

iPIPS

An international study of
children
starting school



Durham
University

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A unique international comparison of children starting school

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It is universally recognised that children's early development, and their progress during the first year of school, are crucial for their later success.

Policy makers everywhere are interested in knowing how well their children are doing at this key stage in their life, not just in their own country, but also in relation to others.

Key questions for policy makers include:

- How do children in my country compare with similar children in other countries when they start school, and how do they also compare after a year in school?
- What do these differences say about the effectiveness of Early Years policies in my country by comparison with other countries in similar circumstances?
- What do these differences say about how well children learn in their first year of school in my country?
- To what extent are differences in later international surveys (e.g. PISA, PIRLS and TIMSS) explained by differences in the Early Years?

The International Performance Indicators in Primary Schools project (iPIPS) offers schools and policy makers the chance to help answer these questions. For the first time, it will provide accurate benchmarks of the attainment of children starting school on an international basis. Over time, this research will enable national and regional authorities to compare their Early Childhood Education and Development Standards against others in the light of these benchmarks, and thus directly contribute to the improvement of early education.

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About iPIPS

iPIPS is a unique international survey of children starting school. It has been developed from the well regarded Performance Indicators in Primary Schools (PIPS) baseline Assessment Scheme which was originally developed in 1994 by the Centre for Evaluation and Monitoring at Durham University in the UK. iPIPS will give schools and policy makers a much greater and more detailed understanding of children's attainment and progress than other early years assessment schemes.

iPIPS offers evidence-based data on children's social and cognitive development as they start school. The objective element is a computer adaptive assessment which takes just 20 minutes to measure children's abilities in language acquisition, early reading, mathematics, phonological awareness and short term memory. The social and behavioural component takes 5-10 minutes of a teacher's time, and is supplemented by contextual data concerning children's home background. This provides a rich and detailed dataset which allows children's development to be compared to their peers, both in terms of whole national cohorts, and in more detailed analyses such as by gender, ethnicity, region, or other demographic groups.

Crucially, the assessments are re-administered at the end of children's first year in school building on the earlier assessment, so that average learning gain at that crucial stage can be measured across the whole system.

The PIPS assessment has been proven to have a very high test-retest reliability rate, and good predictive validity in terms of later measurements of children's progress. Its large dataset allows easy analysis and comparison of discrete groups with their peers. Test data from the PIPS programme has been used by schools and policy analysts in the UK, Australia, New Zealand, Germany and Hong Kong for some years to improve children's education.

The iPIPS project will add significant new functionality and benefits to PIPS. For the first time, it will use systematic sampling methods to provide comparable data across a range of countries rather than focusing on formative feedback to schools.

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Developing iPIPS

The development of iPIPS has been welcomed by experts in the OECD who are responsible for international assessments and for early childhood education and development.

The iPIPS project will be piloted over the next two years, and welcomes expressions of interest from countries or regional administrations interested in taking part.

Taking part in the pilot will offer the opportunity to benefit from the functionality and comparability of the tool, as well as helping to shape its future development.



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How PIPS has already helped schools and policy makers

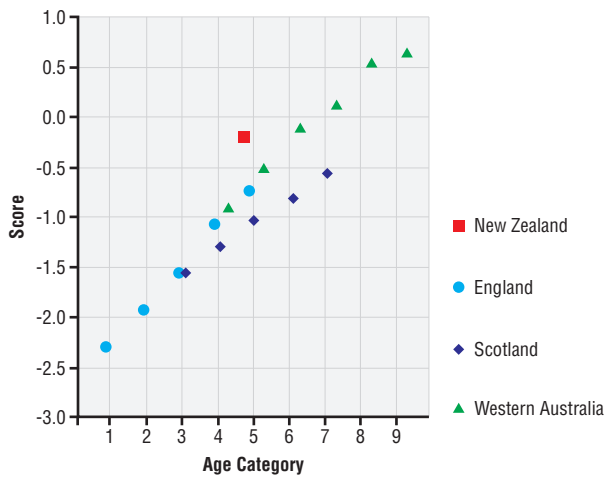
Three examples of how PIPS has already helped schools and policy makers are described on the following pages.

Detailed comparison of scores shows surprising differences across administrations

A study was funded by the Scottish Government in 2005, using PIPS data from several different English speaking administrations. This was used to understand differences between cohorts of children starting school under these administrations to benchmark national performance.

The analysis compared children of different ages at the start of school in the different countries and showed that it was possible to do this regardless of the policy differences in school starting age between different administrations.

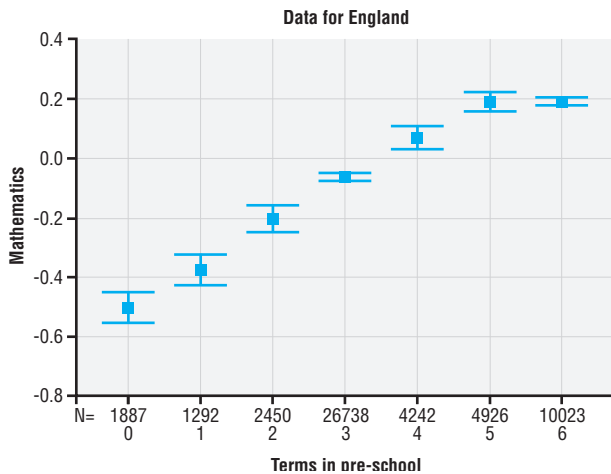
The study indicated that, allowing for age, children in New Zealand had higher reading scores when they started school compared to other countries, while the older children in Scotland tended to have lower scores than their peers, as shown below.



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Surprising differences were also found between Scotland, England, New Zealand and Western Australia in other aspects of children's learning. The analysis showed there is a clear relationship between pre-school and mathematics ability at the start of school in England, whereas in Scotland no clear pattern was found, as shown below.



These findings allowed policy makers in Scotland to raise questions about the effectiveness of pre-school provision, when compared with other English speaking jurisdictions. The number of schools and level of data provided gave a system wide overview and a level of accuracy that would not have been available from other sources.

Differences in vocabulary acquisition across different social and ethnic groups

PIPS data has also been used to understand differences between demographic groups.

An analysis published in 2004 showed a smaller range of vocabulary for indigenous children in Western Australia compared to other groups of children starting school in the state and internationally. It also quantified the vocabulary levels of children with hearing loss and those whose first language was not English in England. PIPS was able to measure this because of the size of the dataset, which allowed more accurate analysis, such as a better understanding of the likely variance found within a smaller group such as indigenous Western Australian children when compared to larger groups within the dataset.

These findings allowed policy makers in Scotland to raise questions about the effectiveness of pre-school provision, when compared with other English speaking jurisdictions.

Changes in reading performance over time

A study published in the Oxford Review of Education in December 2010 used PIPS data to analyse changes in children's performance in England over the period 2001-2008. The study found that average levels of reading skill among children starting school had remained largely stable, despite massive public investment in early years provision during that time. This suggested that the main benefits of this investment may have been in the social and emotional domains rather than the cognitive domain. The UK Government has since reaffirmed its commitment to targeted pre-school interventions through children's centres, coupled with greater emphasis on teaching reading through a systematic phonics approach during children's first year in school.

For further information on these studies go to www.iPIPS.org



A study published in the Oxford Review of Education in December 2010 used PIPS data to analyse changes in children's performance in England over the period 2001-2008.

Information for schools as well as for policy

The iPIPS sample survey is designed primarily to provide reliable and comprehensive information for policy makers concerning the cohort of children starting school and their progress during their first year. However, the efficient processing of data means that the assessment instruments are also suitable for schools to use in the same way for diagnostic and pedagogical purposes both at a class level and with individual children.

Following the survey period of the children and schools selected for the jurisdiction's sample, the iPIPS materials could be released for use more widely if desired.

In this way, schools would be able to see a picture of their intake and the progress made by children over time. Children with particular strengths or learning needs can be quickly identified and action taken, making use of this comprehensive information at several levels to improve later outcomes.

Care will be taken in designing the survey to ensure that using the materials on a wider basis does not result in the assessments becoming 'high stakes' for schools or teachers within a particular national or regional system.



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The iPIPS assessments

There are four components to the iPIPS assessments: (i) cognitive development, (ii) personal, social and emotional development, (iii) physical development, and (iv) contextual information.

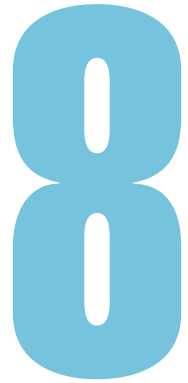
(i) Cognitive development

This assessment consists of a number of measures which have been shown to be good predictors of later educational achievement:

- **Handwriting** – the child is asked to write his/her own name.
- **Vocabulary** – the child is asked to identify objects embedded within a series of pictures.
- **Ideas about reading** – assesses concepts about print.
- **Phonological awareness** – rhymes and repeats.
- **Letter identification** – a fixed order of mixed upper and lower case letters.
- **Word recognition and reading** – words, sentences and comprehension.
- **Ideas about mathematics** – assessment of understanding of mathematical concepts.
- **Counting and ability to use numbers.**
- **Sums** – addition and subtraction problems presented without symbols.
- **Shape identification.**
- **Digit identification.**
- **Mathematics problems** – including sums with symbols.
- **Short-term memory** – recall of a sequence of highlighted buttons.

The teacher or another trained adult works with individual children and the whole assessment takes approximately 20 minutes per child. A computer program presents the child with questions (orally) and depending on the type of question, the child responds either by pointing to the answer from the choice of options on the screen or by saying the answer. The teacher records the child's response on-screen and the program selects the next question.

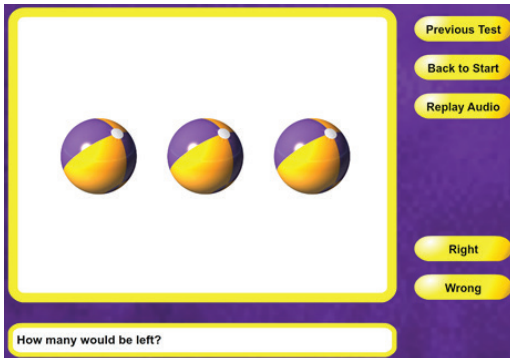
There are four components to the iPIPS assessments: (i) cognitive development, (ii) personal, social and emotional development, (iii) physical development, and (iv) contextual information.



Example

In the sums section in which the child is shown a picture of three balls and is asked:

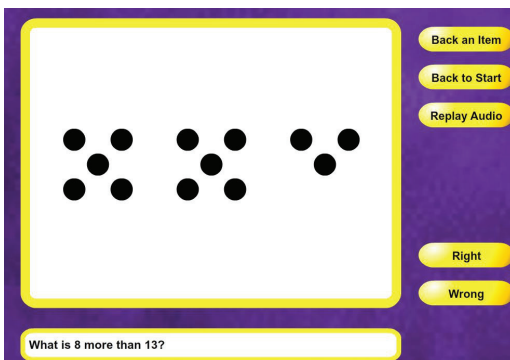
“Here are three balls. If I took one away, how many would be left?”



From previous analysis, we know that this is an easy question even for children who are just four. The program then moves on to another item and another. Each time the item becomes progressively more difficult.

Here is a further example showing a more difficult question.

“What is eight more than thirteen?”.



Each section of the program presents items of increasing difficulty until the child has got a few wrong and then it moves on to the next appropriate section (i.e. the assessment operates on sequences with stopping rules).

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(ii) Personal, social and emotional development

This assessment is designed to assist with the monitoring of children's personal, social and emotional development in the first year of full time education. It is independent of the cognitive development assessment. It is completed by the teacher from their knowledge of the child gained through general day-to-day interaction and observation, and takes 5-10 minutes to complete. The teacher is asked to assess each child against eleven items. The items themselves are arranged into three sections:

- Adjusting to the school environment
- Personal development
- Social development

Each item is assessed using a 5-point scale, with a descriptor provided for each point on the scale. The teacher decides which descriptor provides the closest match for a particular child and clicks on the relevant statement on screen. The computer records the information. This assessment is carried out a few weeks after children start school, and then again at the end of the school year.

(iii) Physical development

This is a proposed additional feature which is still under development. The intention is that it will include:

- Height and weight
- Hearing
- Motor development

(iv) Contextual information

Two short questionnaires, one for teachers and another for parents/guardians, will capture basic background information on the children and schools included in the sample, such as socio-economic status. This will allow policy makers to analyse the information gained from the assessments in the light of these important background factors.

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Key Facts

At a glance:

- Over the past 18 years, PIPS has been shown to provide a highly robust and accurate baseline to gauge later progress.
- No other methodology can offer the same robustness in assessing a child's cognitive development in just 20 minutes.
- It has an inter rater reliability of 0.98 for the early reading and maths sections, which means that children can be reliably assessed by trained administrators other than the class teacher.
- It has excellent predictive validity – it correlates at the 0.68 level with later assessments at age 11 in England.
- The PIPS assessment is a motivating and enjoyable experience for young children.
- The immediate and secure electronic transfer of data from the classroom to the central processing unit is efficient and cost-effective.

Analytical note

The iPIPS project will compare children's developmental profiles at the start of school and look at the progress during the first year at school. Since children start school at different ages, this presents an additional challenge to the more familiar ones of sampling frames and translation issues. We are able to build on extensive work already carried out by Durham University, and will be able to make valid and useful comparisons across the ages by comparing growth curves in different jurisdictions. We will be able to build on careful work on translating and equating assessments in other international projects and the techniques of sampling are well established. In all of this we will draw on the best statistical, psychometric and developmental expertise available.

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Partners

iPIPS is being developed by the Centre for Evaluation and Monitoring at Durham University, UK, in collaboration with a number of partner institutions. These include:

- Educational Testing Services, US and Worldwide.
- Australian Council for Educational Research.
- University of Western Australia.
- University of Wurzburg, Germany.
- Centre for Evaluation and Monitoring, Hong Kong University.
- Centre for Evaluation and Assessment, University of Pretoria, South Africa.
- University of Christchurch, New Zealand.

The Centre for Evaluation and Monitoring (CEM) at Durham University

CEM is home to some of the world's leading educational assessment and research expertise. The Centre is best known for its widely-used school assessment and monitoring systems for children and young people aged between 3 and 19. Combined with several international satellite centres, the Centre processes around one million assessments annually, and has become one of the world's leading providers of computer-adaptive assessments, working with thousands of schools around the world.

The Centre is a not-for-profit organisation and is part of Durham University – a World Top 100 University. Its vision is to improve educational outcomes, by providing a high quality assessment and monitoring service to schools, by training educators, by engaging in leading educational research and evaluation, and by working closely with policy makers and third parties to positively influence education. The Centre uses the latest psychometric techniques, and its systems have evolved to meet the changing demands of the educational environment.

Systems developed by CEM are well established in the UK with over 5000 schools being registered. CEM assessments have also been used successfully in Abu Dhabi, Australia, New Zealand, the Netherlands, Germany, Hong Kong and South Africa, where they help educators and policy makers to monitor children's achievement at local and state level.

CEM is home to some of the world's leading educational assessment and research expertise.

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www.iPIPS.org

Contacts

For further information about the iPIPS pilot, visit www.iPIPS.org.

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