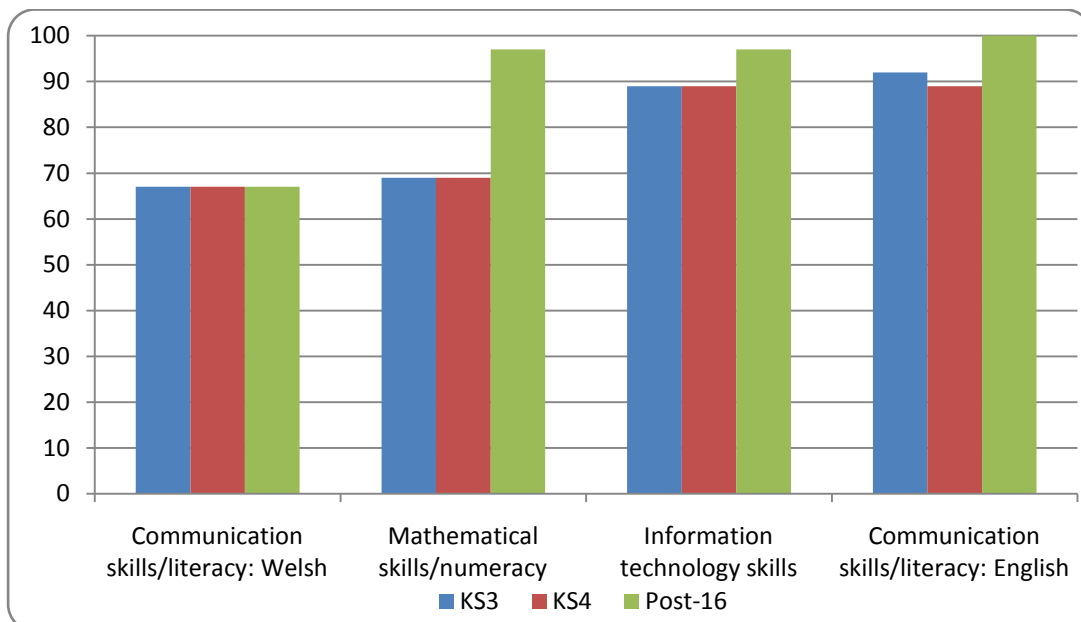
- 28 During Section 28 inspections of secondary schools, inspectors evaluate standards in numeracy. Since 2005, standards of numeracy have improved gradually in secondary schools although there was a drop in standards in 2009-2010.

Figure 1: Percentages of grades awarded in inspections for standards in numeracy between 2005 and 2010



- 29 In 2009-2010, standards were judged good or better in key stage 4 in 69% of secondary schools. This is the same as in key stage 3 and a drop of 19 percentage points from 2008-2009. Standards of numeracy were highest for sixth form students, where they are good or better in nearly all schools.

Figure 2: Percentages of good or better standards in key skills as identified in secondary school inspections between 2009 and 2010



- 30 In key stage 3 and key stage 4, the percentage of secondary schools where standards are good or better is about 20 percentage points lower for numeracy than for information and communication technology or for communication in English. They are similar to those for communication in Welsh. In the sixth form, standards are very high in all skills except communication in Welsh.
- 31 Many schools offer intervention programmes to support those learners in key stage 3 who need to improve their numeracy skills. Only a very few schools offer this support in key stage 4 although standards of numeracy are not higher than in key stage 3.
- 32 Good standards of numeracy are not enough to raise standards in mathematics in key stage 4. This is because there is less emphasis on number in the higher-level GCSE mathematics syllabus at key stage 4 than in the key stage 3 curriculum. At the higher levels there is a greater emphasis on solving problems and on algebraic, geometric and statistical methods. However, having good standards of numeracy does help candidates aiming for the lower mathematics grades at GCSE to achieve better than they would do otherwise. Having good numeracy levels also contributes to a deeper understanding of concepts in other subjects for all learners and equips them for many aspects of life and work.
- 33 Although learners usually learn their numeracy skills during mathematics lessons, to be fully numerate they must be able to apply these skills in other subject areas and real-life contexts.

Standards in mathematics at key stage 4

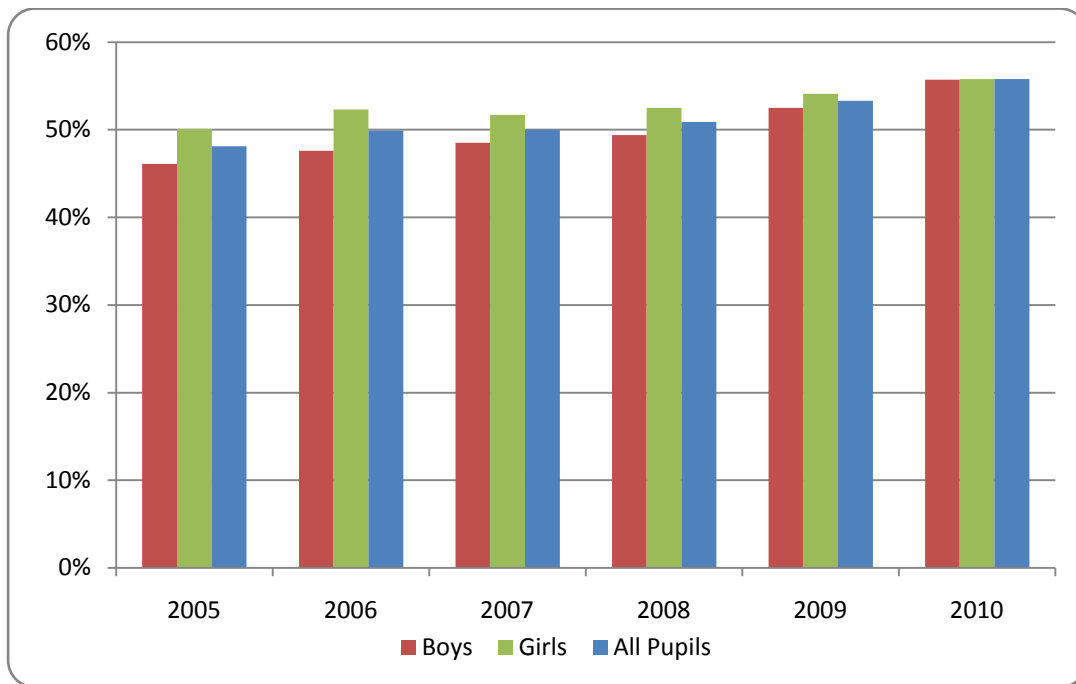
- 34 All learners study mathematics in key stage 4 as a statutory requirement. Nearly all sit an external examination in mathematics, which is usually GCSE. Performance in mathematics GCSE gives us an indication of the standards of learners' numeracy skills at this key stage.
- 35 Since 2005, there has been a gradual increase in the percentage of learners achieving GCSE grades A* to C in mathematics in Wales. Even so, this compares unfavourably with England, and is substantially lower than in Northern Ireland as is shown in table 1 below:

Figure 3: GCSE results – percentage of grades A*-C in GCSE mathematics for Wales, England and Northern Ireland

	2006	2007	2008	2009	2010
Wales	50%	50%	51%	53%	55%
England	53%	56%	55%	57%	59%
Northern Ireland	79%	84%	88%	79%	76%

- 36 Since 2005, there has been a gradual increase in the percentage of learners achieving GCSE grades A* to C in mathematics. The proportion of boys achieving these grades is consistently lower than that of girls, although the gap is narrowing and in 2010 their attainment was the same.

Figure 4: Percentage of pupils achieving GCSE grades A*-C in mathematics between 2005 and 2010



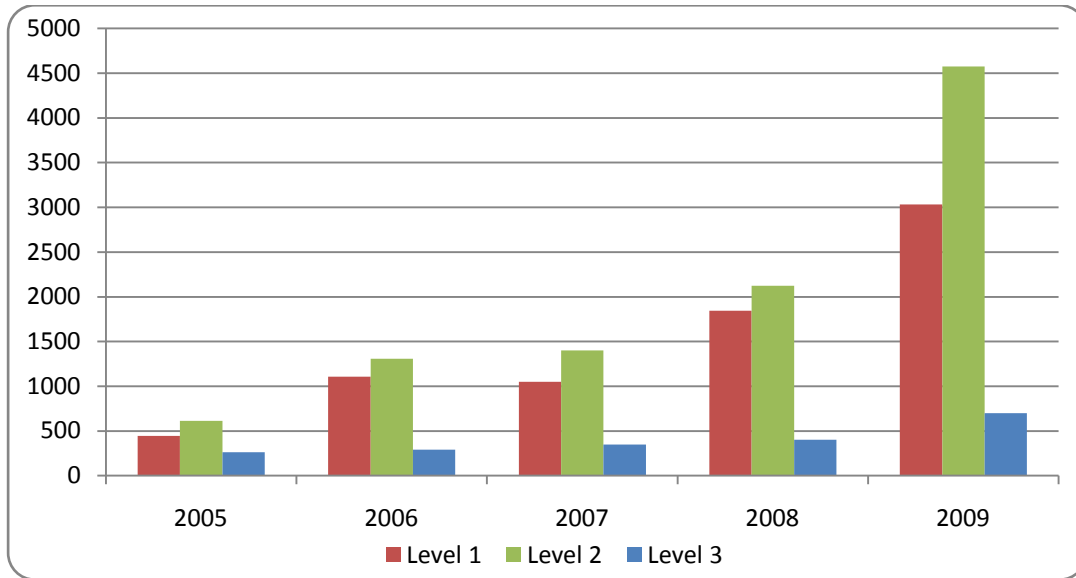
- 37 The Programme for International Student Assessment (PISA) is a survey of the educational achievement of 15-year-olds in reading, mathematics and science in a number of economically-developed countries organised by the Organisation for Economic Co-operation and Development (OECD) and takes place every three years. In 2009, the main subject of the survey was reading. There was a minor focus on mathematics and science and these assessments were undertaken by fewer candidates and had fewer questions than the assessment of reading. The test evaluated pupils' abilities to use their mathematical skills and knowledge to solve problems creatively. The questions ranged in difficulty from simple mathematical procedures to those where pupils had to create their own structure to answer them successfully. The aim of the survey was to assess learners' ability to use their mathematical knowledge in different situations in adult life.
- 38 A total of 65 countries took part in the survey in 2009. The mean score for Wales in mathematics was significantly below the OECD average. In 35 countries, and in the other three parts of the United Kingdom, mean scores for mathematics were significantly higher than those for Wales. In all four United Kingdom countries, boys scored significantly higher than girls, and the gap for each home country was wider than the OECD average.

Application of number qualifications

- 39 At the time of writing, learners were taking key skills qualifications and have yet to take Essential Skills Wales qualifications. Every year from 2005 to 2009 there have been significant increases in the number of candidates achieving level 1, level 2 or level 3 in application of number. Assessment since 2005 has been by an internally-assessed portfolio of evidence whereas previously it included an externally marked test. The immediate result of this change led to a percentage increase of

over 150% in the total number of successful candidates in 2006. The percentage increase year-on-year then ranges from 35% between 2006 and 2007 to 90% between 2008 and 2009. Even so, too few learners are given opportunities in schools to gain level 3 qualifications in application of number. The revised assessment arrangements introduced in 2005 and the growth in the Welsh Baccalaureate have been successful in increasing the number of candidates gaining qualifications in application of number.

Figure 5: Number of learners achieving level 1, 2 or 3 in application of number



- 40 Until 2009-2010, most of these candidates were in further education or work-based learning providers. During 2008-2009, there were around 90 centres offering these qualifications. From September 2009, the number of accredited centres increased to 167, and many schools entered complete year groups of their key stage 4 and post-16 learners for the first time. Since September 2010, the number of schools, further education colleges and work-based learning providers accredited as centres has reached 212, and there is likely to be a further increase in the number of candidates entered for an application of number qualification in 2010-2011.

Figure 6: Success rate of learners in application of number 2010

	Entry	Pass	Success rate
Level 1	6,326	6,145	97.1%
Level 2	10,653	10,275	96.5%
Level 3	1,560	1,437	92.1%

- 41 Overall, too many learners were enrolled for key skills awards at too low a level and they did not achieve as well as they could have done at a more challenging level. Neither schools nor colleges consider learners' prior achievement enough when deciding on the relevant tier of entry.

Numeracy standards and outcomes in further education and work-based learning

- 42 The proportion of students gaining application of number qualifications in further education colleges has improved over time, as shown in the table below, although a quarter of learners still did not get the numeracy qualification they aimed for in 2008-2009.

Figure 7: Key skills in further education colleges

	2006-2007				2007-2008				2008-2009			
	Number of enrolments	% completion	% attainment	% success	Number of enrolments	% completion	% attainment	% success	Number of enrolments	% completion	% attainment	% success
All courses												
Application of number												
L1	7,395	84%	72%	60%	7,528	85%	78%	66%	6,076	86%	87%	75%
L2	8,075	84%	67%	56%	9,235	88%	67%	59%	8,308	89%	84%	75%
L3	1,301	91%	40%	37%	1,518	91%	41%	38%	1,382	92%	63%	58%
Total	16,771	85%	67%	57%	18,281	87%	69%	60%	15,766	88%	83%	74%

Source:
LLWR

- 43 Standards in numeracy were good or better in only about a half of work-based learning providers inspected from 2005 to 2010, but there has been a steady improvement in overall framework success rates over this period. In 2006-2007, the overall framework completion rate was 65%, and it increased to 66% in 2007-2008, 75% in 2008-2009 and 80% in 2009-2010. Unverified data suggests that the 80% rate is at least being maintained this year. Much of this improvement is due to improved attainment in the required key skills qualifications.
- 44 However, work-based learning providers often enter learners at the minimum level required for the qualification framework or at the same level as the rest of their group (usually level 1). Not enough account is taken of the capacity of the individual, and learners are not challenged to reach higher levels of attainment.
- 45 Further education colleges and work-based learning providers routinely assess learners' basic skills on entry. Data collected by Colegau Cymru on the results of basic skills initial screening assessments of all learners in the first year cohort in all further education colleges in Wales, as at November 2010, shows that almost a half of these learners had numeracy skills that were below level 1, which compares with about 43% in literacy.

Assessing and tracking learners' progress

Schools

- 46 Secondary schools use a wide variety of baseline assessments and internally-produced tests to identify their learners' needs, and use these to track their progress. Schools are increasingly using commercial software packages to provide an initial assessment of key stage 4 and post-16 learners' numeracy skills. The incidence of this practice varies across schools and, where it occurs, it is often as a preliminary to the preparation of application of number learner portfolios.

Transition

- 47 Where groups of key stage 4 learners attend a nearby further education college for part of the week, the quality of liaison between school and college numeracy staff varies too much. A few schools send details of learners' mathematics attainment to the college. In other cases, if the college identifies that a learner's numeracy skills are too low for a particular course, the mathematics department is informed in order to address the weakness in mathematics lessons. However, practices such as these are not as widespread as they should be.
- 48 Effective partnerships are developing between some colleges and their partner schools. In one example, key stage 4 learners on link courses undergo an induction in the June before they start in September during which they meet their tutors and undertake a basic skills screening. College staff are allocated to the partner schools and collect transition data on all of the learners in order to place them on a suitable level of course. In another example, partner schools provide the college vocational tutors with learner skills profiles for all of the key stage 4 learners on link courses. As the programme progresses, essential skills tutors in the college meet essential skills tutors in the schools to map the numeracy provision in the main programme of study. There is regular dialogue to share information and to inform teacher and learning.
- 49 Several colleges pass interim and end-of-term reports on key stage 4 learners' achievements to the school. In other instances, however, there is very little information exchange between school and college. Some schools are reluctant to pass on any data about their learners, because they believe that this might go against the Data Protection Act. The improved links between schools and colleges are not used effectively to share information on learners between institutions. More and more schools now enter their learners for application of number qualifications at different levels, but do not pass this information on when the learners transfer to college provision. All colleges require learners to fill in a questionnaire on enrolment, stating their key skills level. Colleges then direct learners to appropriate support where required.
- 50 Schools do not usually pass on statements of special educational need to colleges unless the parent or learner specifically requests it. Even then, it is often difficult for colleges to obtain this information.

Further education

- 51 Colleges use a variety of initial assessments with all their first-year learners, to identify those learners who would benefit from in-class numeracy support or initial intervention support. In some instances, initial assessments are carried out at the interview stage before the offer of a course place is made. Not all initial assessments are available bilingually. A number of schools, further education colleges and training providers piloted a new bilingual assessment tool last year but users state that it had a number of weaknesses, including limited reports, difficulty of use, errors in the Welsh-medium version, and no diagnostic or support materials. Users reported a significant difference in results between this new initial assessment tool and other assessment software. This resulted in a very few learners not having their numeracy needs identified correctly.
- 52 Generally the support that learners get in colleges is good. Diagnostic assessments pinpoint learners' individual needs, and individual learning programmes are planned. In colleges, student services, the learning support department or the head of each faculty or learning area identify the levels of key skills support needed by individuals. This information is either passed on to course tutors, or learners are directed to the learning support unit for extra tuition.

Work-based learning

- 53 About half of the colleges that provide for work-based learners assess these learners off-site initially with a paper-based test, and half with a computer-based test. Most colleges then enter the results onto the college IT network, as for full-time learners. The initial assessment and diagnostic follow-up are then discussed between the learner, the assessor and the employer, and a learning plan agreed, which often includes targets for the development of literacy and numeracy skills. These targets are generally at the level of key skills needed to complete the framework or at a general level for all learners, but do not challenge learners to achieve beyond this level.

Curriculum planning and support

Schools

- 54 By and large, secondary schools consider that early intervention is the most effective strategy and they put most of their resources into Year 7. If this additional support is successful in key stage 3, then most schools feel that it is not necessary to do any more in key stage 4. Instead they address any issues in numeracy through their normal mathematics lessons or through separate additional needs classes. However, schools do not track well enough the progress of learners who have been supported in key stage 3 to know whether they continue to need an intervention.
- 55 School learners who attend courses at a local college usually have additional tutor support for numeracy in their college tutorial and practical sessions. These learners on courses that are at entry level or level 1 usually receive numeracy support as part of their course. This suggests there are a number of key stage 4 learners who continue to need numeracy support. There is not enough communication between the mathematics departments in schools and the college and learners do not always receive the support they need in school.
- 56 Only a few schools provide additional in-school opportunities for key stage 4 learners whose numeracy skills are weak, usually involving extraction from registration/tutorial periods or the provision of specific lessons. This support often involves the use of particular software that can diagnose weaknesses and provide on-line activities and additional resources to address those weaknesses. Learners who have additional support often say that their numeracy skills have improved overall and that their self-confidence has increased. In most schools, the mathematics department provides lunchtime sessions to which learners who need additional support are directed. However, these sessions concentrate on helping learners to gain a GCSE in mathematics rather than on improving their numeracy skills.
- 57 Many schools have increased their focus on improving learners' key skills in response to the non-statutory skills framework. In these schools, all staff have had training either by the mathematics department or the local authority on numeracy and using the skills framework. In many such cases, members of the mathematics department have been linked with other subject departments to provide advice and guidance on how numeracy can be developed within the other subjects and to ensure that the numeracy skills are used correctly. In the best instances, all departments have identified opportunities to use and develop numeracy skills in their schemes of work. In these schools, numeracy is a clear focus in all curriculum planning. Even so, although most schools identify opportunities to cover numeracy in lessons or units of work, they do not pay enough attention to developing and improving learners' skills.
- 58 Around a half of the schools surveyed provide support and a variety of intervention strategies for a wide range of learners in key stage 4. Almost without exception, mathematics departments in these schools have a close involvement in the development of whole school practice, providing effective training and relevant guidance for other departments. On the other hand, where there is no audit of

provision to identify further opportunities to use numeracy across the curriculum, learners do not get a chance to develop their numeracy skills in practical and relevant subject contexts. A few schools have yet to take account of the skills framework.

- 59 More and more schools are entering learners for the qualifications in application of number, usually with a high level of success. The way these are being introduced varies from school to school. In key stages 3 and 4, learners with additional learning needs usually aim for entry level whereas, in general, learners take level 1 in Year 8 or Year 9, and level 2 in Year 9 or Year 10. A small number of schools successfully enter more able Year 11 learners for level 3.
- 60 A few schools enter post-16 learners (especially but not only those studying mathematics A level) for level 3. However, generally, too few learners are entered for level 3. Schools often enter learners for level 2 even though many of them have already gained a level 2 pass in mathematics at the end of key stage 4. This is frequently the case even when these learners are also studying AS or A level mathematics at level 3. As a result, the work is not challenging enough and learners are bored.
- 61 There is not enough progression in the sixth form for learners who have already taken application of number qualifications in key stage 4. Learners who have already gained a level 2 qualification often do not go on to level 3 but take qualifications in other skills instead.
- 62 Usually, the application of number programme of work is undertaken entirely within the mathematics department, when all learners in a class undertake similar projects though working independently. An alternative approach is where it is delivered as part of a 'skills week' or special projects. Overall, few learners include evidence from subjects other than mathematics in their portfolios.
- 63 On the whole, learners have a good attitude towards their application of number project work when they are entered at an appropriate level. They like working on them individually and undertaking their own research when given the opportunity. Learners of all abilities enjoy this approach to developing their numeracy skills, and many teachers and learners report an increase in learners' motivation as a result. They appreciate that they are able to gain a useful additional qualification or contribution to their Welsh Baccalaureate Qualification. Gaining an Essential Skills Wales qualification during Year 10 often improves many learners' motivation to gain further qualifications in Year 11.
- 64 A few schools make careful provision to encourage and motivate disengaged or disaffected learners. In most schools this provision includes support to help learners improve their numeracy skills. For example, one school has a long history of providing its own support programme for disengaged learners in key stage 4. Although the learners have a curriculum that is specific to their needs, all receive literacy and numeracy support through the English and mathematics departments. Nearly all of these learners get an application of number qualification at level 1. Another school creates a small set in key stage 4 staffed by specialist teachers and learning support assistants who have been trained specifically by the mathematics department and the local authority to support learners with additional needs. The

curriculum for this group has a clear focus on numeracy and all of the learners are entered for entry level or level 1 application of number as appropriate in Year 10. Learning coaches work on specific numeracy needs on a rolling programme, whereby learners are extracted from different lessons each week.

Colleges

- 65 Colleges are generally able to provide a variety of support strategies to develop learners' numeracy skills, ranging from one-to-one tutorials, independent study with teacher-directed workbooks, drop-in sessions and specific basic skills sessions, to additional numeracy tutors or team teaching in main course sessions. They also provide a good range of resources to support numeracy, from on-line materials to in-house developed resources. In some instances there is a need for more support and resources in Welsh for learners who have attended Welsh medium schools.
- 66 Learners who have additional support often report a number of benefits, including increased confidence, and the ability to transfer their numeracy skills to their course. Many are able to take a good range of appropriate qualifications, from 'bite-sized' to more long term provision, to reflect their additional learning and to give them motivation and purpose. Although colleges support learners with weaknesses in their numeracy skills, they do not do enough to make sure those who have reasonable skills apply them effectively in their courses.
- 67 Analysis undertaken by individual colleges also shows improved retention, completion, attendance and success rates among learners who are disaffected and others who take up additional support. However, there is no national data to illustrate this point. In one college, learning mentors are used to engage with learners who are reluctant to make use of the offer of support or who are at risk of dropping out of courses. They support the learners in a whole range of personal issues, as well as in their basic skills. However, not all learners identified as having weaknesses in their numeracy skills take up the support on offer. In the majority of colleges, about three-quarters of learners identified take up support, although not all of these learners continue to seek support once they have reached the basic level needed for their qualification aim. Colleges do not encourage learners proactively to continue improving their numeracy to a more challenging level.
- 68 Colleges use a good variety of strategies to monitor and track the progress of the learners, including college intranet records of assessments, personal tutorials, discussion and review of individual learning plans, and teachers' own records. For example, in a minority of colleges each learner has a profile on the college intranet that is updated every time a learner completes an assessment. The system allows all teachers access to the records of any learner. Class reports can be produced to inform session planning, and teachers can allocate an on-line learning programme to individual learners through the system, the results of which are then recorded. The teacher can then discuss the results with the learner, and update the system with teacher and learner comments.
- 69 College learners on work-based learning programmes usually have some specialist support at the work place and have full access to other support services provided by the college.

- 70 Many of the learners on work-based placements have been referred by Careers Wales, and have multiple barriers to effective learning and employment. They are clearly motivated by the relevance and practical nature of the programme, as well as targeted individual support that can link with outside agencies as necessary. In one provider, nearly all of the teaching is done in groups of eight to 12 learners. Depending on the need, good use is made of learning support assistants. The focus is always on essential skills. There is a strong emphasis also on attitude, attendance and good timekeeping. Learners all have their individual and achievable targets. There is no attempt to disguise that the purpose of the work is to improve their basic skills, but they are developed in a real-life and vocationally related context – in this case sport.

Staffing and professional development

- 71 Many schools have organised specific training on numeracy and the skills framework for all staff. This is provided by the mathematics department, the school numeracy co-ordinator, the local authority, or by external consultants. Training needs are identified in a variety of ways, such as through departmental meetings, follow-up from lesson observations or performance management meetings, or by a working group of teachers focusing on teaching and learning. Many local authorities have also provided training on numeracy for learning support assistants, and for sixth form learners who act as 'buddies' for younger learners in need of support in numeracy.
- 72 Training specifically on the application of number qualifications is provided for school numeracy co-ordinators by WJEC. This training is usually then disseminated within the school and is generally helping to improve the provision in the school. However, training does not focus enough on enabling learners to enter level 3 where appropriate. It also does not ensure that portfolios of work contain evidence from a range of subjects.
- 73 Despite this activity, schools undertake little or no evaluation of the training in order to determine its impact and identify further training needs.
- 74 Many of the specialist support staff and learning support assistants who deliver or support the delivery of basic skills in the further education colleges have achieved basic skills teaching or support qualifications at appropriate levels. Additionally, in some colleges, many of the subject/learning area course tutors and teachers also have these qualifications so that all teachers can support learners' numeracy needs. Staff training needs are identified through performance management and review procedures, which may include lesson observation by senior staff, peer observation, informal interviews, and self-reflection, when individual targets are agreed and appropriate training in basic skills delivery identified.

Leadership and management

- 75 In a minority of schools, the mathematics department has a strong input in supporting departments in developing numeracy across the curriculum and across different age ranges. In these schools, the use of numeracy skills across the curriculum is monitored effectively, including the use of lesson observations undertaken by senior managers. On the other hand, a few schools have taken little or no account of the need to develop all learners' numeracy skills in key stage 4, other than for those learners who need specific intervention.
- 76 In several schools, managers work closely with the mathematics department, the head of inclusion or the additional learning needs co-ordinator to ensure that appropriate progress is being made by all learners, including those having specific intervention to address their weak numeracy skills. In the majority of schools, the senior leadership team has initiated the work on Essential Skills Wales qualifications and includes it in whole-school planning and resource allocation. This is most effective when the Welsh Baccalaureate co-ordinator and the mathematics department work well together to deliver application of number as part of this strategy.
- 77 As well as providing training, the majority of local authorities provide useful opportunities for school numeracy co-ordinators to meet and to share good practice, and provide schools with appropriate intervention resources.
- 78 Overall, however, senior managers in schools do not monitor or evaluate sufficiently the impact of the various strategies to support the development of learners' numeracy skills or do enough to ensure that there are systems in place to track the progress that learners make.
- 79 The development of all learners' basic skills has an appropriately high priority in nearly all colleges, with a clear focus in strategic, operational, quality and self-evaluation documents. In the best instances, careful planning ensures that numeracy is established and set in an appropriate context in all college courses. Many colleges continue to run stand-alone numeracy classes and the extent to which learning is contextualised can vary from department to department within a college, with more emphasis focused on the courses that require numeracy in order to achieve occupational competence. For example, numeracy is often contextualised within engineering courses, but not in hairdressing.
- 80 Senior managers in colleges use a variety of strategies to evaluate the basic skills provision and outcomes. Specific and measurable targets are used effectively, and results reported to the governing body. For example, one college monitors success rates at all levels, and data on this is presented to the college quality and evaluation committee and reported to governors through the college standards committee.
- 81 Some colleges also gather the views of their learners through focus groups or questionnaires as an intrinsic part of the evaluation process. Because some colleges do not evaluate their outcomes thoroughly enough, their forward planning cannot take enough account of any analysis of data.

- 82 A minority of work-based learning providers evaluate the impact of numeracy support well. They track and monitor numeracy learning targets on individual learning plans as well as monitoring retention, attainment and successful completion rates.

Appendix 1: Evidence base

The findings and recommendations in this report draw on:

- inspection reports on secondary schools, further education colleges and work-based learning providers from the 2004-2010 inspection cycle;
- GCSE results at the end of key stage 4, and key skills application of number results in schools and post-16 settings; and
- interviews with 54 staff and 100 learners in schools, colleges and work-based learning providers.

Appendix 2: Case studies of good practice in developing learners' numeracy skills

Context

Barry Comprehensive School is an 11 to 18 boys' school of about 1,400 learners in the Vale of Glamorgan.

Strategy

All staff received training on including numeracy in subjects across the curriculum. The school wanted to make sure that this was implemented throughout the school.

Action

The teaching and learning group redesigned the guidance and proforma used for lesson observations with a specific area to comment on the development of skills during the lesson. All staff now evaluate the use of numeracy in lessons, when relevant.

Outcomes

The evaluation of numeracy initiatives has improved and staff know which initiatives have the most impact. Pupils have more opportunities to practise and improve their numeracy skills in subjects across the curriculum.

Context

Ysgyl Gyfun Gymraeg Bro Myrddin is an 11-18 Welsh medium school in Carmarthen with 960 learners.

Strategy

The school planned to ensure coverage of the 'developing number' section of the skills framework and then put quality assurance procedures in place to monitor its delivery.

Action

The mathematics department led a school numeracy training day, during which staff audited their departmental provision and made plans to cover missing sections. Members of the senior management team then followed specific pupils for a day to evaluate the provision for and standards in numeracy across the curriculum. They focused on how effectively pupils could transfer the skills learnt in mathematics lessons to different situations and whether the pupils were challenged enough by the learning activities. This gave the school a clear picture of how well numeracy was embedded in different subjects. A report of the findings from the learner-trail was produced and distributed to various departments, who were required to draw up relevant action plans as a result.

Outcomes: The school's effective quality assurance procedures mean that numeracy is well embedded in the curriculum across all subject areas. Standards in the numeracy-based sections of mathematics GCSE examinations have shown improvement as a result.

Context

Rhosnesi High School is an English medium, 11 to 16 years, comprehensive school in Wrexham. There are 231 learners in Year 10, of whom 35 are receiving additional support for numeracy.

Strategy

The school offers all pupils in key stage 4 the opportunity to gain qualifications in application of number. In order to challenge their most able pupils, the school offers them the opportunity to gain a qualification at level 3.

Action

Approximately 95% of learners in Year 10 take the level 2 qualification in application of number. Learners undertake an estimation activity where they guess when thirty seconds have elapsed. They perform a range of analyses on their data asking questions of their own devising for example, "Does the time of day affect people's ability?" or "Are girls better than boys at this task?" Time is designated for this task

during the first half of the spring term and learners carry out the task independently. The school's more able and talented learners follow the application of number course at level 3 in Year 11. This group of learners has a section of the classroom allocated to them where they work independently to carry out tasks using data from school sports day events. The teacher acts as a facilitator when necessary.

Outcomes

By the end of Year 10, nearly all learners gained a level 2 application of number qualification. By the end of Year 11, the first group entered for level 3 application of number were all successful. Learners involved in this work said that it was valuable because it gave them a qualification and helped them to become independent learners. The learners working at level 3 considered the work challenging, but very beneficial. One of the modules from the Welsh Baccalaureate Qualification was completed early, with the result that workload in college would be lightened.

Context

Coleg Llandrillo Cymru is a further education college in North Wales.

Strategy

The college offers a tailored response to the needs of individual learners. A young learner applied for a place on a construction course but did not have the required entry qualifications. The college offered the learner a place on a support course to gain the relevant qualifications. Since attaining the qualifications, the learner has been able to progress to the course of his choice.

Action

Initial assessment identified the learner's numeracy skills at entry level 1. His first language is Welsh, and he has a hearing impairment. He lip-reads in Welsh and can understand, but does not use, sign language. He did not want to take up support out of class and did not want to be treated differently from the other learners.

The college provided a supporter who could speak Welsh, sign and support numeracy needs. This allowed the learner to access all parts of the support course. The supporter worked closely with the course tutors and the learner's personal tutor to plan learning. By the end of the year, the learner had gained the entry level 3 qualification.

Outcomes

Adam has overcome significant barriers to learning and has progressed to a construction course where he continues to receive support for his numeracy skills development. He is on target to attain level 1 application of number by the end of December and support is planned for him to attain level 2 by the end of the academic year in July.

Context

Wrexham I-Tec is a work-based learning provider based in North Wales.

Strategy

A young learner had been on work experience with the local authority and hoped to be accepted onto the authority's Modern Apprenticeship programme. However, at that time she did not meet the strict entry requirements of a GCSE grade C or above in both English (in which she had a grade C) and mathematics (in which she had only a grade E).

Action

The learner started on the Skillbuild programme in November 2009, when she was assessed at entry level 3 for numeracy.

Outcomes

The learner has now completed the level 2 qualification in application of number, and has been successful in securing a Modern Apprenticeship within a section of the local authority's economic development department. The learner now has aspirations to go on to gain a degree, which is something that, when she left school, she never thought would be possible.

Context

Coleg Powys is a further education college in mid-Wales.

Strategy

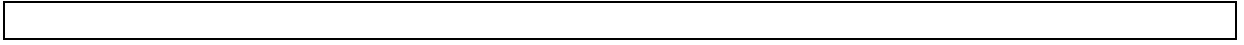
Coleg Powys offers good support through one-to-one advice and workshops to up-skill tutors and work-based learning assessors to help them to support learners with their numeracy needs.

Action

The college encouraged all staff to take an initial and diagnostic assessment in numeracy. This has helped staff to identify areas for self-improvement. Learning support specialists offer drop-in workshop sessions for staff to improve their numeracy skills. Tutors and assessors learn effective ways to support their learners' numeracy needs.

Outcomes

One teacher feels that this has had a positive impact on learner progress. "By attending the drop-in sessions I became more confident in ways to embed numeracy into vocational areas and in the delivery of essential skills Wales application of number."



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