The Role of Academic Buoyancy and Emotions in Students' Learning-Related Expectations and Behaviours in Primary School

The findings of this study showed that high academic buoyancy indirectly predicted lower avoidance behaviour, fewer failure expectations, and higher task-oriented planning via academic emotions. High academic buoyancy was related to high enjoyment and hope as well as low boredom and hopelessness, which further predicted low failure expectations. The findings suggest that academic buoyancy supports positive expectations and adaptive behaviours in learning situations through the regulation of emotions.

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This study investigated the extent to which academic buoyancy

predicts students' failure expectations, avoidance behaviour, and task-oriented planning in learning situations, and to what extent academic emotions mediate the effect of academic buoyancy on these expectations and behaviours. The sample consisted of 845 Finnish students in the sixth grade of primary school. The findings showed that high academic buoyancy indirectly predicted lower avoidance behaviour, fewer failure expectations, and higher task-oriented planning via academic emotions. High academic buoyancy was related to high enjoyment and hope as well as low boredom and hopelessness, which further predicted low failure expectations. The findings suggest that academic buoyancy supports positive expectations and adaptive behaviours in learning situations through the regulation of emotions.

- Previous studies have shown learning-related beliefs and behaviours play a significant role in learning.
- It may be presumed that learning-related expectations and behaviours are influenced by previous learning experiences.

Defining academic buoyancy

- Academic buoyancy refers to students' ability to successfully respond to everyday academic setbacks and challenges, such as poor grades or negative feedback.
- It is related to higher performance in standardised literacy and numeracy tests.
- It has been associated with high self-efficacy, persistence, and planning, high emotional and behavioural school engagement, effective learning strategies, and low self-handicapping.
- It can support students' learning-related self-perceptions and promote subsequent success expectations and task-oriented behaviours.
- It may contribute to expectations and behaviours indirectly by creating a positive emotional atmosphere in learning situations.

The mediating role of academic emotions

- Academic emotions are defined as emotions that relate directly to achievement activities or outcomes.
- Outcome emotions are related to anxiety of possible failure and pride of previous success.
- Activity emotions are related to boredom or enjoyment of learning.
- Valence of emotions differentiates between positive versus negative emotions, and activation of emotions refers to the level of physiological activation that emotions invoke.
- The control–value theory suggests that different outcome- and activity-related emotions are the function of students' control and value appraisals.
- Positive activating emotions (such as enjoyment of learning, hope, and pride) can promote motivation, effort, use of adaptive learning strategies, and self-regulated learning.

Learning-related expectations and behaviours

- The present study focused on three types of learning-related beliefs and behaviours as outcomes of academic buoyancy and emotions:
- one representing negative beliefs (failure expectations)
- one representing maladaptive behaviour (avoidance behaviour)
- one representing an adaptive strategy (task-oriented planning).

Transition to lower secondary school in Finland

- The present study focused on students in the last grade of primary school before their important transition to lower secondary school.
- In Finland, this transition takes place at 12 or 13 years of age.

- In addition to going through biological, cognitive, and psychological changes related to puberty, students at this age face changes in their daily life at school as a result of the school transition.
- They move from a classroom teacher system to a subject teacher system, start to study new subjects, and often change to another school.
- As a result of these changes, students' motivation and effort can decrease and negative attitudes towards school increase during the school transition.

The present study

The present study examined the role of seven academic emotions as mediators in the relationship between academic buoyancy and learning-related expectations and behaviours. Of these emotions, three were positive activating (enjoyment, hope, and pride), two were negative activating (anxiety and shame), and two were negative deactivating (boredom and hopelessness).

Hypotheses:

1. Buoyancy was expected to relate positively to positive emotions and negatively to negative emotions.
2. High enjoyment, hope, and pride were expected to further relate to low levels of avoidance behaviour and failure expectations as well as high task-oriented planning.
3. Boredom and hopelessness were expected to be related to high avoidance behaviour, high failure expectations, and low task-oriented planning.
4. It was expected that anxiety and shame would have positive effects on task-oriented planning and negative effects on avoidance behaviour and failure expectations.

Methods

Participants were 845 Finnish sixth-grade students with an age range at the beginning of the study of 11.6—14.8 years. Two trained testers collected the data in the classrooms on normal school days in the autumn (T1) and spring (T2) of Grade 6.

Findings

- Failure expectations were indirectly explained by buoyancy via enjoyment: higher academic buoyancy was related to more enjoyment, which in turn was related to decreased failure expectations.
- Similarly, buoyancy indirectly explained avoidance behaviour, failure expectations, and task-oriented planning via hope: higher academic buoyancy was related to higher hope, which was related to decreased avoidance behaviour and failure expectations and increased task-oriented planning.
- Avoidance behaviour and failure expectations were indirectly explained by buoyancy via boredom: low academic buoyancy was related to higher boredom, which in turn was related to increased avoidance behaviour and failure expectations.
- Failure expectations were indirectly explained by buoyancy via hopelessness: low academic buoyancy was related to higher hopelessness, which was further related to high failure expectations.
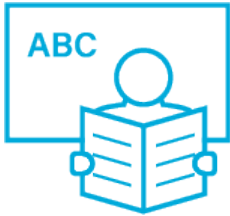
Conclusions

- The results show that the effect of high buoyancy at the beginning of sixth grade on low avoidance behaviour, low failure expectations, and high task-oriented planning at the end of the sixth grade was fully mediated by students' emotions.
- The findings suggest that an adaptive role for buoyancy in relation to positive academic outcomes is partly achieved through the regulation of academic emotions.
- Interestingly, pride, anxiety, and shame were not found to mediate the effect of academic buoyancy on learning-related beliefs and behaviours.
- The findings highlight the importance of positive-activating emotions in supporting primary school students' adaptive learning-related beliefs and behaviours and the role of negative deactivating emotions in increasing maladaptive beliefs and behaviours.
- According to control–value theory, students' appraisals of their subjective control over learning situations and outcomes are crucial for the arousal of positive and negative emotions.
- The sense of this subjective control could be reinforced by rehearsing academic buoyancy.
- Buoyancy could be a fruitful target of intervention studies in promoting students' positive learning experiences, adaptive functioning, and performance at school.
- Attention should be paid to students' positive emotional experiences at school, their feelings of being in control of their learning, and their skills and

confidence to overcome challenges, because these promote students' enjoyment of learning and their effort with learning tasks.

The Effect of Using a Mobile Literacy Game to Improve Literacy Levels of Grade One Students in Zambian Schools

eTale 2022

This intervention study was conducted to document conditions under which a computer-based literacy game (GraphoGame) could enhance the literacy skills of first-grade students in an African city. The game demonstrated a positive effect for the spelling test. The most effective intervention combined exposure of both the teachers and the students to the game.

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Source: Jere-Folotiya, J., Chansa-Kabali, T., Munachaka, J.C.,

Sampa, F., Yalukanda, C., Westerholm, J., Richardson, U., Serpell, R., & Lyytinen, H. (2014). The effect of using a mobile literacy game to improve literacy levels of grade one students in Zambian schools. *Educational Technology Research and Development, 62*, 417-436. DOI: 10.1007/s11423-014-9342-9

This intervention study was conducted to document conditions under which a computer-based literacy game (GraphoGame) could enhance the literacy skills of first-grade students in an African city. The participants were 573 first-grade students from government schools who were randomly sampled into control (n = 314) and various intervention (n = 259) groups. GraphoGame was admistered on mobile phones to students at their school under supervision. There was a positive effect of the game for the Spelling test. The most effective intervention combined exposure of both teachers and students to the game. Initial letter knowledge was a good predictor of final letter knowledge on GraphoGame.

- Literacy is a major cultural resource for effective communication and an essential skill for individuals to prosper in a modern society.
- The proportion of school students in Zambia achieving even the minimal expected standard of literacy by Grades 5 and 6 is exceptionally low, with only 32.3% of students attaining minimal acceptable mastery of skills and knowledge.
- In an attempt to improve reading levels, the Government of Zambia introduced a new educational policy: Primary Reading Program (PRP), which requires the seven Zambian official languages should be used for teaching initial literacy, depending on the geographical location.
- The PRP works on the premise that the orthography of the Bantu languages of Zambia is transparent or consistent in nature.
- Transparent alphabetic codes are much easier to teach and learn.

- Reading improvements have been documented since the introduction of the PRP.
- For example, an increase from 23% to over 60% has been reported in achieving minimal standards in the local languages in Grade 5.

The present study

This paper reports on the findings of an applied research project entitled *Reading Support for Zambian Children* (RESUZ). The objective was to assess the efficiency and effectiveness of a supplementary, computer-mediated learning resource in the form of a phonics game (GraphoGame) played on a hand-held device (mobile phone).

The goals of the study were as follows:

1. To examine the effectiveness of the desktop computer or mobile phone-based phonics game (GraphoGame) in improving initial literacy skills of first-grade students in the context of prevailing conditions as a supplementary resource for literacy instruction in Zambian public schools.
2. To establish which of several methods of providing intervention (students only, teachers only, or a combination of both) was most effective.
3. To investigate the influence of initial letter knowledge and amount of time playing GraphoGame on final letter knowledge.

Methods

Participants were 573 students (age range 5-9 years, 52.4%

females) and their teachers (n = 68). In the post-test, 312 students participated. The participants were randomly selected from 42 government schools in the Lusaka District. Within each school, two Grade 1 classes were randomly selected and randomly assigned to either a control or intervention class. Six students were then randomly sampled from each classroom.

GraphoGame

- The game provides a computer-mediated online environment for learning letter—sound correspondences developed in Finland.
- The game provides an index of initial letter knowledge based on assessment of the child's letter knowledge before they play the game.
- It provides an index of final letter knowledge after the child has played the game.
- The focus of the training was initially letter—sound knowledge and the steps needed thereafter for learning to read (if the training is to continue over a prolonged period).
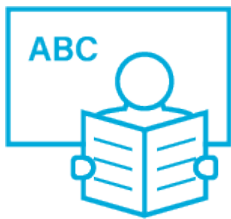

Findings

- GraphoGame produced significant improvements in the performance of the students who were exposed to it directly (when the individual student was exposed) or indirectly (when the teacher alone played the game) compared to students in the control group, as evidenced by the larger increase of mean scores from pre-test to post-test as a function of exposure to GraphoGame.
- Analyses further showed that this improvement was most

prominent when both the students and teachers played the game and the teachers were introduced to the phonics approach so that they would not provide incompatible instruction.

- Playing the game produced a significant effect on participants' decoding skills but not on orthographic awareness.
- Initial letter knowledge was a good predictor of performance in predicting final letter knowledge in GraphoGame.
- Letter–sound knowledge documented by the GraphoGame programme is a significant predictor of performance on conventional paper and pencil test for decoding skills.

Conclusions

- The findings provide evidence that GraphoGame is a tool that can be used to help Zambian students learn to read by enhancing their letter–sound knowledge.
- The effect of playing the game is greater when teachers are introduced to letter–sound knowledge in ciNyanja to avoid interference from English letter names.
- The PRP used in Zambian schools emphasises letter-sound correspondence as basic introduction to literacy.
- This means that these two approaches (the PRP course and GraphoGame) can complement each other in the teaching of basic literacy to students—especially in the early grades.
- The results lead the authors to recommend that GraphoGame can be used as a tool to supplement the

teaching of literacy in Zambian schools.

- Interventions that use the game should focus on both students and teachers.

Challenges Associated with Reading Acquisition in Sub-Saharan Africa: Promotion of Literacy in Multilingual Contexts

eTale 2022

In 17 sub-Saharan countries, fewer than half of all children are learning basic reading skills. Among the key reasons for this are the inadequate number of trained teachers and the high child-to-teacher ratios in schools. Further, because of differences in the orthography of languages, choice of language in early literacy instruction can have a considerable effect on learning outcomes.

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Of the 650 million children of primary school age worldwide, at least 250 million are not learning basic skills in reading and mathematics. Of these children, approximately 130 million had attended school for several years. In 17 sub-Saharan countries, fewer than half of all children are learning the basics. For instance, in 2007, 44% of Grade 6 learners in Zambia were assessed as functionally illiterate. Among the key reasons for this are the inadequate number of trained teachers and the high child-to-teacher ratios in schools. Further, because of differences in the orthography of languages, choice of language in early literacy instruction can have a considerable effect on learning outcomes. In the following, the present situation in Africa is illustrated and how new technology could be used to support literacy learning is discussed.

Effects of language policy in literacy instruction

- Africa is the only continent in which children start school in a foreign language of which their teachers may not have a competent command.
- Use of familiar languages is an important factor for human rights and preservation of cultural values. Moreover, it promotes inclusiveness in education, as it allows children to use the language they commonly speak.
- It is likely that lack of awareness of the strong impact

of language on the ability to learn to read has affected education policy.

- In 1996, a new policy was announced (implemented in 2000), introducing literacy in first grade in one of seven indigenous African languages, followed by a gradual transition to English in later primary grades.
- The new curriculum combined two major technical advantages for ease of initial learning: local language familiarity and orthographic transparency.
- Initial pilot projects in two rural districts comparing the new curriculum with the pre-existing English-medium immersion scheme yielded very encouraging results. However, implementation of the policy nationwide has failed to maintain this finding.
- It is important that teachers receive adequate and effective training in the correct use phonics-based instruction methods and in how to support learners in building literacy skills, from letter-sound knowledge to reading fluency.
- Many teachers, despite receiving orientation training on the new Primary Literacy Programme, still continue to use 'look and say' literacy instruction recalled from their own English language literacy instruction, instead of using the phonics-based approach more suited to local Zambian languages. This may be because they receive inadequate training in the local language phonics.
- English letter names and the correct local language phonemes are pronounced in inconsistent ways. This can slow down learning for all children and pose a particular risk for children who have learning difficulties.

The impact of orthography in learning to read

- The challenge for education in many countries in sub-Saharan Africa is that the most common languages of instruction (for example, English) also happen to have

- some of the most difficult alphabetic orthographies in which to learn to read and write.
- These prove a considerable challenge even for native speakers, let alone for children who have been only minimally exposed to these languages before school entry.
- The complexity of English orthography makes the English language problematic as a universal model for reading instruction and may be misleading for literacy instruction in other languages.
- Literacy instruction should take place in a familiar language with transparent orthography.
- Children should not be required to transfer to second-language instruction before they are fully literate and academically fluent readers in their first language. This level is often not reached before Grade 6.
- Effective methods for teaching reading fluency in early grades are needed, because only sufficient reading speed makes comprehension of the written material possible.
- A requirement in addition to appropriate instruction is that appropriate learning material is available; this should be material that draws young learners into the world of written information.
- Schools that lack learning materials and proficient speakers of local languages cannot comply with language policy.
- Educating teachers about the impact of language in literacy instruction while they are still at college could help to promote the use of local languages.
- Teachers' choices of language are often affected by the opinions of the community around them.
- If parents are unaware of the impact of language on learning to read, they believe that education in a foreign language is preferable to the use of local languages.

Mobile learning games can improve literacy

- In present-day Africa, mobile phones offer an affordable and easy-to-use gateway to reading material, and access to the Internet gives a person more reading material than in any physical library.
- Educational games can provide users with new opportunities to learn basic scholastic skills and access to new learning materials through which to acquire full literacy.
- GraphoGame (GG) was designed based on the findings from the Jyväskylä Longitudinal Dyslexia (JLD) study.
- A key finding of the study was that the degree of early letter knowledge was the best predictor of later learning difficulties in reading.
- The most efficient way to support children with reading difficulties in transparent writing environments is to provide them with practice in letter-sound (not letter name) knowledge.
- In GG, over 20 language adaptations currently exist.
- By adapting to players' performance, GG allows each player to receive individualised learning content during the game.
- The game can be used on multiple platforms, including desktop computers and smartphones/tablets.
- Pedagogically, GG teaches children grapheme–phoneme connections (sounds, syllables, and word formation) based on synthetic and analytic phonics instruction by constantly adapting to the particular player's skill level.
- The aim of such adaptability is to keep the training optimally challenging for the child concerned and to ensure that the child receives mostly positive feedback.
- Because of the similarity between the orthography of the Finnish language and many local languages in Africa, GG could be well suited for use in providing additional support for learning basic reading skills.

- A study by Jere-Folotiya et al. (2014) documented how the greatest effects of playing GG were attained when both the Grade 1 teachers and their learners in the urban areas of Lusaka were exposed to the game.
- It was observed that teachers could use the game to improve their letter–sound knowledge in the local language, knowledge essential to imparting basic literacy skills to early grade learners.

Children with learning difficulties need additional support

- While children of relatively high general cognitive ability are often able to learn to read with minimal instruction, for average and lower-ability learners, successful mastery of the basic grapheme–phoneme code may depend more heavily on a combination of several cognitive factors.
- Familiarity with the spoken language used as a medium of instruction undoubtedly makes initial literacy learning easier by allowing the learner to retrieve meaning from the text as soon as it is decoded.
- The orthography of some languages is much less transparent than others, so that even first-language speakers of English require significantly longer on average to master initial literacy than first-language speakers of languages such as Finnish.
- Identifying children who need additional support requires some form of literacy skills assessment.
- At an individual level, games such as GG can facilitate dynamic assessment.
- The number of children who are struggling to learn to read for environmental reasons (language, poor instruction methods, and lack of reading materials) is so large that little attention has been given to children who have specific learning difficulties.

Education policy needs to be based on research

- The lack of text books and the shortage of trained teachers using the languages are among the biggest obstacles to using local languages in the classroom.
- Short school hours and high teacher–student ratios severely compromise teachers' abilities to give enough attention to struggling readers.
- Mobile technology could be one way to provide additional support.
- It should be acknowledged that because of the effect orthography has in reading acquisition, policy on language instruction has much wider implications than has previously been acknowledged.
- Children can learn early literacy skills relatively quickly and easily if instruction is in their mother tongue, or if the orthography in question is consistent with their mother tongue or a familiar language.
- Using local African languages and training teachers to use phonics-based reading instruction methods could improve literacy rates across the continent and decrease the risk of children dropping out of school.

Letter Knowledge Predicts Grade 4 Reading Fluency and Reading Comprehension

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The present study examined the predictors of fourth-grade learners' reading skills (reading comprehension, text reading and word chain reading). The results showed that children's letter knowledge at the beginning of kindergarten was the most powerful predictor of their reading skills at the end of Grade 4. Other predictors were metacognitive awareness, gender, mother's level of education, and visual attention.

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The present study examined the predictors of fourth-grade learners' reading skills (reading comprehension, text reading and word chain reading). The reading skill antecedents of 158 children aged 5–6 years were measured at the beginning of kindergarten. Students' reading skills were measured in kindergarten and again in Grades 1 and 4. The results showed that children's letter knowledge at the beginning of kindergarten was the most powerful predictor of their reading skills at the end of Grade 4. Other predictors were metacognitive awareness, gender, mother's level of education, and visual attention.

- Decoding skills are of great importance in the early stage of the reading career, because they provide a basis for automaticity in word recognition.
- Skilled reading is a combination of accurate and

automatic decoding that frees resources so that the meaning of what is being read can be understood.

Reading accuracy

- To develop adequate decoding and word recognition skills, children must progress through different stages.
- In Frith's (1985) model, word recognition begins to develop along with the visual processing of printed words, progressing to a phase in which children use letter-sound correspondences for decoding.
- The process ends in the orthographic stage, in which children apply adaptive and flexible strategies to decide the most efficient way to decode the written text.
- Phonological awareness has been found to be associated with early word-reading skills.
- Letter knowledge provides a basis for understanding the alphabetic principle.
- Visual skills (such as automatic orientation of attention) provide a basis for subsequent decoding.

Fluent reading and reading comprehension

- Reading fluency has been suggested to be the product of the development of two components: accuracy and automaticity.
- Once decoding is accurate and automatic, more of the readers' resources can be invested in comprehension.
- Reading comprehension requires the meaning of particular sentences to be derived together with text-modelling processes that are based on general knowledge and inference-drawing ability.
- Listening comprehension skills are suggested to be an important antecedent of reading comprehension.
- Metacognitive skills, such as the ability to monitor and evaluate one's own progress in a particular task, are

    associated with reading comprehension skills.
- Naming speed has been suggested to play a role in both reading comprehension and reading fluency.

Social background factors

- Several family-related factors (such as parents' education and socioeconomic status) may contribute to children's reading development.
- Gender differences in reading performance have also been reported; girls outperform boys in reading measured between the ages of 9 and 14 years.

Orthographic nature of Finnish

- The highly regular correspondence between letters and sounds in Finnish makes it one of the most orthographically-shallow languages.
- In Finland, primary school begins when children are 7 years old.
- Reading is taught through phonics, for which the learning of sound-letter correspondence is important.
- Reading instruction includes letter recognition, listening, segmenting, and blending phonemes and syllables.

Present study

The present study examined the following research questions:

1. To what extend do letter knowledge, phonological awareness, and listening comprehension (measured at the beginning of kindergarten) predict children's text and

word chain reading and reading comprehension at the end of Grade 4?

2. To what extent do other cognitive abilities (such as metacognitive awareness and visual attention) predict text and word chain reading and reading comprehension at the end of Grade 4?
3. To what extent does mother's educational level predict children's text and word chain reading and reading comprehension at the end of Grade 4?
4. To what extent is gender associated with text and word chain reading and reading comprehension at the end of Grade 4?
5. At what stage of the reading career do the different antecedents begin to operate?
6. Would controlling for rapid serial naming and general cognitive ability change the results?

Method

This study is part of the Jyväskylä Entrance into Primary School (JEPS) Study conducted by Nurmi and Aunola from 1999 to 2004. The aim of the study was to investigate the development of a broad range of cognitive, social, and motivational factors among children moving from kindergarten to primary school. The sample of the present study consisted of 196 children (92 girls, 104 boys) who participated during autumn term (Time 1) and spring term (Time 2) of kindergarten, and spring term of in Grade 1 (Time 3). At the fourth measurement point of the study (at the end of Grade 4), 158 children (75 girls, 83 boys) were assessed.

Findings

- In the first path model, reading comprehension and text and word chain reading at the end of Grade 4 were predicted by letter knowledge, phonological awareness, and listening comprehension at the beginning of kindergarten.
- The higher the level of letter knowledge at the beginning of kindergarten year, the higher the level of reading comprehension and text and word chain reading at the end of Grade 4.
- The higher the level of phonological awareness, the higher the level of word chain reading later.
- The higher the level of listening comprehension at the beginning of the kindergarten year, the higher the level of reading comprehension at the end of Grade 4.
- When metacognitive awareness and visual attention at the beginning of kindergarten were added to the model, the results for letter knowledge, phonological awareness, and listening comprehension remained the same.
- Visual attention at the beginning of kindergarten predicted both reading comprehension and word chain reading.
- Reading comprehension was predicted by metacognitive awareness.
- At the third step, mother's educational level was added to the model. The paths from step 2 remained the same, except the association from visual attention to reading comprehension decreased to a statistically nonsignificant level.
- Mother's educational level added to the prediction of reading comprehension skills.
- Child's gender was added to the previous model at a fourth step. The paths of the previous step remained the same.
- The results showed that children's gender predicted their reading comprehension: girls showed a higher level of reading comprehension skills in Grade 4 than boys.
- At the fifth step, earlier levels of reading performance

- at the end of kindergarten and at the end of Grade 1 were added as predictors for reading variables at the end of Grade 4.
- The results for visual attention, mother's education, and gender remained the same compared to the model of step 4.
- Besides having a direct effect on reading comprehension and text reading, letter knowledge had an indirect effect on reading comprehension and text reading via reading skills at the end of Grade 1.
- After taking into account kindergarten and Grade 1 reading skills, letter knowledge had only an indirect effect on word chain reading.
- The impact of phonological awareness on reading comprehension, text reading, and word chain reading was mediated by the reading skills measured at the end of the kindergarten year and at the end of Grade 1.
- Besides having direct effect on reading comprehension, metacognitive awareness had an additional indirect effect on reading comprehension, text reading, and word chain reading via reading skills at the end of Grade 1.
- After controlling for the earlier levels of reading skills, the path from listening comprehension to reading comprehension disappeared.
- The results demonstrated that the level of reading skills at the end of Grade 1 predicted all the outcome measures.
- At the sixth step, rapid serial naming (measured in Grade 4) was added as a predictor in the previous model; however, performance on the rapid serial naming task did not add to the prediction of measures of reading skill at the end of Grade 4.
- At the final step, the impact of general cognitive ability was also tested, but this did not change any of the previous results.
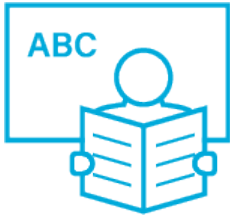
Conclusions

- The results showed that although phonological awareness at the beginning of kindergarten predicted reading fluency and reading comprehension at the end of Grade 4, these effects were mediated by reading skills at the end of kindergarten and Grade 1 (in other words, phonological awareness contributed to reading performance at kindergarten and Grade 1, which then predicted reading performance at Grade 4).
- The best predictor of reading comprehension and reading fluency at the end of Grade 4 was letter knowledge at the beginning of the kindergarten year.
- The findings suggest that besides being a powerful predictor of beginning reading ability, early letter knowledge is also predictive of later development of fluent reading.
- Mothers' educational level predicted their children's performance in reading comprehension tasks at the end of Grade 4, even after controlling for children's reading skills in Grade 1.
- The results confirmed that girls performed better than boys in reading comprehensions tests.

A Comparison Between Verbal Working Memory and Vocabulary in Bilingual and Monolingual South African School Beginners: Implications for Bilingual Language Assessment

This study compared measures of simple and complex verbal working memory and receptive and expressive vocabulary for bilingual and monolingual school beginners. Monolingual learners outperformed bilingual learners in vocabulary, but there were no significant differences on working memory tests. Thus, working memory tests may offer a fairer measure of language ability for bilingual children.

Author: Kate Cockcroft

This study compared bilingual and monolingual school beginners

on measures of simple and complex verbal working memory and receptive and expressive vocabulary. Participants comprised 120 school beginners (English first- and second-language speakers) who were being educated in English. Monolingual learners outperformed bilingual learners in vocabulary, but there were no significant differences on working memory tests. Thus, working memory tests may offer a fairer measure of language ability for bilingual children.

- Vocabulary tests are typically used to assess language learning in children, although bilingual children underperform on such tests.
- Bilingual children develop vocabulary slower than monolingual learners; thus, vocabulary tests alone are unlikely to provide an accurate representation of the bilingual child's language learning.
- Working memory tests may provide a fairer means of evaluating bilingual language learning than tests of vocabulary.
- In South Africa, 79% of the population speak South African languages as their mother tongue rather than English. However, language tests are usually conducted in English.

Benefits of using working memory tests

- Procedures and stimuli are typically designed to be equally unfamiliar to all testees and are based on material that is either not explicitly taught (such as non-words) or very well learned (such as digits and letters).
- Tests of working memory evaluate the passive, short-term storage of the verbal-based phonological loop and/or the visuospatial sketchpad (known as 'simple' verbal/visuospatial working memory), as well as the active central executive (or 'complex' verbal or visuospatial working memory).
- Phonological loop tasks are implicated in vocabulary

ability and new word learning.

The study

The purpose of this study was to compare performance on tests of simple and complex verbal working memory and receptive and expressive vocabulary in monolingual learners' mother tongue and bilingual learners' second language. The aim was to determine whether verbal working memory tests provide a fairer means of assessing bilingual language-learning than measures of vocabulary.

Participants were 120 first-grade students. Of these, 67 spoke only English at home, while 53 spoke African language at home with English being their second language. Their non-verbal intelligence, vocabulary, and working memory were measured.

Findings

- Significant language group differences emerged on the vocabulary tests and with non-verbal IQ.
- There were no significant differences between the language groups on any of the four working memory tests.
- All the working memory tests were moderately-to-strongly correlated with the vocabulary measures in the monolingual group.
- In the bilingual group, the vocabulary measures were

only significantly correlated with the digit span tests. Non-word recall and counting recall appear unrelated to expressive and receptive vocabulary in this group.

Summary

- Worldwide, there has been an increase in the number of immigrant children who do not speak the majority language.
- Psycho-educational assessments of these children may be complicated as they are often conducted in a language that is not the child's mother tongue.
- It would be useful to be able to include tests that can provide an objective indication of typical language processing in such assessments, even when the child is assessed in their second language.
- Working memory tests may be suitable for this kind of assessment.

Key findings

- Monolingual children performed significantly better than bilingual children on the measures of expressive and receptive vocabulary.
- There were no significant differences between language groups on the simple or complex verbal working memory measures, even when differences in vocabulary were statistically accounted for.
- Working memory tests showed different patterns of relationship with the vocabulary tests for monolingual and bilingual groups.
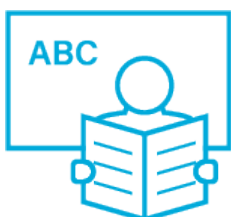
Implications

- The findings of this study suggest that tests of verbal working memory are able to give an indication of whether the articulatory rehearsal and storage processes of the phonological loop are developing appropriately in the bilingual child, even when the child is tested in a second language.
- Phonological loop processes predict performance on a range of linguistic and academic tasks.

Child-centred versus Teacher-directed Teaching Practices: Associations with the Development of Academic Skills in the First Grade at School

eTale 2022

This study explored the extent to which child-centred versus teacher-directed teaching practices would predict the

development of children's reading and maths skills in the first year of elementary school. Evidence was found that a high level of child-centred teaching practices predict improved children's reading and maths skills' development during the first school year. Child-centred teaching practices were equally beneficial for academic skills' development of children with varying initial skill levels.

Authors: Marja-Kristiina Lerkkanen, Noona Kiuru, Eija Pakarinen, Anna-Maija Poikkeus, Helena Rasku-Puttonen, Martti Siekkinen & Jari-Erik Nurmi

Source: Lerkkanen, M.-K., Kiuru, N., Pakarinen, E., Poikkeus, A.-M., Rasku-Puttonen, H., Siekkinen, M., & Nurmi, J.-R. (2016). Child-centred versus teacher-directed teaching practices: Associations with the development of academic skills in the first grade at school. *Early Childhood Research Quarterly 36*, 145-156.

This study explored the extent to which child-centred versus teacher-directed teaching practices would predict the development of children's reading and maths skills in the first year of elementary school. Evidence was found that a high level of child-centred teaching practices predict improved children's reading and maths skills' development during the first school year. Child-centred teaching practices were equally beneficial for academic skills' development of children with varying initial skill levels.

- Early childhood education (ECE) classroom practices impact child outcomes such as children's social and academic skills.
- In child-centred teaching, children are viewed as active constructors of knowledge and the teachers' role is mainly to facilitate their learning. The teacher-directed approach holds that basic academic skills are acquired through direct instruction and practice. These approaches differ in terms of the degree by which the

teacher facilitates learning, that is, by encouraging children's active exploration and construction of their own knowledge.

Defining child-centred teaching

Partnership: teachers assist and facilitate children's learning by providing them with guidance, opportunities, and encouragement to direct their own exploration of objects and academic topics.

Supportive: the teacher supports children's learning efforts and social skills.

Sensitive: teaching practices are sensitive to children's needs and interests.

Motivational: by taking into account children's needs and interests and promoting children's autonomy in the classroom, the teacher motivates children to learn, thereby resulting in improved learning outcomes.

The study

The benefits of different teaching practices can vary depending on the skill domain and age of the children. In this study, we were interested in how child-centred versus teacher-directed teaching practices contribute to the development of reading and maths skills during the first school year in a Finnish school context for children aged seven years old.

- *Child-centred teaching* emphasises the child's active role as a learner and is sensitive to children's needs

and interests.
- *Teacher-directed teaching* emphasises the provision of information and the employment of structured group lessons, teaching discrete skills in small steps, and giving praise to children when predetermined goals are reached.

Participants were 1132 Finnish first-grade children from 93 classrooms (and their teachers). A subsample of 29 teachers participated in classroom observations on a voluntary basis. The Early Childhood Classroom Observation Measure (ECCOM) was employed to observe the extent to which child-centred and teacher-directed approaches to instruction, management, and social climate were present in the classrooms.

Findings

- Child-centred teaching practices were associated with better reading and maths skills in Grade 1 (spring).
- Teacher-directed teaching practices were negatively associated with reading skills in Grade 1 (spring).
- Child-centred teaching practices seems to promote better skills in reading and maths.

Child-centred teaching practices

- Child-centred teaching practices predicted better reading and maths skills developmentthrough the first grade.
- Child-centred teaching practices benefited the reading and maths skills of children with different initial skill levels in reading and maths.
- The higher the initial skill levels the children had and

the smaller the class sizeswere, the more child-centred teaching practices were used.

Teacher-directed teaching practices

- Teacher-directed teaching practices predicted poorer reading skills development among those children who initially had average or high skill levels.
- The larger the class size, the more teacher-directed teaching practices the teacher used.
- There was no effect of teacher-directed teaching practices on maths skills.

Summary

- Children's higher initial reading skills were associated with higher levels of child-centred teaching practices in their classroom.
- A high level of child-centred teaching practices contributed positively to children's reading and maths skills development, while the effect did not depend on children's initial skills.
- Teacher-directed teaching practices had no effect on maths skills development.
- However, an emphasis on teacher-directed practices was negatively associated with reading skills development among children who had average or high initial reading skills.
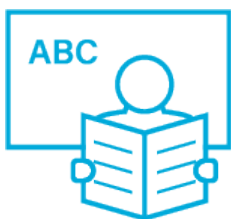
Implications

Child-centred teaching practices in first-grade student classrooms resulted in better learning development of both reading and maths skills. Thus, the use of child-centred teaching practices may be recommended especially when children have initially average or high skill levels. A teacher who emphasises child-centred practices in the classroom is a supporter and sensitive facilitator of children's academic skills development and views children as active contributors to their own learning. Teachers using child-centred teaching practices provide a wide array of literacy experiences and instructional choices (including phonic-based and meaning-based tasks) to facilitate each child's individual literacy learning based on the child's previous knowledge and skills. In child-centred classrooms, children have more autonomy over their learning and they can choose activities and texts according to their personal interests, which will keep their motivation for reading practices high while further fostering their reading skills.

Designing for Scale: Reflections on Rolling Out Reading Improvement in Kenya and Liberia

eTale 2022

In this study, the Liberian and Kenyan experiences of implementing large-scale reading programmes are examined, documenting the critical components and conditions of the programme designs that affected the likelihood of successfully transitioning from pilot to scale. The study also reviews the design, deployment, and effectiveness of each pilot programme and the scale, design, duration, enabling conditions, and initial effectiveness results of the scaled programmes in each country.

Authors: Amber Gove, Medina Korda Poole, & Benjamin Piper

Source: Gove, A., Korda Poole, M., & Piper, B. (2017). Designing for scale: Reflections on rolling out reading improvement in Kenya and Liberia. In A. Gove, A. Mora, & P. McCardle (Eds.), *Progress toward a literate world: Early reading interventions in low-income countries, New Directions for Child and Adolescent Development*, *155*, 77–95.

In this study, the Liberian and Kenyan experiences of implementing large-scale reading programmes are examined, documenting the critical components and conditions of the programme designs that affected the likelihood of successfully transitioning from pilot to scale. The study also reviews the design, deployment, and effectiveness of each pilot programme and the scale, design, duration, enabling conditions, and initial effectiveness results of the scaled programmes in each country.

- UNESCO estimates that 250 million children globally are not learning basic reading and maths skills.
- Both Liberia and Kenya began pilot programmes to

evaluate various approaches to improving reading outcomes, specifically the Early Grade Reading Assessment (EGRA) Plus programme in Liberia and the Primary Math and Reading (PRIMR) Initiative in Kenya, with noteworthy results.

- The resulting rigorous evidence encouraged both countries' governments to scale up the programmes to a larger number of schools.

Liberia

- The country has struggled to provide basic education services to its population.
- Net primary enrolment is less than 40%, and more than 400,000 children are out of school.

Kenya

- The country is not as poor as Liberia.
- The quality of early primary school education remains low.

The study

This study examined the particular characteristics of scaling up reading programmes in Liberia and Kenya and documented essential technical components and conditions of the programme design that increased the likelihood of a successful pilot-to-scale transition.

Research questions:

1. Do pilot interventions in Liberia and Kenya improve learning outcomes?

2. How do the pilot findings inform the scale-up design in Liberia and Kenya?
3. Do the scaled-up interventions improve learning outcomes in Liberia and Kenya?

Liberia's EGRA Plus programme was designed with two treatment groups and a control group that received the intervention after the endline assessment. Each of the three groups included 60 schools. The 'light' treatment included support for classroom-based assessment and the dissemination of student results to parents and community members. In the full-treatment schools, teachers received instructional materials and a manual with 110 scripted reading lesson plans. They were trained by instructional coaches, and were given a small library. Liberia began implementing an approach in 2011 designed to be similar to the EGRA Plus full-treatment intervention in 1,200 schools.

Kenya's PRIMR initiative was implemented in 1,384 schools. Students received both English and Kiswahili textbooks. Teachers received a corresponding teachers' guide. Teachers were trained 7 days per year, and they observed and then practiced a model mini-lesson. There were also tutors who focused on improving teaching and providing in-classroom instructional support.

Findings

Liberia Pilot Results

- Full treatment increased student achievement for every EGRA subtask, with an overall effect size of 0.79 SD, ranging from 0.39 SD to 1.23 SD.

- Full treatment increased letter-naming fluency by an additional 1.2 years compared to the effect of being in school for 1 year. This was the smallest effect size.
- The light treatment group had a statistically significant effect on letter-naming fluency and phonemic awareness but no effects on the other areas of literacy. This suggests that accountability alone cannot rapidly improve results.

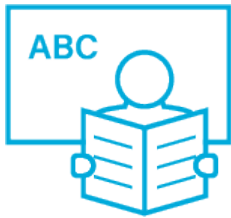## Liberia Large-Scale Intervention Results

- Letter-naming fluency and phonemic awareness were the only skills to show significant improvements relative to the control group, with effect sizes 0.56 and 1.03 SD, respectively.

Kenya Pilot Results

- Kenya's PRIMR programme produced effect sizes between 0.3 to 0.8 SD in reading.
- The mathematics outcomes were somewhat smaller in size but were still statistically significant.
- The most important factor to learning outcomes was the higher-quality student book.
- The PRIMR resulted in moderate-to-large effects for all subjects, including English, Kiswahili, mathematics, and mother tongue.

Kenya Large-Scale Intervention Results

- Tusome (a large-scale PRIMR programme) was implemented in more than 23,500 schools in 2015 and currently serves more than 2.5 million pupils annually.
- Results are not yet available for this programme; however, large-scale implementation seems promising.

Implications

Both pilot interventions—the EGRA Plus in Liberia and the PRIMR in Kenya—have been found to improve reading. However, the final results from large-scale interventions are not yet available because the Ebola crisis affected the large-scale intervention in Liberia, and in Kenya they are waiting to determine the effects of the intervention.

Differentiation of Effect Across Systemic Literacy Programs in Rwanda, the Philippines, and Senegal

eTale 2022

This study compared three localised applications of a literacy approach for resource-lean environments (in Rwanda, Senegal, and the Philippines) and examined the factors influencing its

impact in each context, considering dosage, duration, and environment.

Authors: Rachel Christina & Elena Vinogradova

Source: Christina, R. & Vinogradova, E. (2017). Differentiation of effect across systemic literacy programs in Rwanda, the Philippines, and Senegal. In A. Gove, A. Mora, & P. McCardle (Eds.), *Progress toward a literate world: Early reading interventions in low-income countries, New Directions for Child and Adolescent Development*, *155*, 51–65.

This study compared three localised applications of a literacy approach for resource-lean environments (in Rwanda, Senegal, and the Philippines) and examined the factors influencing its impact in each context, considering dosage, duration, and environment.

- All three literacy programmes (in Rwanda, Senegal, and the Philippines) were funded by the U.S. Agency for International Development (USAID).
- In Rwanda, the Literacy, Language, and Learning Initiative (L3) implemented a comprehensive, bilingual, early-grade literacy programme, including literacy standards development, training for early-grade teachers, development of print and audio teaching and learning materials, support for educational leadership, and community-based activities to support literacy.
- In the Philippines, the Basa Pilipinas programme worked to strengthen the literacy component of the new primary-grades curriculum in trilingual classrooms through standards development, teacher and school leader training, materials development, and awareness campaigns.
- Senegal's Harnessing Youth Volunteers as Literacy Leaders (HYVALL) programme improved local education outcomes by training youth volunteers to mentor students at risk of failure due to low literacy and to engage

families and communities in supporting reading.

- Across the three countries, low parental literacy, teacher absenteeism, lack of teaching and learning materials, and overcrowding in primary schools were constants.

Rwanda

- The adult literacy rate is 68%.
- The national language of instruction changed from French to English in 2009.

Senegal

- Overall literacy rates are between 50% and 60%, and below 40% for women.
- French is the official language of instruction, although less than 1% of the population speaks French as a first language.

The Philippines

- Literacy rates for those aged 10 years and older are 80%–90%; this is primarily reflective of decoding abilities (but not comprehension).
- The Philippines is a trilingual country (English, Filipino, and local languages)

The study

This study examined the literacy progress among students in Grades 1–3 during implementation of each of the projects in the three countries. Students were tested at baseline and at endline for the core reading skills of fluency and

comprehension. Contextual and demographic data was also collected.

Findings

Rwanda

- The L3 intervention demonstrated an average effect size of 0.20 SD when scaled up at the national level.
- The effects sizes for girls were nearly double those for boys.

The Philippines

- The Basa Pilipinas intervention demonstrated an average effect size of 0.51.
- Girls improved more than boys.

Senegal

- In the HYVALL intervention group, all zero scores were eliminated at endline. The results demonstrated a dramatic advantage for children over comparison peers.
- The average effect size of difference in gain scores was 1.29.
- Girls made greater gains than boys.
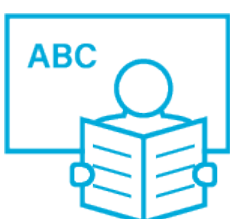
Implications

- Data can make a difference. Engaging ministry personnel in the collection of and reflection on student and teacher data has helped to motivate support and engagement that have been crucial for moving programmes forward.
- More really is better. Both dosage and duration of exposure to the literacy programmes in these countries were related to increased performance and greater effect sizes.
- Methods matter. The three literacy programmes moved beyond explicit phonics and deliberately incorporated extensive oral language development, writing, and critical thinking.

GraphoLearn India: The Effectiveness of a Computer-Assisted Reading Intervention in Supporting Struggling Readers of English

eTale 2022

The aim of this study was to determine whether GraphoLearn, a computer-assisted reading tool, could be used to support the English reading skills of struggling readers in India. GraphoLearn led to significant improvements in children's letter-sound knowledge. Thus, it offers a potential intervention to support struggling readers of English in India.

Authors: Priyanka Patel, Minna Torppa, Mikko Aro, Ulla Richardson, & Heikki Lyytinen

There are hundreds of millions of illiterate individuals in India. Those living in poverty struggle to learn English as they have no prior exposure to it and no support at home. The aim of this study was to determine whether GraphoLearn, a computer-assisted reading tool, could be used to support the English reading skills of struggling readers in India. Participants were 7-year-old, Grade 3 students (N = 30) who were not native English speakers. Grapholearn led to significant improvements in children's letter-sound knowledge. Thus, it was determined that GraphoLearn offers a potential intervention to support struggling readers of English in India.

- The population of India is over 1.3 billion, and the literacy rate is 72% among those aged 15 years or older.
- Education plays a major role in literacy; however, those living in poverty face many problems in accessing education.
- With a country-wide push towards English-medium education in India, poor students especially are studying in a language that they may have no prior

exposure to and no support at home for.

- Speaking English can influence the standard of living in India, as those with better English skills attain better job opportunities and consequently better pay.
- Slum children often have no exposure to English prior to entering school, as parents typically cannot speak English and are also illiterate in their mother tongue.

Schooling in India

- A large majority (95.9%) of children ages 6–14 years are enrolled in school across India.
- Across all languages, only 47.8% of children in Grade 5 are able to read a Grade 2 level text.
- In term of English, only 19.3% of Grade 3 children can read simple words.

What is GraphoLearn?

- This was previously known as GraphoGame.
- It is a theoretically-driven, computer-assisted tool for early reading that provides training on the connections between spoken and written language by explicitly instructing on grapheme–phoneme correspondences.

Grapheme–Phoneme correspondences

- Those learning to read need to understand the grapheme–phoneme correspondences that occur within a particular language.
- Knowledge of grapheme–phoneme correspondences directly impacts reading fluency.
- Ease of reading acquisition is greatly determined by the orthographic depth of a language.
- The grapheme–phoneme correspondences in English are more complex and context-dependent.
- English (and other opaque orthographies) might be more effectively introduced through larger units, also known

as rime units, rather than at the level of single graphemes and phonemes, although this idea is subject to disagreement.

- There tends to be consensus that early reading instruction through phonics should follow a systematic approach whereby children are taught to connect spoken language segments to their corresponding written forms.

Methods of Teaching English

Rote manner

- Children in India are taught English in rote manner.
- Students learn the names of letters, rather than sounds, and are then expected to learn 'common' words as a whole.
- Through such rote learning methods, children are unable to blend or decode unfamiliar words and are therefore only able to 'read' words that are familiar to them.

Systematic phonics

- This refers to explicitly instructing readers on the linkages that exist between letters and their corresponding sounds and how that is then used to read words.
- This approach is believed to be the most logical way to support early reading development.

The study

This study examined the efficacy of GraphoLearn, a computer-

assisted reading tool, in improving basic English reading skills of slum children in India by supporting the development of grapheme—phoneme knowledge, reading, and spelling ability.

Participants were 31 Grade 3 learners, aged 7—8 years. Students were randomly allocated to either the experimental group (which played GraphoLearn; n = 16) or the control group, which played a math game (n = 15). All students came from low-income homes with no exposure to English in the home environment. One student's data was removed because they did not participate in any of the post-tests.

Findings

- At post-test, group differences in favour of the GraphoLearn group were significant for all GraphoLearn tasks (letter-sounds, rime units, and word recognition).
- On the paper-and-pencil tasks, results revealed no significant differences between groups at either pre-test or post-test.
- For both GraphoLearn and paper-and-pencil tasks, there was a significant main effect of time on all three tasks (letter-sounds, rime units, and word recognition), with both groups showing improvement from pre- to post-test.
- For the letter-sounds task, there was a significant main effect for group and a significant interaction effect for time*group, with the GraphoLearn group showing significantly higher scores and faster development than the control group.
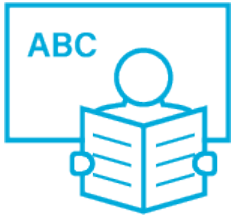
Implications

- The GraphoLearn intervention group showed the greatest improvements with the letter-sounds task; therefore, it can effectively support the development of English letter-sound knowledge among Indian children.
- Letter-sound knowledge has been identified as a critical building block in early reading development and it affects early literacy skills.
- Technology has the potential to enhance learning.
- The greatest efficiency may be achieved if technology is used to create a 'blended learning' environment in which teachers use information gathered from the technology to guide further instruction.

Great Expectations: A Framework for Assessing and Understanding Key Factors Affecting Student Learning of Foundational Reading Skills

eTale 2022

This paper reviews recent data regarding how different types of donor interventions (structural or pedagogical) have contributed to improved reading outcomes. Moreover, effect sizes are compared over a series of intervention studies conducted from 2003 to 2015. We identify the programme design characteristics and types of interventions that increase the likelihood of successful expansion of the interventions commonly referred to as 'scaling-up', the ability to sustain interventions, and the value of reading programmes in low- and middle-income countries.

Authors: Audrey-Marie Moore, Amber Gove, & Karen Tietjen

Source: Moore, A.-M., Gove, A., & Tietjen, K. (2017). Great expectations: A framework for assessing and understanding key factors affecting student learning of foundational reading skills. In A. Gove, A. Mora, & P. McCardle (Eds.), *Progress toward a literate world: Early reading interventions in low-income countries, New Directions for Child and Adolescent Development*, *155*, 13–30.

This paper reviews recent data regarding how different types of donor interventions (structural or pedagogical) have contributed to improved reading outcomes. Moreover, effect sizes are compared over a series of intervention studies conducted from 2003 to 2015. We identify the programme design characteristics and types of interventions that increase the likelihood of successful expansion of the interventions commonly referred to as 'scaling-up', the ability to sustain interventions, and the value of reading programmes in low- and middle-income countries.

- The Education for All (EFA) movement is a global commitment to providing high-quality basic education for all children, youth, and adults.
- Basic education is a human right, is central to countries' economic, social, and political development, and leads to better family health and nutrition, improved capacity of the poor to participate in the political process, and higher lifetime incomes.
- Reading skill acquisition is most effectively achieved by instruction in languages that the student speaks and understands, a phonics-based approach, and a materials-rich environment.
- To achieve basic education outcomes, a move from focusing on access to focusing on quality and learning is required.

Moving from access to learning: the EFA era

- The number of out-of-school children worldwide has been reduced by half since 1990, although approximately 57 million children and youth remain out of school.
- The 2011 global youth literacy rate of 90% masks huge regional differences; for example, in Sub-Saharan Africa, 30% of youth between the ages of 15 and 24 are considered illiterate.
- Most low-income countries failed to meet their targets. By the end of 2015 (of those countries with data), only 14 of 122 countries had ensured that 8 out of 10 children were enrolled in school, and only 13 out of 90 achieved completion rates near 97% for primary education.
- Nearly 40% of the world's children (some 250 million) do not acquire basic skills in reading and maths.
- Three major challenges have been identified: large gains are required quickly; achieving the required standard and making a system reform will not be easy; we need to be committed (and strategic) about how to do the system

reform.

The study

This paper reviews recent data on how different types of donor interventions have contributed to improved reading outcomes. Moreover, it compares effect sizes over a series of intervention studies conducted from 2003 to 2015. We present a framework for understanding how the intensity, frequency, and fidelity of the interventions as well together with the enabling environments of reform affect the magnitude and rates at which reading and learning outcomes can be expected to improve. This article identifies the programme design characteristics and types of interventions that increase the likelihood of successful expansion of the interventions commonly referred to as 'scaling-up'.

Findings

- Effect sizes of the interventions vary greatly, from 0.03 to 0.85.
- The programmes that achieved strong effect sizes focused narrowly on reading in the early grades and provided teachers with substantial support through coaching and supervision.
- The World Bank projects that tended to focus on direct

pedagogical interventions and support rather than classroom- or school-based management tended to achieve higher effect sizes; thus, they exerted greater influence on learning outcomes.
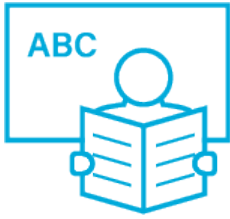
Duration of intervention

- Duration refers to the length of time that interventions are provided to participants.
- When support for interventions is provided for a longer time, the chance that those interventions will take hold and demonstrate positive results increases.

Dosage of intervention

- The 'dosage' refers to the frequency and intensity (or strength) of interventions, and is found to make a difference to outcomes.
- Implementation dosage refers to strength of preparation that stakeholders (such as teachers) receive to deliver an intervention (for example, pedagogical method).
- Intervention dosage refers to the frequency with which an intervention is provided to a particular stakeholder.
- One 'dose' of an intervention is usually not enough. Professional development interventions should be delivered more intensively, and usually with a longer duration or higher frequency to make a difference.

Enabling environment

- This refer to a set of interrelated conditions (political, institutional, technical, and cultural) that affect the capacity of actors (teachers, parents, communities, donors, and governments) to engage in development processes in a sustained and effective manner.

Implications

- Dosage and duration of intervention as well as an enabling environment affect the success of the intervention.
- Donors and implementers should endeavour to instigate more comparisons between different approaches within their implementation designs and test multiple hypotheses to answer key policy and practice questions.