

**Comments from the Scottish Mathematical Council (SMC)
on the Scottish Survey of Literacy and Numeracy (SSLN) 2011.**

The SMC welcomes the care and attention to detail in the design, implementation and publication of this important survey. The results of the survey have led to a number of comments and questions which are listed below.

1. P4 is the end of first level (for most pupils), P7 is the end of second level (for most pupils) and S2 is the middle of third level for many pupils (although some will have covered both third and fourth level by the end of S3). Bearing in mind that 'the assessments are designed to cover the full range of the curriculum at a given level' (see section 1.3), is there a case for conducting the SSLN with S3 pupils rather than S2 pupils?
2. It is well-known that mathematics is a very cumulative subject, with further work usually depending significantly on earlier work, to an extent that may be greater than in some other subjects. As pupils progress in mathematics, there may be a tendency for the gaps between their abilities to widen. It is therefore encouraging that the level of performance in P4 has been generally maintained up to P7. On the other hand, although disappointing, it is not completely surprising that there is more of a divergence in performance amongst pupils at S2. If only half of the pupils in P7 are scoring more than 63% then, by the time they start secondary school, the other half of the pupils are missing almost two fifths of the foundations supporting their further mathematical development. It is not surprising that they have difficulties when they move to more complicated fraction, decimal and percentage work.
3. Large class sizes make it difficult for teachers to focus on the needs of individual pupils and to use new teaching methods. Therefore it is likely that the implementation of smaller class sizes for mathematics in S1 and S2 would lead to improved feedback and teaching conditions (see Hattie, 2010) which might then lead to an improvement in pupils' understanding and performance. It seems likely that the smaller class sizes in P1-P3 (targeted as an Early Years priority since 2007) may have been influential in the relatively good performance at P4.
4. As pointed out in section 1.1, the S2 cohort that was surveyed in 2011 is the last cohort which has not experienced the new Curriculum for Excellence. However, '...assessments used in the survey were designed to assess the wide range of knowledge, skills, capabilities and attitudes identified in the Curriculum for Excellence (CfE) experiences and outcomes'. Nevertheless, '...the surveyassesses skills which pupils should be experiencing as part of good learning and teaching practice'.

It is also pointed out in section 1.1, that the results of this survey are not comparable with the results of SSA surveys in the period 2004 – 2009. Nevertheless, is it possible to infer from the SSLN data and any earlier data that there have been improvements in P4 and P7 as a result of implementing CfE?

5. The expectations for fractions have changed a lot from "5-14" to CfE, but there has not been sufficient time for this to impact on achievement in SSLN yet. Good quality resources for the teaching of measurement and fractions/ decimals/ percentages will be welcomed by teachers. They should be accompanied by high quality CPD directed at how to develop pupils' understanding of these areas. (Research shows

that pupils in schools all round the world have difficulties when developing understanding of fractions, decimals and percentages.)

6. The following is taken from the SSLN sample questions document:

*S2 – Level 3 (Calculator not allowed)
A businessman buys mobile phones for sale in his shop.
Each mobile phone costs him £36. He wants to make a profit of 37.5%
What price will he have to sell the phones to make 37.5% profit?
7 per cent of pupils gave the correct answer.*

This is a disappointing response to a question which we would like pupils to be able to handle. Is it possible to analyse whether the main difficulty is with the interpretation and reasoning or with the numeracy aspect? It would have been useful, for comparison, to have a similar question asking the pupils to find (for example) 32.5% of 48 and then to add their answer to 48.

Similarly, the following is also taken from the SSLN sample questions document:

*P4 – First Level
Sam buys 2 pens. She pays with four 20p coins and she is given 10p change.
What did one pen cost?
22 per cent of pupils gave the correct answer.*

Again, this is a disappointing response to a question which we would like pupils to be able to handle. Is it possible to analyse whether the main difficulty is with the interpretation and reasoning or with the numeracy aspect? It would have been useful, for comparison, to have a similar question asking the pupils (for example) to multiply 30 by 3, then to subtract 20, and then to divide their answer by 2.

7. It is disappointing that:

- When asked "How often does someone in school (e.g. class teacher / head teacher) talk with you about how you are doing overall with your learning?" - 29% of S2 said "hardly ever or never"
- When asked "How often does someone in school (e.g. class teacher / head teacher) talk with you about what you need to do to improve your learning?" - 23% of S2 said "hardly ever or never"
- When asked if they "enjoy working with numbers" the percentage agreeing a lot went from 71% in P4 to 45% in P7 to 22% in S2. (Although, on the other hand, 37% of S2 thought that they usually do well in working with numbers.)

Does the work in S1 and S2 get too difficult, too quickly for many of the pupils? Is more consolidation of the areas of weakness needed before moving on to new and more challenging concepts which often rely on the work that has come before? Do pupils feel helpless and switch off if they have no control over the pace of learning?

Hopefully CfE will help maintain pupils' interest in the subject through relevant context and engaging teaching methods, but secondary teachers are going to be under considerable pressure to develop their practice whilst still meeting the attainment targets set by SSNL and others in terms of age and stage.

8. There are interesting differences between the activities reported by teachers at primary and secondary; e.g. much more time spent with the primary cohorts "working with a partner or group on shared task" and "Finding out things by exploring or investigating". These teaching approaches could reflect changes associated with CfE. The hope is that CfE will give teachers more opportunities to focus on developing understanding rather than 'teaching to the test'.
9. The results in Chart 2.7 in section 2.5 (Mental Maths) paint a disappointing picture. How do the questions compare to PISA questions, for example?

Many countries use a diagnostic assessment in which the pupils are not allowed to write anything down. However, the assessor then probes the pupil's understanding by asking them to explain what strategy or knowledge they used. Further questioning helps to form a full picture of the range of strategies and knowledge that the pupil is able to use with confidence. Are the "mental maths" questions carefully constructed to elicit this information or do they simply form a list with increasingly bigger or more complicated numbers? Have the SSLN assessors been given sufficient training for the assessment to be consistent across all of Scotland?

10. It is interesting to note that the cut-off percentages for "Not yet working within the level" differ (quite significantly) with age group:

P4: 9 per cent or less,
P7: 19 per cent or less,
S2: 34 per cent or less.

SSLN gives a justification in section 1.3. Nevertheless, the general public may find it surprising that the phrase 'Working within the level' is being used as a definition that includes pupils scoring only 10% at P4.