CURRO in the classroom

ISSUE 2 2017

CULTIVATING OUR LEARNERS' NUMERICAL, READING AND IT SKILLS

Building numerical reasoning skills in the **FOUNDATION PHASE**

NUMBERSENSE – a strong sense of number is at the heart of being able to do Mathematics

IT CURRICULUM FOR GRADES 1 TO 9 IN CURRO SCHOOLS

READING IS **THINKING!**

Message from André

Preparing our learners for the challenges of tomorrow and the future

At the Curro Curriculum Management and Delivery centre, there is a constant focus on preparing our learners and educators for tomorrow and the future. Throughout the world there is a focus on engaging learners in authentic and extended tasks which ensures deeper learning. **Ted Sizer explained it as 'helping young people learn to use their minds well.'**

One of our challenges is to make sure that our educators also develop skills to ensure that deeper learning takes place in all our schools. Curro educators are therefore fully aware and focus on the six deeper learning competencies our learners need to flourish in today's complex world:

- Mastering core academic content
- Thinking critically
- Solving complex problems
- Working collaboratively
- Communicating effectively
- Learning how to learn and developing academic mindsets

We also realise that our learners still need the basic **literacy, numeracy and digital skills** to be successful in the future.

The development of our learners' reading skills starts in Grade R with our phonological awareness programme. There is a constant focus on decoding and comprehension to ensure that our learners develop all the necessary reading skills. Developing the necessary reading skills is a process whereby we gradually release responsibility (shared and guided reading). Skills are introduced and modelled until learners independently master it. By recording and analysing each learner's reading records we ensure that our learners read books that match their own reading level. They can therefore enjoy reading and become confident readers.

To make sure that our learners develop their numeracy skills in such a way that they will be able to cope with the challenges of Mathematics in the Further Education and Training phase (Grade 10 to Grade 12), we train our educators to make use of the problem-centred approach. The problem-centred approach does not impose formal methods on learners, but legitimises and builds on the intuitive and informal knowledge children already possess. Learners are challenged to tackle sensible problems using their common sense, and compare their answers to reach agreement. Educators support our learners to develop their own number concept so that they are positive and confident about their own abilities in Mathematics.

We also developed our own Information Technology curriculum that is now implemented from Grade 1 to Grade 9. The Curro IT curriculum gives expression to the 21st century skills that is essential in teaching and learning in all our schools. This curriculum aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives.

By ensuring that our learners master the basic skills and through the continuous development of our educators, our learners will adopt the necessary skills to flourish in today's complex world.

André

André Pollard
CCMD Manager

BUILDING NUMERICAL REASONING SKILLS IN THE **FOUNDATION PHASE**

Our classrooms are filled with learners who view Mathematics as a collection of rules and procedures to memorize, instead of a system of relationships to investigate and understand.

When instructing Mathematics, educators should concentrate on ways to guide learners to find their own strategies to understand and resolve mathematical problems. Learners need to be able to make sense of their own thinking. They have to be able to communicate their own and their peers' way of thinking when solving problems accurately and efficiently, while showing a flexible approach. They must also be able to justify their solutions to problems when they can find an answer mentally.

Accuracy is the ability to produce an accurate answer, whereas efficiency shows the ability to choose an appropriate strategy. Flexibility refers to the ability to use number relationships with ease in computation.

Learners often have a 'fear to fail' attitude, leading to learners withdrawing from the group instead of participating in reflection and discussions. We learn by making mistakes. To make a mistake does not mean you are a failure.

Educators should create a classroom environment where learners feel safe and are comfortable in offering responses for discussions, questioning themselves and their peers, and investigating new strategies. The culture of the classroom should be one of acceptance based on a common quest for learning and understanding. It takes time to establish a community of learners built on mutual respect, but if you consistently set this expectation from the beginning, learners will respond. A first step towards establishing a respectful classroom learning community is acceptance of all ideas and answers – regardless of any obvious errors. Rich mathematical discussions cannot occur if this expectation is not in place. We must remember that incorrect answers are often rooted in misconceptions and unless these ideas are allowed to be discussed, we cannot help learners confront their thinking. Learners who are in a safe learning environment are willing to risk sharing an incorrect answer with their peers to grow mathematically. This should be allowed which will help learners to confront their thinking. Successful reflection and sharing strategies used is rooted in communication. All answers, even incorrect ones, should be discussed.

The benefits of sharing and discussing computation strategies may lead to the following:

- Clarify thinking
- Applying mathematical relationships
- Explore different efficient strategies
- Decision-making when choosing different strategies
- Considering and testing different strategies

The primary goal of building a sense of number is to help learners to understand Mathematics and to find different strategies to solve mathematical problems.

As educators, we are accustomed to assuming the roles of telling and explaining. This is the method many of us experienced at school and we may have a tendency to do the same in our own classes. Our role must shift from being the sole provider of information and confirming answers to the role of facilitator, questioner, listener and learner.

(Acknowledgement: Sherry D Parrish – University of Alabama).

NumberSense

A strong sense of number is at the heart of being able to do Mathematics

Number sense is developed in the early years of schooling and lays the foundation for all mathematical development.

The NumberSense and Companion Workbook Series has been created to support children's development of a robust sense of number and deep understanding of Mathematics. The series is responsive to the developmental needs of children, is informed by current research on how children learn Mathematics and provides a comprehensive Mathematics solution for Grades R to 7.

In the early workbooks the development of number sense starts with foundational concepts and understanding in a low number range. As children progress through the series they are supported and encouraged to develop increasingly sophisticated strategies and deeper understanding in higher number ranges. The NumberSense and Companion Workbook Series provides regular (daily) practice. Children should (if they are working in the correct book) be able to work independently from one page to the next, asking for help and guidance if needed. The richly-illustrated and engaging workbooks are used in a wide range of different ways. From schools who use the NumberSense and Companion Workbook Series as their Mathematics programme[1], to schools that use the series as an integral part of both their extension and remediation programmes. From corporates and volunteer organisations that provide the series to children and schools as part of their corporate social investment projects, to parents who homeschool their children and others – the series is gaining in popularity. As the workbooks are being used more widely, the body of both anecdotal and more rigorously researched evidence in support of the efficacy of the series is growing.

The NumberSense and Companion Workbook Series consists of:

- Grade R (two 48-page NumberSense Workbooks that are mediated by the educator).
- Grades 1 to 3 (available in all South African languages):
  - Four 48-page NumberSense Workbooks per year (a page a day).
  - A set of classroom activities[2] for each grade that assist educators with measurement, geometry and data handling.
- Grades 4 to 7 (available in English and Afrikaans):
  - Three to four 48-page NumberSense Workbooks per year (a page a day).
  - An 80-page Companion Workbook for each grade that deals with measurement, geometry and data handling.
- Support materials and activities:
  - Web-based user guides and downloadable print masters of teaching aids.
  - Classroom resources (GeoGenius Construction Kit, GeoGenius Visualisation Kit, number lines, Flard cards, projection CD).
  - Regular educator-parent workshops in major centers across the country.

In all applications, the series allows for differentiated learning support, independent engagement by children and the opportunity to experience Mathematics as a meaningful sense-making activity. Educators (and parents) play an important role in the success of the series. Not only is there a need to ensure that children are working in the most appropriate workbook, but educators also need to monitor children's progress for the identification of problems, misunderstanding and necessary interventions. Furthermore, it is critical that educators (and parents) discuss the activities with the children: ask children to explain their answers, to describe any patterns they may have observed, and invite them to ask questions. This contributes to their development of a strong sense of number.

The NumberSense and Companion Workbook Series was created in response to the South African reality in which many children's mathematical careers end as early as Grade 4. The reason is quite simple. In the absence of sense-making, young children typically develop a wide range of idiosyncratic calculation strategies (rules) which appear to result in 'correct answers'. As the number range in which children work grows, these strategies increasingly let children down causing struggles, frustrations and children eventually giving up on Mathematics.

By focusing on sense-making, understanding, reasoning and the development of fluent and flexible calculation strategies, the series supports a more meaningful experience of Mathematics for children.

Please visit www.NumberSense.co.za for more information.

Footnote:

1. The NumberSense and Companion Workbook Series is aligned with the South African Mathematics curriculum. That said, the way in which topics are addressed does not always coincide with the sequence of the current CAPS document. Concepts in the NumberSense and Companion Workbook Series follow a developmental trajectory and are visited and revisited on a regular basis. With the completion of each workbook a child 'covers the curriculum' and by completing the workbooks intended for each year the child does so several times.
2. Available from May 2017

READING IS THINKING!

Well-developed reading and viewing are central to successful learning across the curriculum. Learners develop proficiency in reading in a wide range of literary and non-literary text, including visual text. Through guided and independent reading learners become critical and creative thinkers.

Reading gives learners more exposure to their language. Vocabulary development is heavily dependent on the amount of reading they do.

To become good readers who comprehend what they read the learners must use reading strategies.

1. Prior knowledge – What do you already know?
2. Prediction – Can you predict what is going to happen?
3. Visualising – Can you visualise the story in your mind?
4. Connections – Can you make connections between what you read and your prior knowledge?
5. Questioning – Does the story make sense?
6. Inferring – Can you read the line?
7. Summarising – What is the main idea and supporting details of the story?
8. Self-monitor – Did you reread the text to understand what you read?
9. Synthesise – Can you combine your prior knowledge with new ideas?
10. Skim and scan – Can you use the fast reading techniques when you read?

Reading strategies help learners to understand the meaning of the text and not just to be able to read the words.

Good readers often use reading strategies without even realising it.

The main aim of using reading strategies is to help learners to understand what they are reading, which makes reading much more fun!

What do good readers do?

Before reading
- Activate prior knowledge → What do I already know about this topic?
- Predict/make inferences → I predict this book will be about … because …
- Question → I wonder why …

During reading
- Make connections → I know what that feels like because …
- Visualise → I can make pictures in my mind
- Make inferences → I think that what the author is trying to tell me is …
- Question → I wonder why …
- Revise and adjust predictions → I predicted … would happen, but now I think …

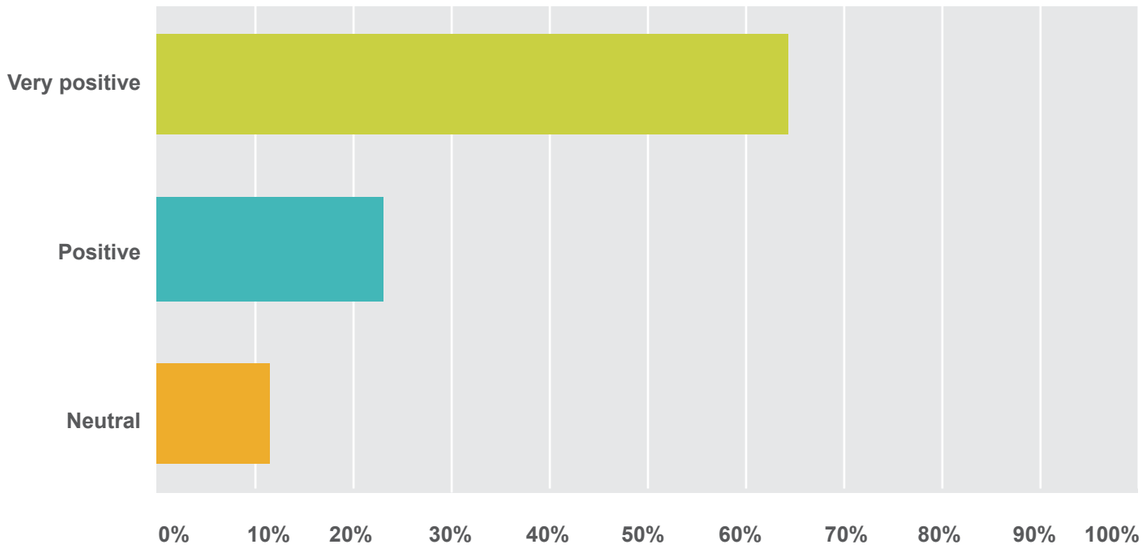
After reading
- Retell/summarise → The main idea of the story is …
- Synthesise → My ideas have changed after reading this …
- Revisit predictions → At the beginning, I predicted that …
- Question → I'd like to find out why …
- Evaluate the text → I found this book useful for my report because …

IT CURRICULUM

FOR GRADES 1 TO 9 IN CURRO SCHOOLS

Background

In 2015 Curro used a survey to determine whether primary schools have IT curricula and concluded that only a few were offering it. On the question of a standardised curriculum, the idea ranged from neutral to very positive – see graph below. An IT road trip was planned in four clusters to workshop what this curriculum should contain.



IT road trip

The results of this road trip concluded that the foundation phase IT should include programs of a playful nature. The intermediate phase should focus on essential programs like MS Office as well as coding and the senior phase should venture into programming languages like Java, C+, Python and Delphi.

This curriculum therefore aims to ensure that children acquire and apply knowledge and skills in ways that are meaningful to their own lives.

The curriculum

The curriculum is based on six focus areas as shown in the diagram.

To become an expert digital learner, they need to have knowledge of communication, systems, the Internet, information management, social platforms and solution development which includes all software packages.

One hour per class is set aside for IT. Solution development entails about 60% of the curriculum and is tabled below.

Software packages for the different grades:

Gr	Term 1	Term 2	Term 3	Term 4
1	Tux Paint	Tux Typing	TuxMath	TIM 2
2	MS Paint	Tux Typing advance	TuxMath advance	The Incredible Machine 3
3	Picture Gallery Animations	Moviemaker	Intro to Internet Minecraft	Intro to Email
4	Word Processing	Inkscape/Movie Maker	Freemind/QR Coding	Coding (Scratch 1)
5	Word Processing adv	Spreadsheets	Presentation Programs	Coding (Scratch 2)
6	MS Publisher	Spreadsheets adv	Presentation Programs adv	Coding (Scratch 3)
7	Recap on Office MS Publisher	Alice	Alice	Alice
8	MS Office and Alice	Greenfoot	Greenfoot	Greenfoot
9	Java Fundamentals	Java Fundamentals	Java Fundamentals	Java Fundamentals

Training

Across the world learners are coding on 'virtual platforms' using Scratch, from MIT, and Alice and Greenfoot, from Oracle. The teaching of these skills has also been included in the Curro IT curriculum that was rolled out in 2016 and 2017.

To empower our educators to be able to facilitate these courses, Curro arranged IT camps at the beginning of 2016 and 2017 to train them on this software. One educator per school was trained with the idea that this champion would return to the school to empower his/her colleagues. An educator who has attended both these camps should be able to facilitate all the programs for Grades 1 to 8 as set out in the table on the previous page. Java Fundamentals will be introduced at the IT camp planned for 2018.

Assessment

The assessment planned for the IT curriculum is more of an appraisal system. Focus is placed on gaming principles where learners enter the flow of learning with little anxiety.

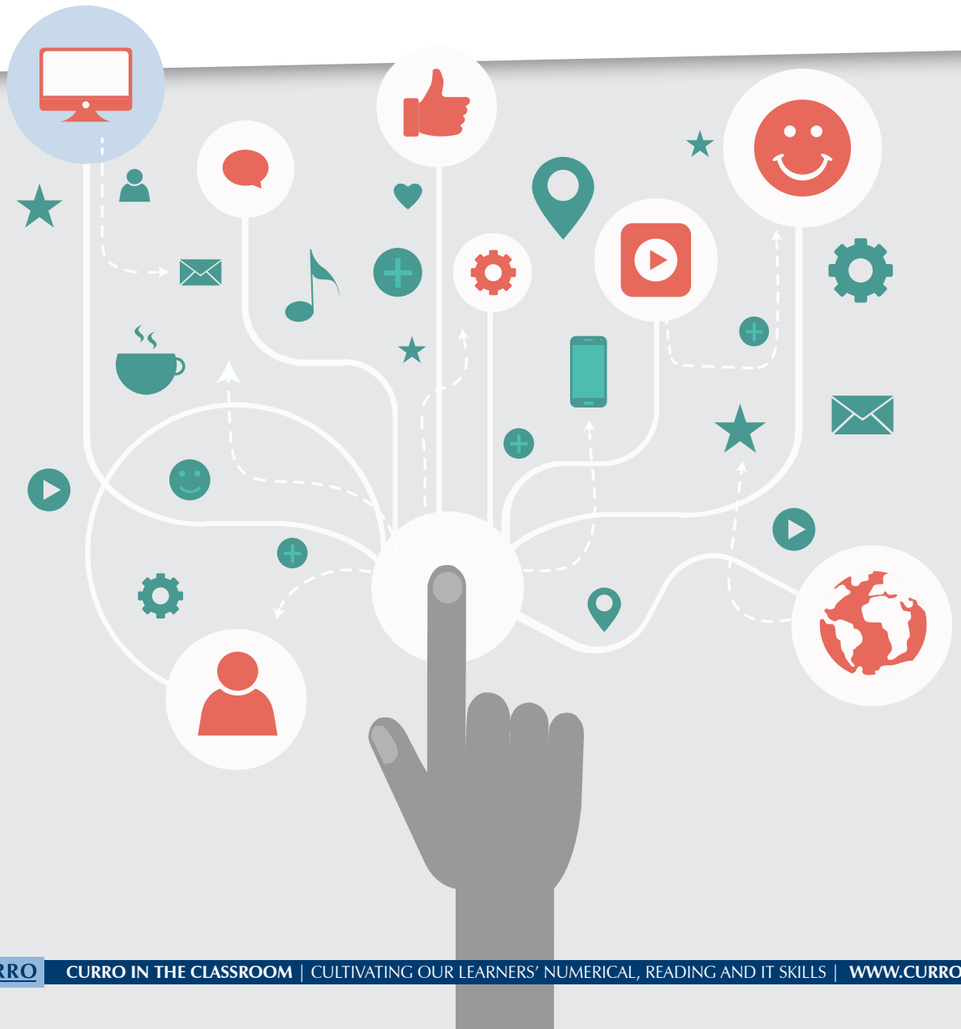
> *'It is important for educators to realize the potential of play and to work towards making learning more like play so that the learners will enter the flow of learning (Csikszentmihalyi, 1996; Jong et al., 2008).'*

If educators plan to assess the IT curriculum in a way that most subjects are assessed, then learners will lose interest as it will become part of their workload at school that they need to master.

> *'… when play is replaced by work children no longer engage in learning with the same effortless flow resulting in reduced motivation and less overall performance (Csikszentmihalyi, 1996; Shelton & Wiley, 2007).'*

Assessment can be done in the form of recognition. For Tux Paint, the educator can display the best ten pictures. For TuxMath, the best scores can be displayed. The week after, the best progress can be displayed to give the more-time-learners an opportunity to be appraised. For MS Publisher, a group can work on the school's newspaper, etc. In Scratch learners can write games and Alice is a storytelling software programme. Educators can use their imagination in order to appraise.

In conclusion, think about learners and their cellphones. No formal training, no formal assessment; yet they thrive on it. Let's do the same with IT – it is not very different!



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