



SANDBOX RESEARCH COMPENDIUM 2023

Emerging Insights from the
Sandbox Schools Project

edhub

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Chapter 1

Executive Summary

In an era marked by rapid change, education systems face the imperative of equipping learners to navigate complexity and uncertainty. Yet empirical studies indicate that the majority of formal education systems are falling short of adequately preparing youth for life beyond school (Fadel et al., 2015). Over the past three years, the NECT's innovation unit, known as the Edhub, has worked to better understand and contribute to the local evidence base to assist the basic education sector in preparing young people to thrive in a fast-changing world. In 2018, the NECT Edhub embarked on a multi-year research venture to explore how education fit for the 21st century and beyond could be realised in South African public schools. The research project, referred to as the Sandbox Schools Project, had a planned duration

of three years. The Sandbox Schools Project included designing, prototyping and researching a number of interventions in 11 South African public primary schools, intended to deliberately develop social, emotional and cognitive competencies for a changing world alongside content knowledge in specific grades and subjects.

This research compendium stands as a repository of insights gleaned from the Sandbox Schools Project from 2020 to 2023. The Edhub executed and studied numerous interventions within the Sandbox Schools, and the ensuing section highlights key discoveries and takeaways from the research. More comprehensive articles on each intervention accompany this summary, providing a deeper dive into the findings.

Key Insights from the Sandbox Schools Project Interventions 2020-23



COMPETENCY-BASED LEARNING PROGRAMME (CLP)



Timeframe: Jan 2020 to 2022 (3 years)

A structured learning programme that deliberately incorporates competencies into Grade 1 Home Language, consisting of daily lesson plans, classroom resources, quarterly training, light-touch coaching and ongoing support.

Key insights:

CLP training is relevant to teaching in the classroom

Confidence to implement the CLP increases with more exposure to training

Teachers need time and practice to fully understand the competencies

Teachers can articulate why they believe the infusion of competencies in teaching is beneficial for learners

Teachers' understanding of competencies influence their enactment in literacy lessons

Previously entrenched methods can serve as barriers to exploring new pedagogies

This intervention introduces a sensorially enriching classroom experience, encouraging students to actively engage with and manipulate building blocks and an array of materials, effectively harnessing the power of play as a learning tool.

Key insights:

- More training sessions and teaching support materials are needed for effective implementation
- Tinkering comes highly recommended by educators as an impactful teaching approach
- Tinkering kits can be used by teachers across grades and subjects, but require tailored implementation
- Inclusive learning tools are especially beneficial for students with learning difficulties
- Fosters creativity, deeper learning and collaborative experiences in the classroom

A daily mindfulness-based routine at the Grade 5 level designed to equip teachers with 5-10 minutes of mindfulness activities and practices they can do in the classroom.

Key insights:

- Teachers observed benefits of facilitating mindfulness in the classroom
- Training was practical, but more teacher training is needed
- It can be challenging to implement mindfulness in large classrooms
- Teacher buy-in improved as teachers observed benefits of mindfulness practice



Reading the Big Book as part of the Grade 1 Competency-based Learning Programme



ROBOTICS & CODING (R&C)

Timeframe: Aug to Nov 2021 (4 months)

The interventions involved professional development of in-service teachers and initial teacher education on R&C implementation, as well as the provision of R&C kits which learners used in Natural Science and Technology group projects.

Key insights:

Effective teacher training is an essential pre-requisite for R&C integration into schools

To adequately prepare future teachers, R&C should be introduced in initial teacher development programmes

Collaborative learning was the preferred pedagogical strategy for teaching R&C in schools

Adequate dosage and ergonomic resources are required to improve learning outcomes

Group tasks using robotics kits help to improve learners' communication, collaboration, creativity, computational thinking, critical thinking and problem-solving skills

Learners expressed positive sentiments towards the R&C group project

Teachers viewed learners in a new light as previously unobserved learning potential was revealed during R&C activities



SCHOOL CULTURE FOR A FAST-CHANGING WORLD

Timeframe: March 2020 to May 2023 (3 years)

A series of participatory workshops with school leaders to co-create an environment conducive to learning in a fast-changing world.

Key insights:

Focusing on social-emotional learning for school leaders, teachers and students is key to the effective management of schools during a global pandemic

Social emotional learning is as important as the academic curriculum

A neuroleader is the future-fit leader

Technology and digitisation are essential tools in creating future-fit schools

Strengthening school-community partnerships is important for successful teaching and learning in rural primary schools

Collaboration and adaptability lead to innovative changes



 *Timeframe: August to October 2022 (3 months)*

The DBE conducted a series of consultative workshops with education stakeholders to identify what they think are the most important attributes, tools, skills or competencies that South African learners need to develop while in school.

Key insights:

Participants highly prioritised the following learner competencies/tools/attributes: communication, critical thinking, technological competence, problem solving, financial competence, resilience, respect, digital literacy, organisational competence and collaboration

Participants suggested that learners should also have acquired knowledge on several cross-cutting priorities before exiting Grade 12

80.5% of the participants thought that learners in non-fee-paying schools leave school with inadequate tools/attributes to succeed in life beyond school

62.5% of the participants thought that learners leave fee-paying schools with adequate tools to succeed in life beyond school

Introduction to the Edhub

The Edhub, the innovation unit of the National Education Collaboration Trust (NECT), is mandated to design and drive education innovation to assist the South African basic education system in preparing for the demands of a fast-changing world. The purpose of the Edhub is to learn on behalf of the broader basic education system about teaching and learning practices that are relevant to the changing world, and to explore how these

practices could impact, at scale, the South African education system. This occurred primarily through iterative Research and Development (R&D) within the 2020-2022 Sandbox Schools Project and by conducting advocacy within the broader education sector. Learnings emerging from the Edhub are being used to inform shifts in both policy and practice.



About the Sandbox Schools Project

This research compendium is a collection of emerging learnings for the period 2021 to 2022 from the R&D unit within the Edhub, the Sandbox Schools Project. The Sandbox was a three-year research project that explored approaches to competency-embedded education in South African public schools. The project ran from 2020 to 2022 with the Sandbox Schools – a group of 11 quintile 1-3 primary schools based in Limpopo and

Soweto. The aim of the Sandbox was to prototype teaching and learning practices for a fast-changing world within the context of a typical public school to gather evidence on practices and models that could be considered for use in South Africa. As the project progressed, emerging learnings were shared with the Department of Basic Education (DBE) and education sector stakeholders, providing practical tools for programming and contributions

to the advancement of theoretical understandings in the field; this was achieved via formal and informal channels such as dialogues, research papers, book chapters and policy briefs.

This is the final Sandbox research compendium, which documents learnings from 2021 to 2022 and reflects on the evolution of the project and its outcomes over three years. The interventions and research conducted in the Sandbox have contributed significantly to a deeper understanding of what competency-embedded teaching and

learning could look like in South African schools, and how teachers and school leaders experience and internalise these changes. Each research article in this compendium explores the process of intervention design, provides insights into teacher and learner experiences of the intervention, and proposes recommendations for taking these insights further.

The table below provides an outline of the interventions and research conducted with the Sandbox schools between 2019 and 2022.

Interventions and research in Sandbox schools (2019-2022)

Intervention	Description	Target group	Timeframe
Competency-based learning programme (CLP)	A structured learning programme designed to provide support to teachers to enable them to include skills and competencies deliberately and systematically in their daily teaching.	Grade 1 Home Language	2020-2022
School culture	Participatory intervention with school principals from 10 Sandbox schools over a period of three years to co-create an approach to school leadership in a fast-changing world.	School principals and SMT	2020-2022
Robotics & coding	In-curriculum or extra-curricular robotics and coding activities in the intermediate phase, designed to develop competencies for a changing world.	Phase 1 & 2: Grade 4, 5 & 6 Phase 3: Gr 6	Pre-pilot: 2018-2019 Sandbox: 2021-2022
Tinkering	Exploratory intervention using tinkering kits in classrooms, across subjects and grades	Grades 1 to 7	2022
Mindfulness	Daily 5–10 minutes mindfulness exercises, facilitated by teachers, to explore the development of mindfulness in schools and classrooms	Phase 1: Whole school Phase 2: Grade 5	Phase 1: 2020 Phase 2: 2021
Sandbox@ Home	COVID-response mini-intervention consisting of a resource pack of home-based learning activities for families of Grade 1 learners, designed to facilitate learning during school closures, through stories and play.	Grade 1 Home Language	2020

Looking ahead

Insights from the past three years of Sandbox research have contributed to a growing body of knowledge on ways to develop social, emotional and cognitive competencies in South African public schools. Some of the Sandbox interventions – such as the CLP – have provided exemplars and prototypes for further development and larger scale piloting and have contributed to building

an understanding of ways to strengthen teaching and learning so that it better equips learners to thrive in a fast-changing world. These insights, among many others, are being used in support of the DBE’s National Curriculum Strengthening initiative.



Chapter 2

The Competency-based Learning Programme

Prototyping the deliberate inclusion of competencies for a fast-changing world in the taught curriculum

Introduction

The world is changing fast and there is increasing consensus that education systems need to prepare young people to thrive in contexts of complexity, uncertainty and rapid change. However, research evidence suggests that the majority of formal education systems are not adequately preparing young people for life after school (Fadel et al., 2015), and that schools need to foster a breadth of competencies that will enable young people to better navigate an uncertain future (Winthrop, 2018). While the Brookings Institution found that the current South African curriculum contains many of the competencies required for a fast-changing world, it highlighted several challenges regarding the deliberate and systematic implementation of

the competencies in the classrooms (Care et al., 2017).

To assist the South African basic education sector in preparing young people to thrive in a fast-changing world, the NECT Edhub has been exploring how learners and teachers in South African public schools can be better equipped with the knowledge, skills, competencies and values needed for success in the 21st century and beyond. This exploration was undertaken through the implementation of the competency-based learning programme (CLP) intervention in the Sandbox schools in 2020-2022.

Description of the Intervention

The approach of 'competency infusion' takes the current curriculum as a vehicle for more deliberate teaching of 21st century skills and competencies, through existing content knowledge. This approach acknowledges the intertwined relationship between content knowledge and skills, as it does not advocate for competencies to be taught separately or as add-ons (Willingham, 2007; Fadel et al., 2015). Rather, it proposes that the competencies for a changing world should be learned with and through the teaching of content knowledge, through relevant pedagogical practices and content choices.

As part of the ongoing work to understand how to deliberately infuse social, emotional and cognitive competencies into the existing South African schooling curriculum, the Edhub in collaboration with Class Act Education Services and the University of Johannesburg (UJ) Faculty of Education, developed the CLP. The underlying

premise for the CLP intervention is that the approach may be applied to any subject, in any grade. However, for the purposes of learning, and to improve the design of the intervention, the CLP was prototyped in Grade 1 Home Language classrooms in the 11 Sandbox schools. [The CLP consists of the following:](#)

- 1 Quarterly training for teachers and Head of Department (HoDs) on the implementation of the methodologies;
- 2 Provision of competency videos to enrich teacher training;
- 3 Provision of materials for teachers (such as a detailed lesson guide, Big Book of themed stories per term, and supporting classroom resources); and
- 4 Light-touch coaching.



What is the CLP?

The CLP is a structured learning programme for teachers that aims to equip them to develop competencies for a changing world in their learners, whilst delivering the CAPS curriculum. The CLP consists of structured lesson plan exemplars, supporting materials and accompanying teacher training and support, all explicitly designed to develop learner competencies.

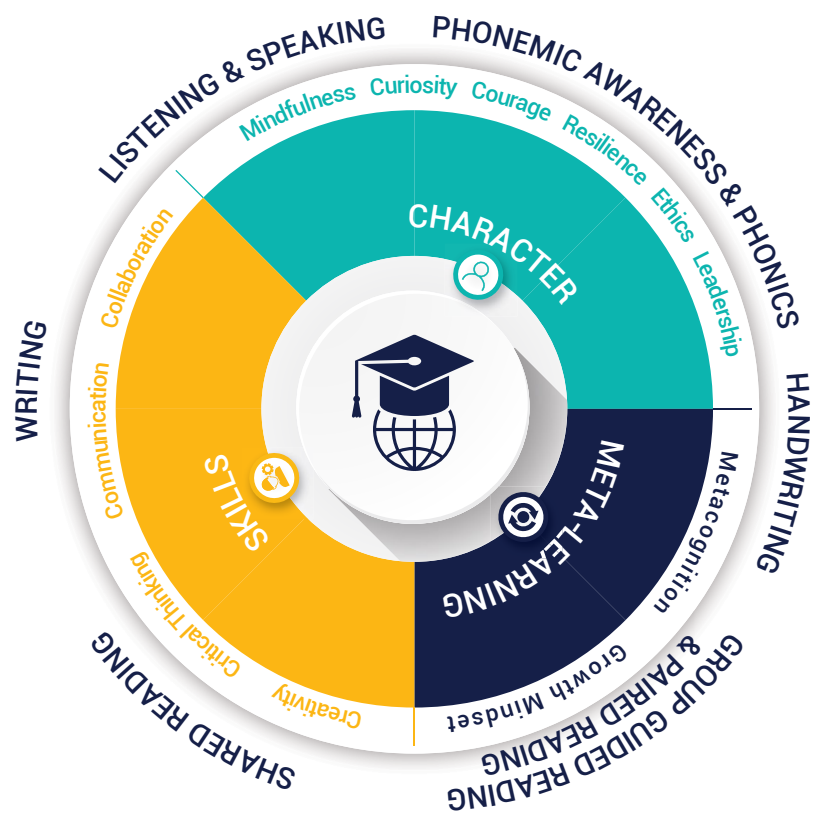


What is the primary objective of the CLP?

The primary objective of the CLP is to provide scaffolding to teachers and empower them to deliberately and systematically develop competencies for a changing world in their learners, through the delivery of the CAPS curriculum.

The CLP embeds 12 competencies into a structured, CAPS-aligned tool with which many public-school teachers are familiar (structured learning programmes [SLPs]), thereby providing teachers with the necessary scaffolding to deliberately infuse these competencies into their teaching. The CLP combines evidence-based literacy methodologies (Kim & Davidson, 2019; DBE, 2017) with pedagogies to promote the deliberate

development of competencies for a changing world (such as mindfulness, growth mindset, critical thinking, creativity and ethics). It introduces a structured weekly routine, methodologies and themes which are designed to develop literacy skills outlined in the curriculum and systematically help learners develop the 12 competencies shown in the CLP framework.



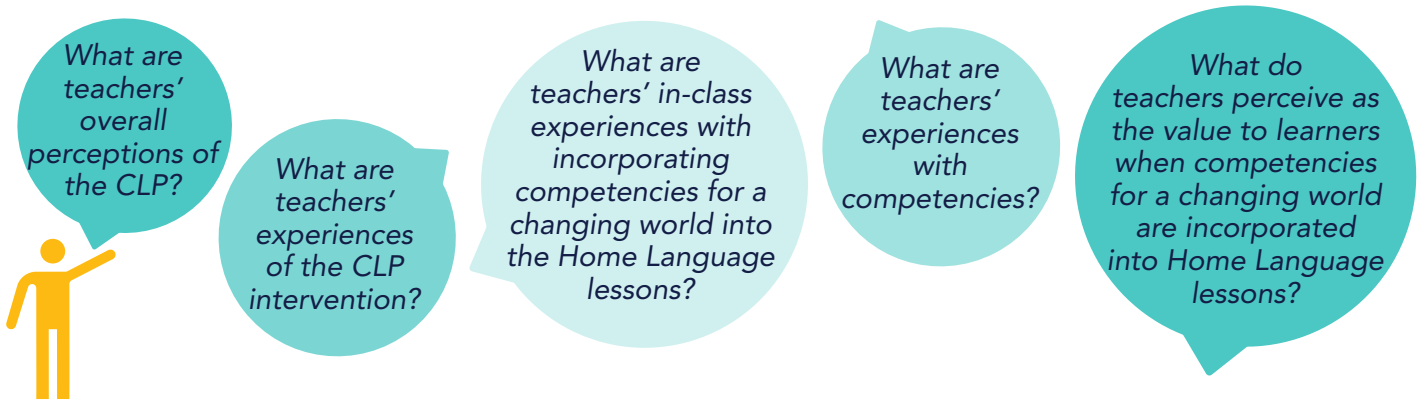
The CLP framework shows the relationship between competencies (inner ring) and methodologies for developing literacy (outer ring), highlighting that these methodologies can be vehicles for developing competencies through deliberate pedagogical and content choices. The 12 competencies are listed in the inner ring as part of three broad categories: skills, character, and

meta-learning. The framework's outer ring lists the components of the structured literacy development programme made of evidence-based routines and methodologies. The design of the CLP uses this framework to develop specific competencies through any given methodology in an integrated and seamless way.

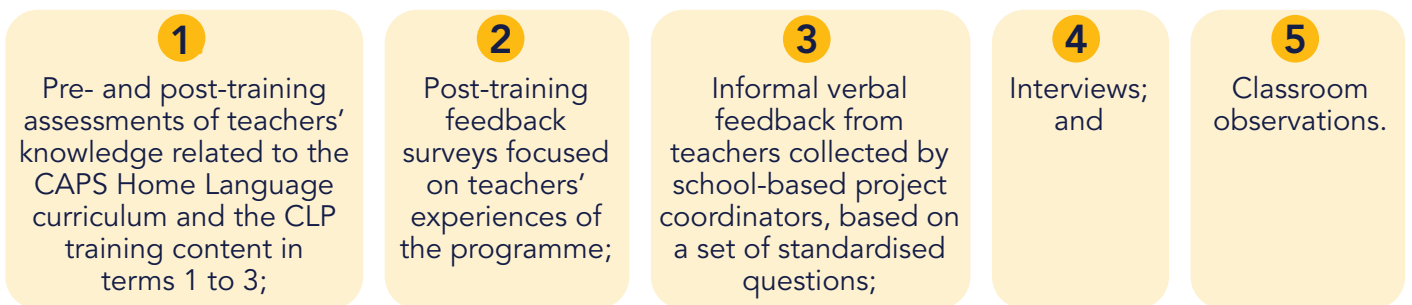
Insights from Teachers' Experiences of the CLP

Insights discussed in this section are drawn from research conducted with Grade 1 teachers at the 11 Sandbox schools from 2020 to 2022. Using a mixed-methods approach, the study explored

teachers' experiences and perspectives regarding the competency-based learning programme (CLP). During the prototyping phase, the research aimed to address the following research questions:



To gather information on teachers' experiences and perception of the CLP, the following data were collected:



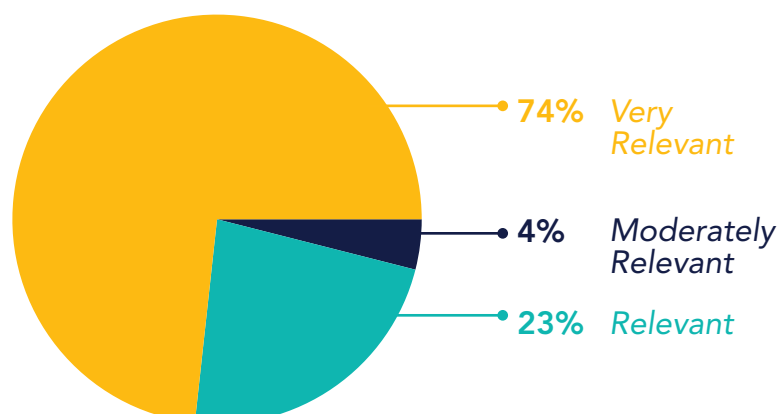
The key insights derived from a combination of qualitative and quantitative data analysis are briefly discussed below.

1. CLP training is relevant to teaching in the classroom

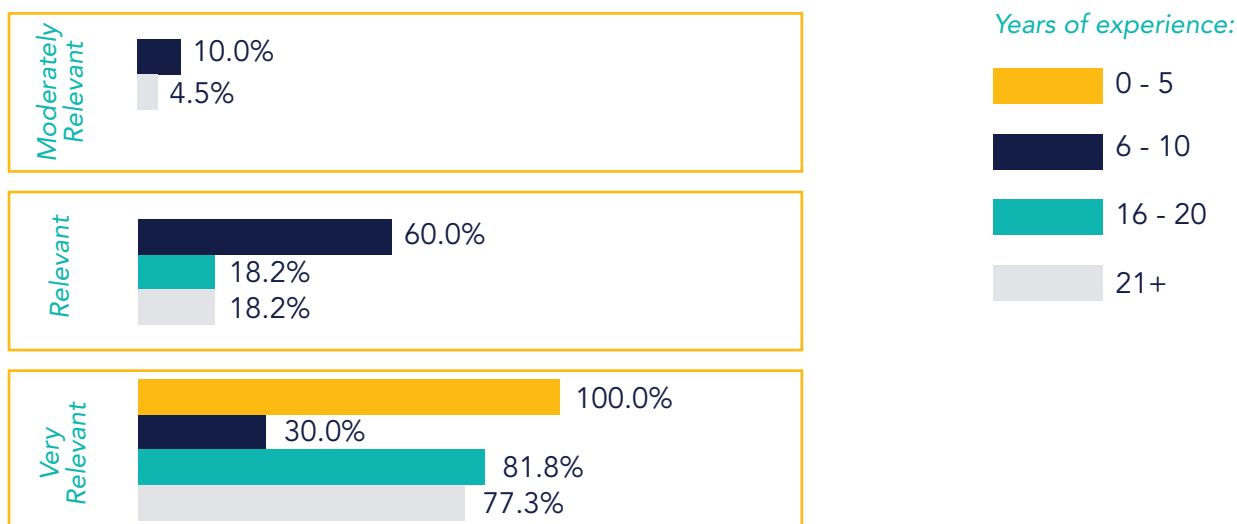
Through a survey, 29 teachers were asked to rate the relevance of the CLP training to teaching their Grade 1 Home Language (HL) lessons. More than 90% of teachers considered the CLP training to be "extremely relevant" or "relevant" to their

teaching in the classroom and none of the teachers consider the CLP to be irrelevant. Interestingly, the perception that the CLP is relevant and important is shared across teachers with varying years of teaching experience.

CLP Training Relevance



Training Relevance by Teaching Experience Groups



Percent of Respondents by Teaching Experience →

When asked during interviews whether or not the CLP training is relevant for teaching in the classroom, teachers' responses included:



The training was relevant and appropriate for the teachers. The knowledge of content on the facilitator side was rich. (Teacher 2)



What I like about it is the training it provides They show us [to] do this and do it this way so it can fit our situations. Like last time I went to the training they showed us how to do classroom management. (Teacher 3)

2. Training content is detailed enough and the course structure is learner-friendly

Feedback from teachers suggests that they appreciate the quality and design of the training received. Teachers were asked to rate not only the level of detail of the training content but also how easy it was to follow the course sequence and flow: more than 60% rated the course content as very detailed. Similarly, the majority of teachers found

the sequence and flow of content to be very good. Although none of the teachers gave a negative rating, there is room for content improvement since 8% of the teachers reported that the content is moderately detailed and a few reported that they had difficulties with the group guided reading.

3. Confidence to implement the CLP increases with more exposure to training

As the training dosage and exposure to the programme increases, teachers grew in confidence to implement CLP in their classrooms. In 2022, during term 1, approximately 82% of the teachers reported that they were highly confident in implementing CLP in their classrooms, whereas in term 2 the percentage rose to 92%. Perceptions of the training content seem to influence the teachers'

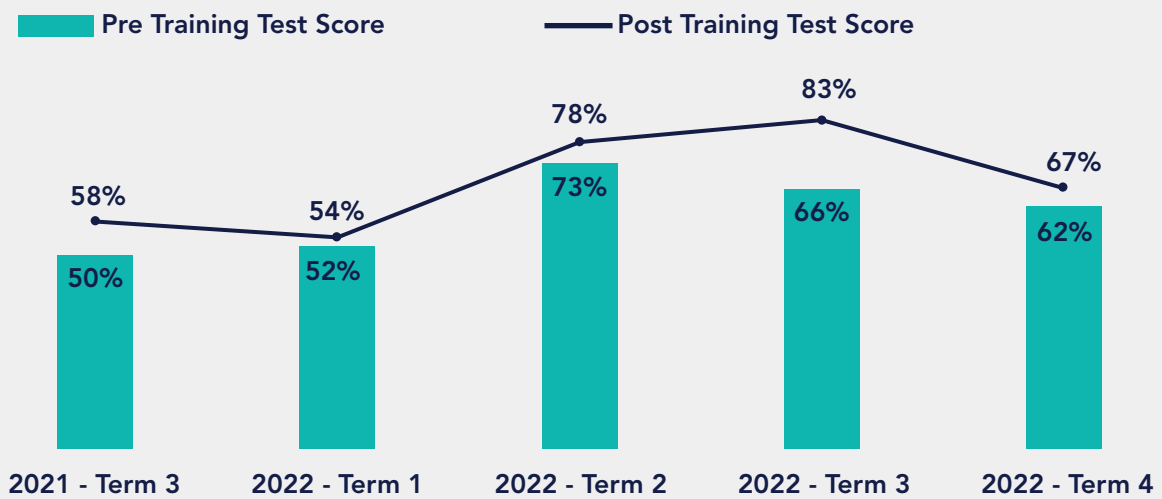
confidence to embed competencies in their lessons. We observed that teachers who rated course content as very detailed had a higher probability of reporting high confidence to implement the CLP in classrooms compared to those who rated course content as moderately detailed; the probabilities are 0.97 and 0.2, respectively.

4. Teachers need time and practice to grasp an understanding of the competencies

Between 2021 and 2022, teachers completed pre- and post-training assessments which were developed to test their knowledge of both Home Language curriculum content and CLP training content. In general, pre- and post-training test results indicate an improvement in teachers' knowledge of CLP methodologies and CAPS curriculum content after each training session and over time. However, as with other programmes, the improvements stem from a relatively low

base of knowledge. Test scores also suggest that teachers understood the section of the training relating to the implementation of literacy routines and methodologies to a greater extent than the competency-infusion aspects of the programme; understandably, the teachers struggled to grasp content on CLP methodologies (including competencies) because these were relatively new concepts.

Teachers' test scores on knowledge of CLP methodologies



5. Teachers can articulate why they believe the infusion of competencies is beneficial

During interviews, teachers were asked whether they considered it important to incorporate the competencies into teaching, and all teachers reported that it was important. Several teachers stated that the infusion of competencies in their

teaching is important for learners because it will enable learners to thrive in a changing world. Examples of teacher responses regarding the value of the CLP to learners are as follows:



The world is changing; we do not know [what] the future is going to be like. So, for that reason, we must help and teach our learners competencies which will enable them to be independent tomorrow. (Teacher 1)



It is important, because they say it is [an ever] changing world ... so if we do not teach them now how things are going, like ... technology and other things ... in future they will suffer. (Teacher 2)

6. Teachers' understanding of competencies influenced their enactment in lessons

During classroom observations, the researchers observed that when teachers had a good understanding of the competencies, they deliberately infused these competencies into their Grade 1 literacy lessons (Cancelliere et al., 2023). Competencies such as communication, collaboration, critical thinking and ethics were more frequently incorporated in lessons after the CLP training, as many teachers were already somewhat familiar with these competencies prior to CLP training.

However, there were some competencies such as meta-cognition, growth mindset and creativity which teachers still grappled with, resulting in less frequent deliberate infusion of these competencies during lessons. Data suggest that teachers

sometimes had a superficial understanding or held misconceptions about some competencies in the CLP (Cancelliere et al., 2023). For example, one teacher described growth mindset as, "the ability of learners to correct themselves", while another described it as, "an ability for one to see his mistakes". This belief that learners would be able to correct themselves or see their mistakes is misplaced as foundation phase learners require scaffolding and prompts to guide their thinking. It appears that the training time may not have been sufficient to develop a deep understanding of the CLP and competencies for a fast-changing world, or that teachers were not sufficiently invested in the training to make more permanent changes to their teaching repertoires (Cancelliere et al., 2023).

7. Previously entrenched methods sometimes served as barriers to exploring new pedagogies

Teachers engaged differently with new learnings combined with their prior knowledge and experiences when planning and enacting competency-infused lesson plans. During classroom observations, some teachers exhibited greater agency by experimenting and expanding on the new learnings from the CLP in combination with prior experience (Cancelliere et al., 2023). For example, one researcher observed that teachers were using CLP materials as teaching aids; some teachers used the Big Book, flashcards and visual representations on the projector screen as well as a globe. However, in some instances, teachers' prior knowledge, combined with years of teaching

experience, led to inflexibility and resistance to trying new teaching approaches, resulting in outdated practices. For instance, during a lesson on segmenting and blending words, the researcher observed that the lesson was very teacher-centred, quite repetitive and had too many instructions with learners collectively responding to the phonic segmentation – not a step-by-step approach (Cancelliere et al., 2023). Although the CLP training hand-out indicated step-by-step instructions for teachers to give to learners, during the lesson many teachers deviated from the training and reverted to their previous styles of teaching.

8. Positive teaching and learning experiences

Some teachers reported that the CLP led to improved communication with the learners, enabling them to identify which learners were struggling and how they could better assist. In addition to better communication skills, mindfulness activities were considered to have been successful

in the classroom by calming learners and creating a happier learning environment, facilitating better learner engagement and concentration in the lessons; consequently, teachers experienced the classes as more exciting and enjoyable, reporting the following:



The class is exciting. The learners are responding, you see. It is no longer that kind of a programme where you spoke alone. I like the fact that CLP is learner centred. And then the learners are active, it teaches learners to communicate. (Teacher 1)



When the learner is tired in the class, I know that it is time to do mindfulness activities. I let them stand up, do breathing exercises, close their eyes, and place their hands on their laps. This is a way of returning their minds back to class. (Teacher 3)



Challenges and Suggestions for Improvement

In 2022, during the interviews, teachers were asked if they had faced any challenges while implementing the CLP in the classroom and to give suggestions for improvement. Although teachers largely reported positive experiences during the implementation of the CLP in classrooms, a few

challenges were raised. The table below shows the challenges teachers faced and their suggestions on how the CLP could be improved. The research team is reviewing these suggestions for improvement and will consider them in the design of future iterations of the CLP.

Key challenges and teachers' suggestions for improving the CLP

Challenges	Suggestions for Improvement
Pacing – teachers found it difficult to keep up with the programme	The CLP routine is longer than the daily routine in the DBE annual teaching plans; therefore, the duration of the CLP activities must be aligned with the DBE time allocations.
Some stories in the Big Book are too long – when reading the stories, learners get bored and fall asleep	Shortening the Big Book stories so that learners stay captivated during shared reading.
Difficult vocabulary and names in the Big Book – some words are too difficult for Grade 1 learners and several teachers did not know the meaning of some words.	Using simpler vocabulary. Using familiar Sepedi or Setswana words instead of using isiZulu or English names in the stories.
Two phonics per week is too much – it is difficult for Grade 1 learners to grasp two phonics per week	Doing one instead of two phonics per week to avoid confusing learners and enabling learners to grasp the phonics more quickly.
Overcrowded classrooms and limited space made group guided reading difficult	During CLP training workshops, allocate more time to illustrating how teachers can conduct group guided reading in overcrowded classrooms.

Pacing remained a major challenge as many teachers have found it difficult to keep up with the programme. However, this is not unique to the CLP; this challenge is commonly experienced by teachers across structured learning programmes when first implemented (Piper & Dubeck, 2021). Over time, and with sufficient practice and support, teachers in similar programmes generally begin to master the methodologies and keep up with the pace of the programme.

In addition to the suggestions for improvement highlighted above, the teachers suggested extending the programme to other grades so that learners do not lose the skills as they move to higher grades. When asked whether or not they

would recommend the CLP to other teachers, all but one teacher interviewed said that they would recommend the CLP to colleagues (the latter felt that it was too difficult) for several reasons:

- ✓ *the mindfulness aspect of the programme, which is beneficial in creating a more conducive learning environment;*
- ✓ *the detailed lesson plans, which make their jobs easier;*
- ✓ *the usefulness of the phonics aspects of the programme; and*
- ✓ *the enriching CLP workshops.*



Refinements and Improvements to the CLP

Insights from the critical review process and feedback from Sandbox teachers since 2020 were and are being used to make improvements to the CLP programme and to inform broader policy recommendations relating to competency-infused

approaches to teaching and learning. The learnings have resulted in continuous improvements to the CLP over the three-year period. These refinements included:

1. 'Tagging' competencies in the CLP documents

Feedback from the Centre for Curriculum Redesign indicated that the inclusion of the competencies in the CLP documents was not sufficiently clear, which might have contributed to teachers' vague understanding of the competencies. They recommended that all competencies be 'tagged' to foreground and highlight their inclusion, and to

entice teachers to engage with them on a more regular and explicit basis. Every tag includes an explanation of how the competency manifests in the tagged story or activity. As a result, the competencies are much more explicit in the CLP and are more likely to be internalised by teachers.

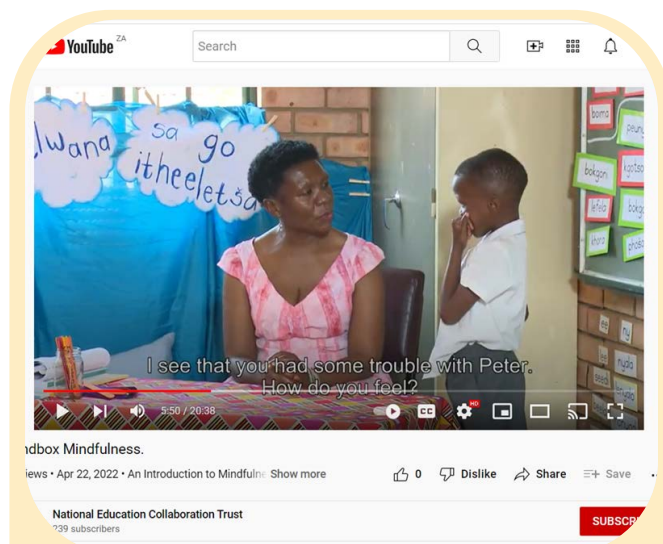
2. Development of a series of competency 'explainer' videos

Despite the programme having competencies embedded into classroom activities and highlighted during training sessions, teachers still struggled to deeply understand and implement the development of competencies. As part of the continuous efforts to improve the CLP, the Sandbox team in collaboration with Class Act took the decision to develop a series of competency videos, focusing on one competency per video.

These videos were shot in schools that are part of the Sandbox Schools Project to model to teachers how competencies can be intentionally infused in a typical South African classroom. Each video gives a broad explanation of the competency, illustrated by a concrete example; explains how and why to develop the competency; offers strategies to build the competency in the classroom, with demonstrations by actual teachers; and presents teachers' thoughts, with one or two teachers sharing their experiences of implementing the competency.

These videos have been well-received by teachers during training, indicating that they were inspired and motivated by seeing their colleagues demonstrate the successful implementation of the CLP.

CLP Mindfulness video



[Click here to watch the video](#)

youtube.com/watch?v=y26H4wVz4ao



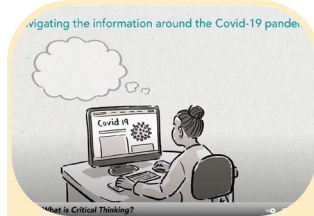
Other CLP competency videos can be accessed using the following links



Introduction to Competencies
youtu.be/dYCde9bFV3k



Creativity
youtu.be/P6pAQp2tVHs



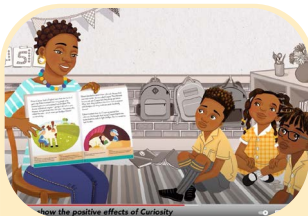
Critical Thinking
youtu.be/LT1shr1BGJs



Courage
youtu.be/AjVcJCcWIVU



Communication
youtu.be/KLljFL7psjA



Curiosity
youtu.be/gLQ3EnJbnxk



Collaboration
youtu.be/2h00-aVXVnw



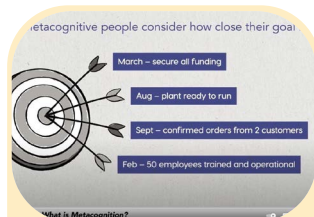
Ethics
youtu.be/-ISdv7R52NA



Growth mindset
youtu.be/H8J4kLCqBWg



Leadership
youtu.be/swkDEkVhJQU



Metacognition
youtu.be/PCUJMeGSg30



Mindfulness
youtu.be/y26H4wVz4ao



Resilience
youtu.be/0Dq3KkOUoVg

3. Revised Training Schedule

When the CLP was first implemented in term 1 2020, the competency development component and literacy methodologies were combined during training, and there was little explicit instruction around each competency. After feedback from teachers and the critical review, a decision was

made to focus initially on consolidating the core literacy methodologies during training, with a short, explicit section on a particular competency. As training progressed and teachers began to master the literacy methodologies, more competencies were added to the training materials.

4. CLP Framework

As part of the development of the competency videos and updates to training materials, the CLP framework image was designed, outlining how competency development relates to literacy

development in the programme. This framework and supporting information, has been used in CLP materials and training and it plays a central organising role in the video series.

Conclusion

The design, research and evolution of the CLP have all contributed to a burgeoning understanding of ways to deliberately infuse competencies for a changing world into the teaching of curricular content in South African schools. By building on an established literacy intervention, the structured learning programme, the CLP appears to have served as a useful bridge for Grade 1 teachers in providing support for both literacy and competency development, with teachers' skill and understanding of both components deepening over time.

Insights from the research suggest that the CLP teacher training provided a strong foundation upon which further learning was extended and deepened throughout the year, particularly through the light-touch coaching component in classrooms. Teachers rated the training highly and there was an evident positive relationship between their understanding of the materials and their reported level of confidence in implementation.

Although teachers may not necessarily demonstrate a deep understanding of how some of the competencies for a changing world are infused into the CLP, classroom observations and interviews indicate that they are indeed practicing and appreciating several methodologies designed to develop these competencies. There has been feedback that these methodologies have contributed to an improved classroom environment, and there is a growing understanding of the different types of competencies developed through the programme. This aligns with literature on teacher development that outlines how changes in teachers' practice, and the effects of this change in the classroom, can contribute to a deeper theoretical understanding of the practice. As such, the insights from the CLP suggest that there is scope for the deliberate infusion of competencies into existing curricular materials and teacher development programmes in public schools.



Recommendations

Based on the research insights discussed earlier, several recommendations are outlined below.

1. Continue to strengthen the CLP

A

Incorporate teacher reflection to promote deeper learning

Teacher feedback confirms that the training provided the necessary foundation for learning about competencies for a fast-changing world. The deliberate inclusion of teacher reflections during CLP training workshops could deepen teacher learning as indicated by international best practices in teacher development.

B

Encourage and incorporate teacher autonomy

Teacher autonomy should be advocated for during the enactment of structured CLPs as it assists teachers in their understanding as well as in adapting the CLPs to suit their individual teaching contexts.

C

Incorporate competency assessments

To support competency development, assessment should be aligned to curriculum and pedagogy. This could mean piloting and embedding competency assessments in the competency-based learning programme via assessment for learning approaches. This would also enable teachers and researchers to track changes in learner competencies and literacy over time.

2. Pilot CLP

A **Pilot/mainstream into existing programmes**

Continue to learn about the CLP in practice by expanding the prototype into a larger pilot, ideally scaling the CLP to include schools that have experienced success in implementing traditional structured learning programmes. This will facilitate a deeper understanding of the feasibility of implementation and outcomes at a larger scale and in a variety of contexts. Consider mainstreaming the CLP methodology into existing national programmes such as the Primary School Reading Improvement Programme (PSRIP), Assessment for Learning (AfL), Embedding of Maths and Science and the District Teacher Development Framework.

3. Use CLP insights to inform broader curriculum strengthening efforts

A **Development/evolution of competency framework**

Use insights from the CLP research to adapt and strengthen the implementation of the draft South African competency framework.

B **Developing terminology in local languages**

Develop shared terminology for the competencies in local languages and use some familiar stories and names in Home Language Big Books.

C **Teacher development and Learning & Teaching support material (LTSM)**

Use insights from the CLP to inform teacher development and LTSM development aligned to the strengthened curriculum.

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Chapter 3

Sandbox Schools Tinkering Intervention

Exploring tinkering as a tool for teaching & learning in the classroom

Introduction

There is increasing acknowledgement that for children to thrive in this fast-changing world and be equipped to create a better world, learning needs to entail more than just memorising facts. According to UNICEF (2018), learning through play can enhance learners' mastery of academic concepts and build motivation to learn. Similarly, research suggests that play is a fundamental mechanism for children to develop, and it is increasingly being perceived among educators as critical for engagement, positive relationships and learning (The LEGO Foundation, 2022).

Given this body of research, the NECT Edhub implemented a tinkering mini-intervention in 2022 at two primary schools which are part of the Sandbox Schools Project, using tinkering kits

donated by the LEGO Foundation. Tinkering is a sensory-filled experience in the classroom that encourages learners to interact with and manipulate building blocks and various other materials – thereby learning through play. The primary objective of the tinkering intervention was to obtain an understanding of how teachers perceive and experience the use of tinkering kits in South African public-school classrooms. This report provides an overview of the research insights gathered during the implementation of the Tinkering intervention in the Sandbox schools. The intent is that these insights will give decision-makers a better understanding of what tinkering in classrooms could potentially look like and the challenges faced across the various primary school phases.

Tinkering Explorations in South African Primary Schools

The mission of the LEGO Foundation is to advocate for, and contribute to, the growing evidence base in support of empowering children to learn through play. The Sandbox Tinkering intervention formed part of the LEGO Foundation's tinkering pilots being conducted in several schools in South Africa. Two primary schools located in the Bela Bela circuit of Limpopo were selected from 10 Sandbox Project schools to participate in the intervention. The choice of schools was based on their willingness to participate and proximity to each other. Initially, the intervention was meant to focus on Grades 3 and 6 teachers; however, during the planning phase, teachers from other grades (1, 4 and 7) showed interest and were also given the opportunity to opt-in.

The intervention began with a two-day workshop,

during which 16 teachers were given introductory training on tinkering. The training included a breakdown of tinkering terminologies, a description of the components in the tinkering kits and demonstrations of potential ways to use tinkering as a pedagogy in the classroom. The training was practical and experimental in nature, in that the teachers spent most of the training time using the tinkering kits to build different objects. After the training, teachers were given tinkering kits so that they could use the kits with their learners while teaching in the classroom. They were also given a training manual and tinkering lesson samples for different subjects pitched at different grades (1 to 7). The teachers were then given full autonomy to decide when and how to use tinkering as an alternative pedagogy in their classrooms.

After two months of implementing tinkering in the classroom, the 16 teachers from the Sandbox schools were asked to participate in semi-structured interviews. The interview questions focused on their experiences and thoughts on the use of the tinkering kits in the classroom. The research questions that guided the interview questions were as follows:

- 1. What are teachers' experiences of the training on tinkering?
- 2. What are teacher's experiences with trying out tinkering in the classroom?
 - 2.1 In which subjects did they choose to use the tinkering kits and why?
 - 2.2 Example of use cases?
 - 2.3 What worked well and what challenges did they face during implementation?

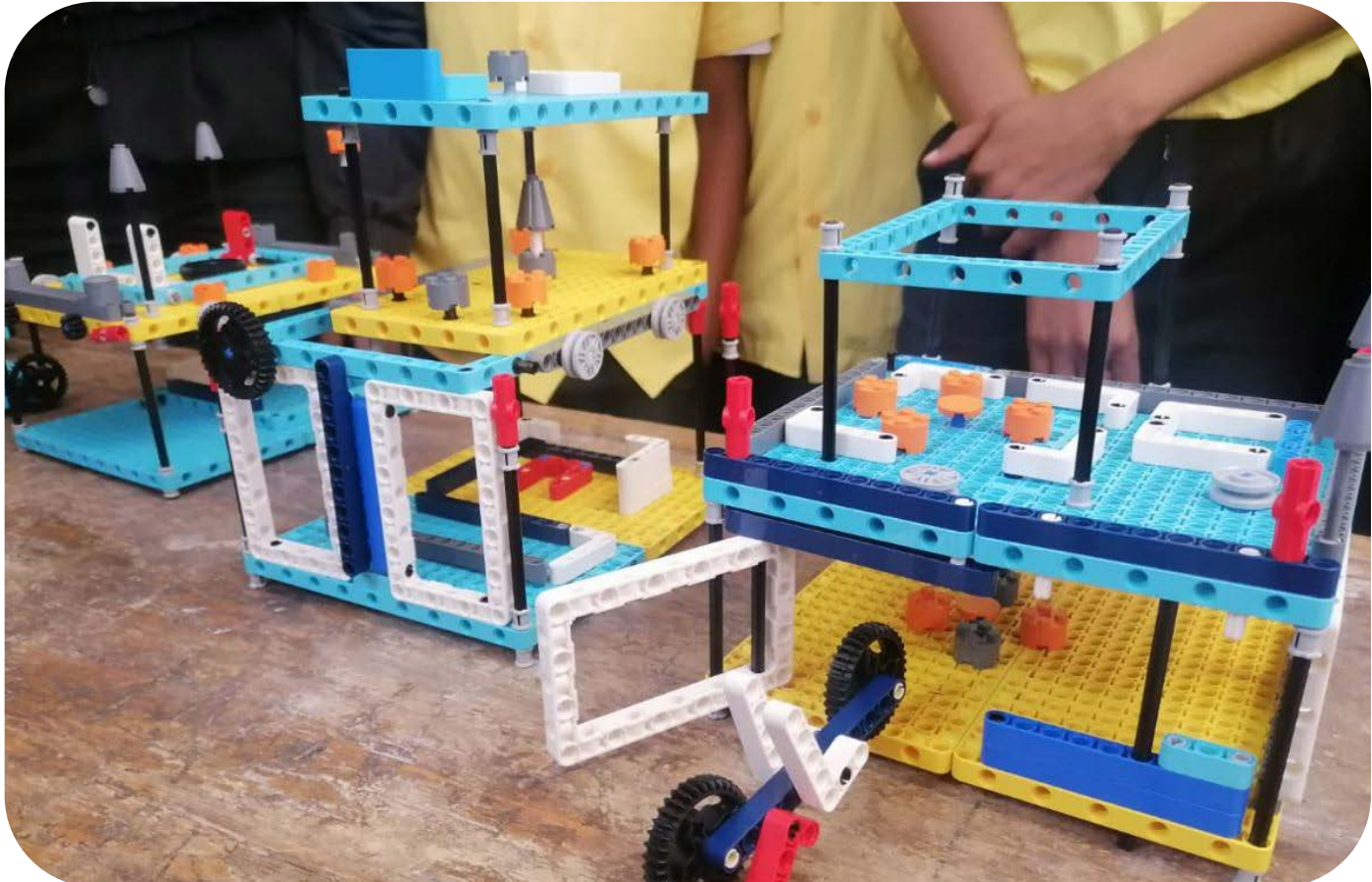


The Tinkering intervention was divided into two phases. The first phase, which is reported in this document, focused on the implementation of the intervention: teachers' in-class tinkering experiences. The next phase of the intervention will attempt to explore

1
How the introduction of tinkering influences curriculum pacing and coverage; and

2
If there are potentially scalable and replicable models for tinkering in the classroom.

The research insights derived from analysing the interview data for phase one are discussed in the following section.



Key Research Findings and Insights

Teachers' tinkering experiences were explored through the analysis of qualitative data gathered through interviews. The method used to analyse the qualitative data was deductive thematic analysis,

with close attention paid to the data relative to the research questions. The following observations and insights emerged when the interview data from the 16 teachers were analysed.

Teachers' Perspectives on the Tinkering Intervention

1. Need for more training sessions and support materials

Teachers felt that the number of training sessions held was inadequate. It was suggested that teachers could further benefit from refresher

training workshops, videos with practical examples and manuals with more examples. Teachers' views with regards to training included the following:



The workshop must not just be once-off, but sometimes there must be a refresher course. It could have been that when Tinkering is introduced, it gets introduced with its manuals for us to be able to see that this thing, like this lesson, it can fit in all subjects. (Teacher 5)



Rather give us videos of practical things that learners can see because visual is also important for our learners. So if they can see, if we can put on some video and then we say, do that. So, anything to help learning. (Teacher 10)

2. Tinkering involves the use of toys to make learning fun

During the interviews, teachers were asked how they would describe tinkering to another teacher. Their definitions varied but a common theme emerged in their definitions: tinkering is a pedagogical approach that uses toys and gives

learners the chance to learn in a fun and hands-on way. Six of the teachers described tinkering as 'learning through play'. Below are some of the teachers' descriptions of tinkering.



Tinkering is learning through play. Since learners started working on the tools that were provided, they are expressing their thoughts while playing with the tools. (Teacher 5)



I would say it is learning and teaching in a fun manner. Letting the learners think out of the box, also bringing out an element of creativity from them. (Teacher 7)

3. Tinkering was highly recommended as a useful teaching method

The majority of teachers (81%) across grades and subjects recommend tinkering as a way to teach in the classroom. The most common reason that accompanied the recommendation was that

tinkering helps students learn in different ways – it caters for different types of learners. Teachers' responses, when asked if they would recommend tinkering to other teachers, included the following:

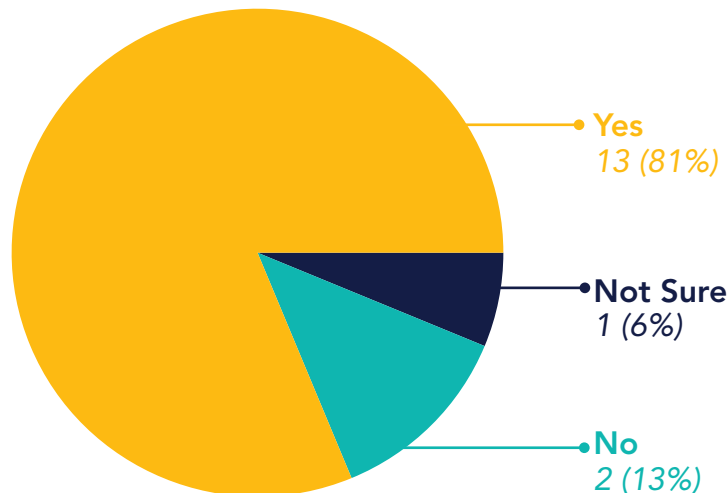


What I will actually advise to other educators is that tinkering is the method which enhances your teaching and learning. I think with tinkering we can actually introduce certain skills to learners that they can develop even though they are not good academically. (Teacher 5)



I recommend tinkering because when most of these learners use tinker kits, it brings their mind back into the class. When you teach sometimes, you see that the learners are absent-minded, but should you bring the kits in front of them, their whole attention gets concentrated onto them. (Teacher 12)

Teacher responses when asked if they would recommend tinkering to another teacher



Implementation of Tinkering in the Classroom

1. The majority of teachers used tinkering kits in the classroom

Most teachers (14 of 16) used tinkering kits in their classrooms. Interestingly, some teachers used tinkering not with just one group of learners, but across grades and subjects. However, two teachers

did not engage much in tinkering in the classroom; the reasons provided were that they were sick, or the learners misbehaved during tinkering.



I have not used it. We used it when we were teachers only, so I did not get an opportunity to use it because I was not all right. I was not feeling well. (Teacher 5)



I only use it for fun because my learners are not disciplined. I thought when I introduced it, they would be fully focused on what they are doing, but then the more they enjoy it, they start misbehaving, and then they do whatever they want to do. (Teacher 10)

2. Tinkering kits were used by the teachers across grades & subjects

After two months of tinkering in the classroom, teachers were asked to share the grade level and subjects in which they used tinkering. Several teachers used the tinkering kits in different grades, while others used the kits in multiple subjects within the same grade. This suggests that the tinkering kits can be used across different grades and subjects within primary schools. Teachers mentioned using tinkering in Grades 1, 3, 4, 6 and 7. The grade in

which tinkering was most frequently implemented was Grade 6. The tinkering kits were also used across a range of subjects, namely: Languages, Life skills, Mathematics, Economic & Management Sciences (EMS), Natural Science & Technology and Social Sciences. However, the majority of the teachers used tinkering in language lessons and in Mathematics.

Teaching and Learning with Tinkering Kits

1. Tinkering facilitates hands-on and engaging ways of learning

Tinkering is a hands-on and learner-centred approach to teaching. Most teachers reported that using tinkering as a pedagogical approach enables learners to be hands-on during lessons, which stimulates learners' critical thinking and gives them more exposure to problem solving. Moreover, teachers reported that the use of tinkering kits

enhanced learner engagement during the lessons. For example, during tinkering the more rebellious, slow and practical learners became more engaged and focused and tended to understand the concepts better. Teacher observations during tinkering in the classroom include the following:



Tinkering is a new method of teaching in which the learners learn through doing. It's a method which involves all learners, encouraging all of them to be part of the lesson.
(Teacher 3)



Tinkering encourages learners to develop their thinking ability in the world in which we live today.
(Teacher 9)



The fact that I have been able to include even the learners that have learning barriers to be involved in the work because now they were not left behind, but now they were more involved. So being involved encourages the learner to participate in terms of the lesson. (Teacher 7)

2. Tinkering promotes creativity and deeper learning through play

Several teachers reported that using tinkering kits in the classroom promoted creativity and deeper learning. Play-based learning promotes active learning involving different parts of the brain and various ways of thinking, thereby facilitating deeper learning and development of other critical skills

(Barblett et al., 2016; UNICEF, 2018). According to the teachers, due to the hands-on nature of tinkering, learner creativity was enhanced. Below are two teacher comments on how they incorporated tinkering into their lessons.



In Grade 7, we had an entrepreneur topic where they would build any object, and they would say how much they would sell it for.
(Teacher 7)



So, when they are tinkering, they use different resources which are different. So, they can see that if I join this one to that, it will give me a 2-D shape, 3-D shape, a triangle or whatever. (Teacher 4)

3. Tinkering can be used to facilitate collaboration

Tinkering can promote collaboration among learners when they are asked to do a task as a group. It improves learners' ability to work as a team and learn valuable skills like problem-solving, cooperation, communication, experimentation

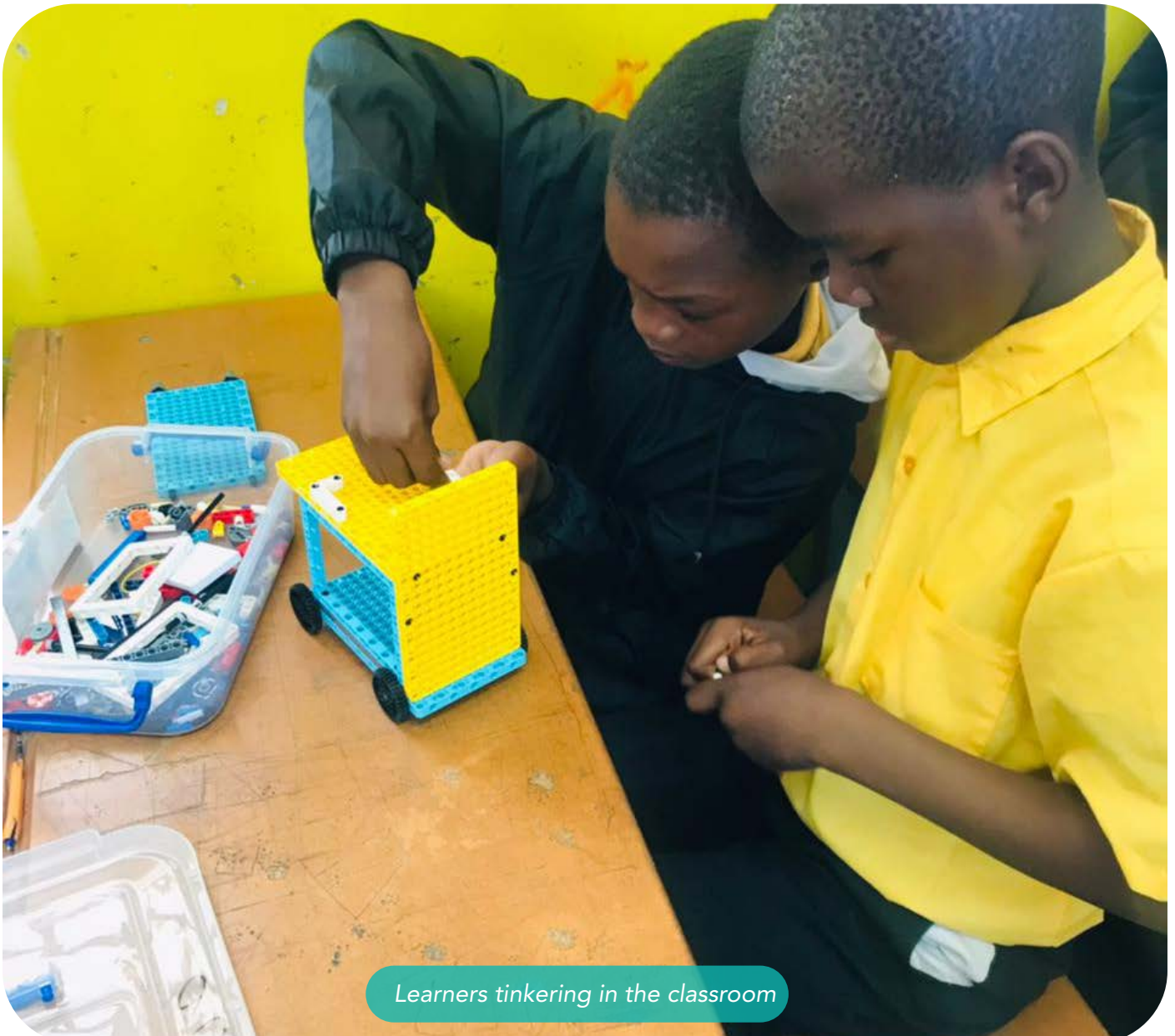
and persistence as they complete these tinkering group tasks. Many teachers reported that through tinkering group tasks, the learners were able to develop collaboration and communication skills.



Our learners just need to have discipline. All about discipline. Some of these learners do not want to share. It also helps us to teach our learners to learn to share. (Teacher 4)



It is for two learners, they are working in pairs, meaning that they learn to work as a team and communicate with each other. (Teacher 11)



Learners tinkering in the classroom

Challenges Faced by Teachers during Tinkering in the Classroom

As tinkering is a new approach to teaching and learning, it presented several challenges for some teachers. This section briefly describes the main challenges faced by teachers when they used or attempted to use tinkering kits during lessons.

1

Tinkering is not a one-size fits all teaching approach:

It is not possible to incorporate tinkering kits in all lessons. Ten teachers expressed that it is difficult to integrate tinkering into some specific parts of their lessons. For example, the teachers who used tinkering in their English lessons reported that they found it difficult to use tinkering when covering topics such as tenses or parts of speech.

2

Time constraints hinder use of tinkering kits:

Time allocated to each lesson is limited and not designed to include tinkering activities. According to the teachers, the time constraint therefore hinder learners from fully engaging with tinkering kits, as a significant amount of lesson time is spent unpacking and tidying up the kits. Fourteen teachers highlighted limited lesson time as an issue.

3

Pieces of the tinkering kits easily get lost:

Some pieces of the tinkering kit are quite small; therefore, learners often lose these parts when using the tinkering kits. Ten teachers mentioned that since these learners are young (in primary school), the size of some of the tinkering pieces makes it easy for learners not to lose them.

4

Insufficient tinkering kits can disrupt learning during group projects:

Collaboration between learners can be improved by asking them to create things, as a group, using tinkering kits. However, some teachers mentioned that asking learners to tinker as a group can disrupt the learning environment. Due to large class sizes, the kits are often fewer than the number of learners, which can lead to unnecessary fighting between learners during a group task.



Teacher Suggestions and Recommendations

While most teachers offered suggestions for improving the tinkering experience, four teachers had no recommendations or concerns with regards to implementing tinkering in the classroom. This group of teachers outlined that they had

not encountered any challenges and that their experience with tinkering had been positive. Suggestions for how the tinkering experience can be improved are discussed below.

Improving tinkering kits

Teachers suggested that the implementation of tinkering in class can be improved by increasing the size of the small pieces in the tinkering kits; this will minimise the chances of learners losing them. Alternatively, tinkering kits could come with extra pieces which can be used to replace lost pieces. Teachers also recommend that tinkering kits be organised according to size to improve time management issues in the classroom and reduce time spent identifying the exact missing pieces.

A tinkering kit for each learner

Teachers reported that the learning process would be more enriching if a tinkering kit could be made available for each learner. When learners have their own kit, they are able to fully engage with the kits and conflict amongst learners will be minimised during tinkering exercises.

Community of practice or support network

As tinkering is a new pedagogical approach, a supportive network could benefit teachers and improve their implementation of tinkering in the classroom. Seven teachers expressed that tinkering is a new teaching approach for them, so they are still trying to figure out how to effectively use it in their classrooms. They highlighted the need for spaces or platforms from which to learn, reflect and enhance their tinkering teaching approach.

Officially allocating time for tinkering on the timetable

Time allocated to each lesson is short and limited, making it challenging to incorporate tinkering into the lessons. Six teachers strongly felt that tinkering should be used more to facilitate learning, and they suggested that this can be achieved by allocating time after lessons to do tinkering and adding more time for tinkering within the curriculum.

Conclusion

Tinkering introduces teachers and learners to a more learner-centred teaching approach that can be used across various subject areas and age groups. It is a new method of teaching that utilises tinkering kits, allowing learners to be actively engaged with the learning process by following certain instructions from the teacher. Tinkering involves a kinaesthetic learning approach which seems to hold learners' attention to the instructions given by teachers. Not only is this effective in engaging learners, but it also involves a creative and fun approach to learning.

Tinkering in the Sandbox schools allowed the learners to engage with more practical thinking and deeper learning while enhancing learner creativity and independence. The pitfalls noted

by teachers include the difficulty of incorporating tinkering within specific lessons, such as teaching sentence structure. The majority of teachers agreed that the packaging of the tinkering kits could be reformulated as small parts present challenges when packing away and keeping the tinkering kits complete. Teachers recommend that the kits be organised by size and that the LEGO Foundation consider putting additional pieces in the kit to serve as replacements when parts get misplaced or damaged. Lastly, teachers recommend that an internal networking group be made available so that teachers can communicate their successes and challenges within the tinkering teaching process and support and advise one another accordingly.

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Chapter 4

Mindfulness in South African Classrooms

Exploring a Culture of Mindfulness in South African Public-School Classrooms

Introduction

Education systems that cultivate social-emotional competencies and mindful presence in learners through mindfulness practices can help prepare children to withstand adversity and respond positively to challenges in a fast-changing world (Lantieri et. al, 2016). There has been an emerging consensus among education stakeholders that educational systems should support children to develop emotional and social skills to nurture meaningful relationships and become emotionally and socially responsible, fulfilled individuals. Important to the South African context, there is evidence that implementing social and emotional activities in school, including mindfulness, benefits all children; however, it disproportionately benefits children from low-income communities because many of these children experience higher levels of adversity and trauma resulting from insecure access to housing, food, health care and safety (Franke, 2014).

Research suggests that well-conducted mindfulness activities can impact positively on the mental, psychological and social health and well-being of learners (Weare, 2019). According to Bailey and Jones (2019), children with better emotional self-

regulation are calmer in class, interact reasonably with peers, and respond to teachers with more focused attention. Although the ability to regulate emotions is constructed over a lifetime, explicitly learning the skill earlier is advantageous. Based on this growing body of evidence, the Sandbox team introduced the “Mindful Classroom” intervention in five Sandbox Schools in 2021 to explore how to cultivate social emotional competencies and mindful presence in learners through daily mindfulness practice. The intervention focused on the socio-emotional learning that needs to take place for children to regulate their own emotions and build a network of cognitive and social skills. The main research question for the study was as follows: How feasible is it for teachers to use mindfulness practices in Grade 5 classrooms in South African public schools?

Insights from the Mindful Classroom intervention may guide the design of future long-term interventions related to mindfulness practice; while mindfulness is not a designated subject like history or maths, it can be woven into the fabric of classroom learning across subjects (Shardlow, 2015).

Description of Intervention

The Mindful Classroom was a structured intervention that introduced a daily 5–10 minutes mindfulness-based routine at the Grade 5 level in five of the Sandbox Schools in 2021. The Mindful classroom intervention was developed as a universal intervention for all Grade 5 learners. As a universal intervention, it minimises inequalities in accessing the intervention and issues of acceptability, stigma and social comparison that often arise when targeting interventions at subgroups of learners

within schools (Kuyken et al., 2013).

The main goal of the mindfulness intervention was to investigate the feasibility of implementing mindfulness activities in South African primary schools. The intervention was designed as a 12-week structured programme; however, due to COVID-19 restrictions, the start date was delayed and the intervention was therefore adjusted by reducing the implementation period from 12

weeks to 6 weeks. The mindfulness activities were guided by the teacher and were 5 to 10 minutes long. They included Seated meditation exercises, where learners sit in an upright position with their eyes closed and direct attention to their breathing. Of the 10 Sandbox schools in the Waterberg District, five schools were identified as control schools and the other five as treatment schools. Control schools were aware of the mindfulness practice intervention; however, they did not participate in the training and did not receive any

mindfulness practice support. Thirteen teachers from the five treatment schools were trained online by the Sandbox team during a 2.5-hour workshop. In addition, teacher support was provided during the implementation of the Mindful Classroom intervention, including light-touch¹ coaching and a WhatsApp group.

¹Light-touch coaching refers to advising teachers when they note challenges while facilitating a mindfulness activity.



Pre-intervention: Baseline Study

The Sandbox team conducted a baseline study before the implementation of the Mindful Classroom intervention which involved the administration of a pre-exposure survey for teachers and one for learners. The study was conducted for two reasons:

A

To determine whether or not the teacher and learner questionnaires were reliable data collection instruments in the South African context; and

B

To assess the degree to which teachers understand the concept of mindfulness and endorse mindfulness practice in the classroom.

The teachers' pre-exposure survey was designed to collect:

- 1 background data (such as years of teaching experience) and demographic information (including gender and age) of the teachers; and
- 2 information on teachers' understanding and endorsement of the mindfulness practice.

The survey included a scale to assess the degree to which teachers endorse mindfulness practice and an open-ended question about the definition of mindfulness. In total, 23 teachers from both control and treatment schools responded to the online pre-exposure questionnaire. The key findings from the baseline study were as follows:

1

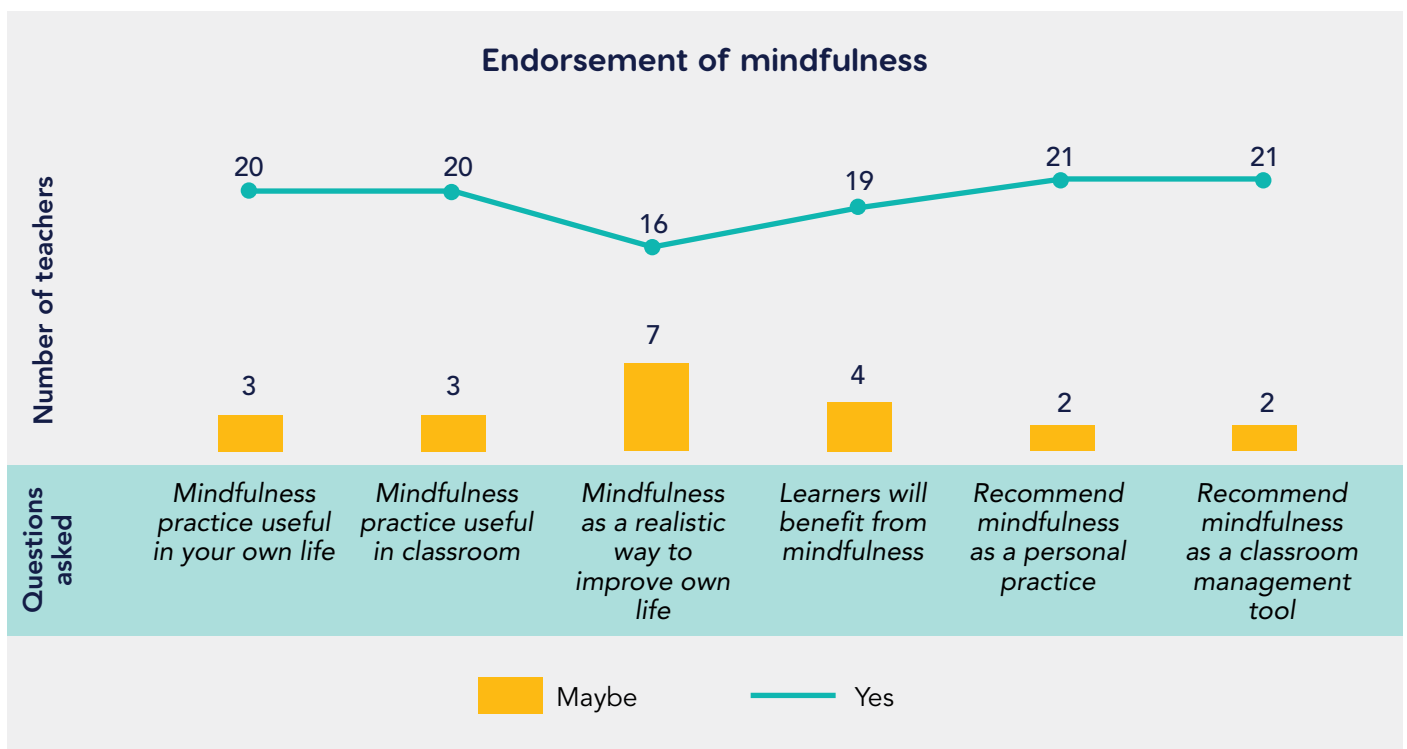
Teachers' definitions of mindfulness practice suggest that most teachers know the elements that comprise mindfulness.

2

More than 80% of teachers reported that they would recommend mindfulness practice as a useful classroom management tool.

3

Linguistic challenges caused noise and error to the extent that no valid or reliable inferences could be drawn from the data collected using the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA)².



²The ERQ-CA was written in English; some learners struggled to understand the items because they were attending schools in which the Language of Learning and Teaching (LoLT) is an African language until the end of Grade 3 before changing to English in Grade 4.

Post-intervention: Endline Study

After the baseline study, the Sandbox team refined the research questions and developed semi-structured interview questions to collect data on teachers' perspectives and experiences of the Mindful Classroom intervention. The main research question for the study was as follows: *How feasible is it for teachers to use mindfulness practices in Grade 5 classrooms in South African public schools?* Five teachers were purposively

selected to participate in the semi-structure interviews; these were teachers who had facilitated mindfulness in their classrooms more than once. The method used to analyse data collected during the interviews was deductive thematic analysis, which was guided by the research question and interview questions. Thematic analysis is a way to make sense of interviews by looking for themes or similar experiences across participants.

Insights from Educators' Experience of the Mindful Classroom Intervention

Data analysis was done in Atlas.ti version 9, a computer-assisted qualitative data analysis software package and the following observations and insights emerged.

Teachers' Perspectives on the Mindful Classroom Training

1. Training was practical, but there is a need for more training sessions

When asked to describe their experiences with the training for the Mindful Classroom intervention, the majority of teachers (three of five) reported that they found the training challenging. The reasons given included that the training was too short, making it difficult to fully grasp the new concept

of mindfulness practice. However, the teachers also reported some positive experiences with the training. The training approach was practical, so teachers had many opportunities to facilitate and participate in several mindfulness activities. The teachers' views on training included the following:



I think we needed a bit more time during the training.
(Teacher 4)



The training was good, but the timing was not enough for us; we needed a week... Most of the time we're doing practice, so it's practical, so we have the material and then we are using these strategies in classes.
(Teacher 2)

2. In-person training is preferred to virtual training

In-person training provides opportunities for greater interaction and more hands-on experience. Most teachers (four of five) felt that face-to-face rather than online training would improve the training experience and their understanding of mindfulness. Moreover, face-to-face training would eliminate technology constraints such as poor internet connectivity. Poor connectivity was an

issue during the training sessions, so the bulk of the training session took place with teachers' videos off and some teachers got disconnected. This affected the ability of the facilitator to interact visually with the teachers during much of the training session. Below are some teacher comments with respect to in-person training and internet connectivity.



*The only thing we can improve is doing it face-to-face when people are doing an exercise face-to-face rather than doing it through the phone or a laptop.
(Teacher 5)*



I was feeling alone because usually when we attend training, I was attending in a group of colleagues, and you'll see there's a bit of destruction of network, internet. (Teacher 3)

Due to COVID-19 restrictions, the Mindful Classroom training workshop could only be conducted virtually. When virtual training is the only option, it is recommended that high-quality internet connectivity be provided for each school.



1. Mindfulness exercises are calming and relaxing

Practicing mindfulness in the classroom can have a calming effect on both learners and teachers. Two teachers reported that they felt calmer when they did the mindfulness exercises. The “breathing and smelling the flowers exercise” as well as “blowing

out the candle and imagining a place you have been” emerged as favourite mindfulness activities for the learners. When asked to describe their experience facilitating mindfulness in a classroom, teacher responses included the following:



It is calming the children and focusing them. (Teacher 5)



The activity that I think they enjoyed the most was making the flowers blow out the candle flame. Again, I saw, most of them enjoyed it. (Teacher 1)

2. Mindfulness exercises improved participation and enhanced learner attention

Mindfulness activities benefit four sub-components of attention regulation: sustained attention, cognitive inhibition, data-driven information processing and attention switching and cognitive flexibility (Bishop et al., 2004). Three teachers

reportedly observed improved focus, more classroom participation and increased learner attention spans after facilitating mindfulness activities in the classroom.



*They are learning better....
They concentrate better.
(Teacher 4)*



I can see the difference because in the afternoon, after eating and I enter the classroom, it will be like a TV. It's like they went to sleep there; they don't pay attention. But after doing this activity, they look lively. (Teacher 2)

3. Teacher buy-in improved as they observed benefits of mindfulness practice

Teacher buy-in is an essential factor for the successful implementation of mindfulness programmes in schools (Kenwright et al., 2021; Nguyen et al., 2022). The Sandbox school teachers had varying degrees of buy-in around mindfulness practice; some teachers felt more positive towards

mindfulness as they continued to use the practice and began observing the benefits of mindfulness in their classrooms. Teachers reported that for mindfulness practice to be successful, time and commitment are required from teachers.



You need to understand it; you need to understand the reason why you are doing this.... When it comes to mindfulness, at first, I was not so keen to do it. (Teacher 5)



Because of this COVID ... we are struggling. Maybe after this, it will be much better, but we are doing it [mindfulness], we're doing it because we see improvements in class. (Teacher 2)

Challenges and Suggestions for Improvement

During the interviews, teachers were asked if they faced any challenges during training and while facilitating mindfulness in the classroom; they were also asked for suggestions for improvement. Although teachers reported positive experiences

during the implementation of the Mindful Classroom intervention, a few challenges were raised. The table below outlines several challenges teachers faced, followed by suggestions for improving the intervention.

Challenges and suggestions for improvement of mindful classrooms

Challenges	Suggestions for Improvement
It is challenging to facilitate mindfulness in overcrowded classes	<ul style="list-style-type: none">• Working with small groups (approx. 15 learners).• Learners could be appointed as mindfulness leaders, and they will have a small group to lead separately.• Schools could be provided with assistants or volunteers to help with mindfulness activities.
Some teachers have limited knowledge about mindfulness practice and feel uncertain about its value	<ul style="list-style-type: none">• Extend training time. This will give teachers more opportunity to do practical activities and a better chance to grasp the concept of mindfulness.
Poor connectivity, limited interactivity and group work when training is conducted virtually	<ul style="list-style-type: none">• In-person training is better.• In case of virtual training, trainers could provide good quality internet for each school to use during the training.
Some learners do not take mindfulness seriously – they take it as play time	<ul style="list-style-type: none">• Including learners, even a few representatives, in the Mindful Classroom training will help learners understand what mindfulness is and the benefits of mindfulness practice, potentially improving long-term buy-in for the practice.

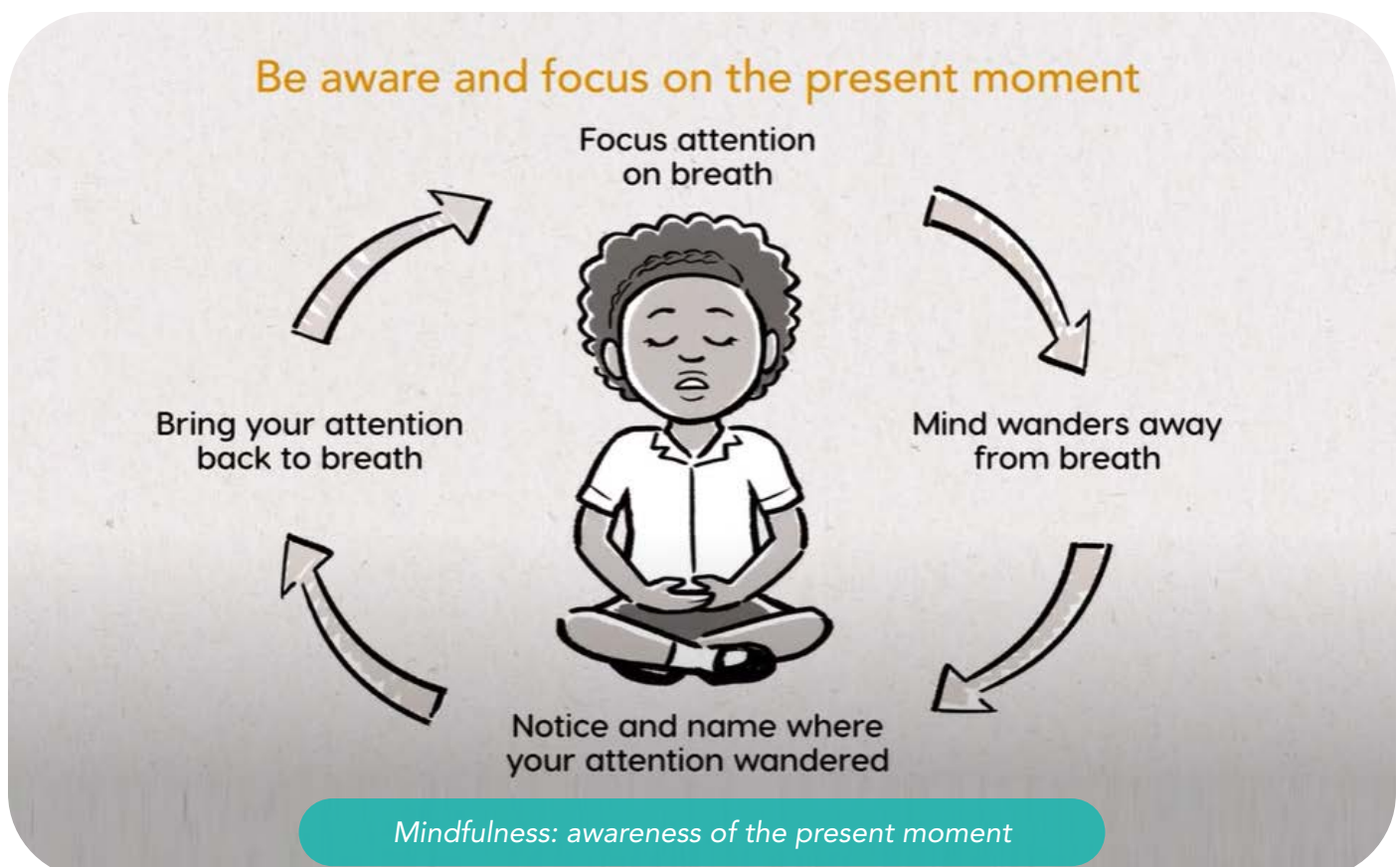
Concluding Remarks

The Sandbox team gathered several insights from designing and implementing the Mindful Classroom intervention. The research findings suggest that it is feasible for teachers to implement mindfulness practice in classrooms, but factors such as large class sizes make it more challenging (working with small groups of approximately 15 learners is best). Teachers reported that the training duration was insufficient; therefore, their training experience and their confidence to facilitate mindfulness in the classroom can be enhanced by increasing the training duration. Some studies, for example, suggest training teachers for 15 to 45 minutes per week over a period of 8 to 12 weeks (McCown et al., 2011).

Although, the majority of teachers interviewed highly endorsed classroom mindfulness activities, it was evident that some teachers struggled to see the value of mindfulness practices at the beginning of implementation; however, the long-term practice of mindfulness may reveal its usefulness to teachers. Research suggests that teachers' perceptions and endorsement of new classroom practices ultimately determine whether or not they will continue implementing the practices and how effective these practices will be (Jean-Baptiste,

2014). Therefore, it would be worthwhile to conduct an in-depth study with teachers in South African public schools to determine what they perceive as the key enablers or facilitators to successful implementation of mindfulness programmes. Some enablers were highlighted by the teachers who participated in the Mindful Classroom intervention, including self-efficacy and motivation, knowledge about mindfulness, and acceptance of responsibility to facilitate mindfulness.

Most teachers reported observing benefits of conducting mindfulness activities with their learners in the classrooms; this highlights the importance of providing teachers with tools such as mindfulness practices to aid in classroom management and enhance the socio-emotional learning of children. An exploration of why some mindfulness activities resonate more with children could form part of a more extensive future study. A quantitative investigation of the benefits of mindfulness could also be part of a more extensive study; for example, an experiment in which learners' concentration spans before and after mindfulness practice is compared to a control group, may strengthen the evidence of mindfulness benefits.



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Chapter 5

Lessons Learned from Teacher Professional Development in Robotics & Coding

The current rapid global changes have necessitated an equally rapid response and shift in the manner in which learning occurs across different spheres. Nowhere is this more evident than in the context of learning and teaching in the classroom. Learners are increasingly required to develop knowledge, skills, attitudes, and values that will not only hold them in good stead within their current world but also prepare them for a fast-changing and uncertain future. In direct correlation with this is the increasing need for teachers to be adequately prepared to provide the necessary support and

guidance that promotes the development of relevant competencies and values.

This section provides key learnings and insights from several research studies on the professional development of in-service teachers as well as initial teacher education conducted by the Edhub, CRSP dsgn, and students and faculty members of the University of Johannesburg. All the studies focus on areas of teaching and learning robotics and coding in the classroom and the need for teacher development.

RESEARCH STUDY 1



Introducing Robotics & Coding into CAPS to Foster 21st Century Learning

By CRSP dsgn and NECT Edhub

Introduction

21st century learners need to be inquisitive, creative, explorative, reflective and agile in learning – these competencies and skills are developed through the execution of certain actions. However, in the South African context, socio-economic challenges faced by some learners directly impact their ability to access the resources necessary to develop these required skills and competencies

for a fast-changing world. The belief that learners innately possess these qualities, together with a belief that access to technological resources is the right of every 21st century child, has stirred the desire of CRSP dsgn to develop a mechanism that can support learners to develop competencies for a fast-changing world through engaging learning experiences.

Description of Intervention

With the above in mind, CRSP dsgn and the NECT Edhub conducted several pilot studies from 2018-2021 to:

A

Determine if learners' work with robotics kits facilitates the development of competencies for a fast-changing world, such as critical thinking, communication, curiosity and problem-solving techniques;

B

Understand the nature of collaboration among learners in project-based learning; and

C

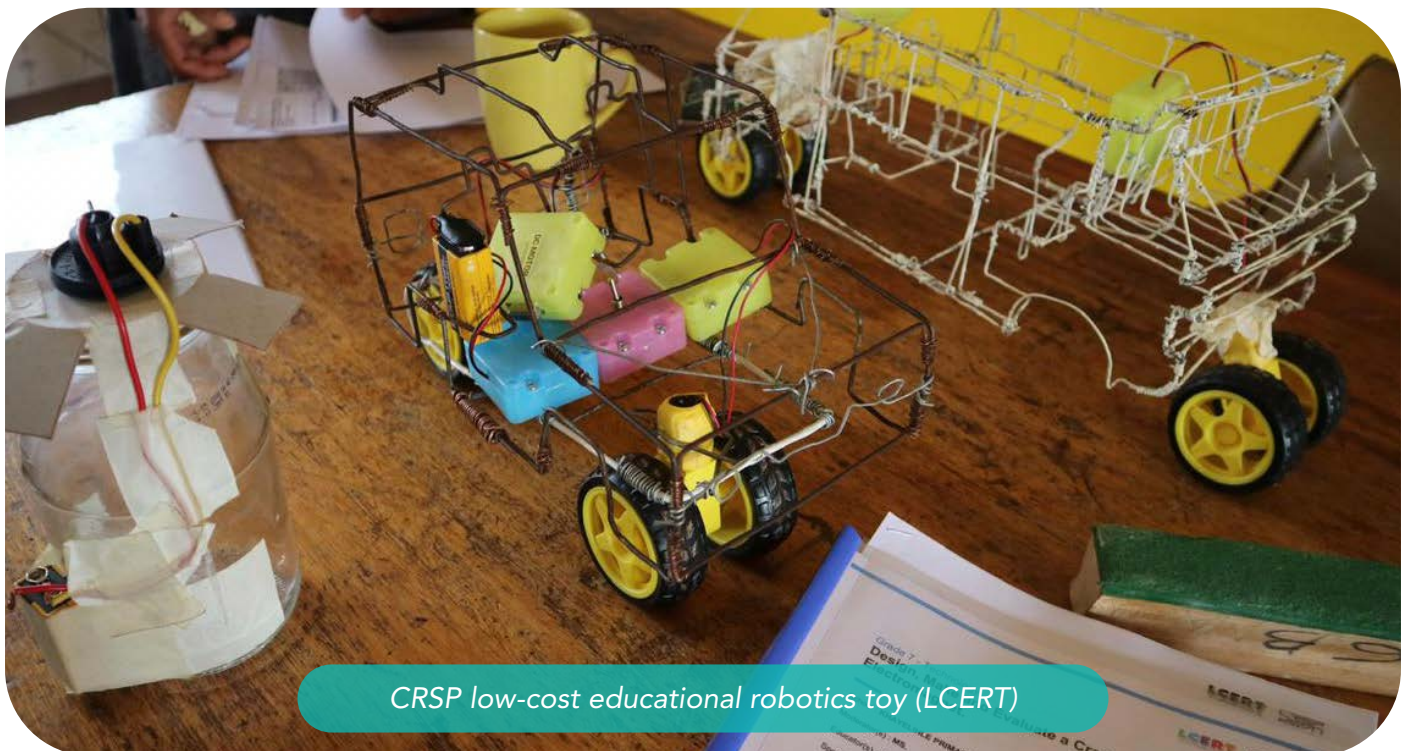
Observe teachers' uptake of and experience with the R&C kits provided to them.

Sandbox R&C Intervention Key Metrics

METRIC	2018	2019	2021
Schools	5 primary schools	2 primary schools	4 primary schools
Phase	Intermediate & Senior Phase	Intermediate Phase only	Intermediate Phase only
Grades	Grade 6 & 7	Grade 4, 5 & 6	Grade 6
Subject	Natural Science & Technology (Grade 6) Technology (Grade 7)	Natural Science & Technology (Grades 4-6)	Natural Science & Technology (Grade 6)
Dosage	Variable (based on term's ATP): <ul style="list-style-type: none"> • Related informal lessons • Related mini-PATs • 75 total lessons in 2 terms 	Variable (based on term's ATP): <ul style="list-style-type: none"> • Related informal lessons • Related mini-PATs • Additional coding sessions • 82 total lessons in 1 term 	Variable (based on term's ATP): <ul style="list-style-type: none"> • Related informal lessons • Related mini-PATs • Additional coding sessions • 8 total lessons in 1 term
No. of kits	20 per school (100 kits)	50 per school (100 kits)	22 per school (88 kits)
No. of learners	1600	891	320
No. of teachers	19	10	8
Training type	<ul style="list-style-type: none"> • In-person • Synchronous 	<ul style="list-style-type: none"> • In-person • Synchronous 	<ul style="list-style-type: none"> • Synchronous • Asynchronous
Support type	<ul style="list-style-type: none"> • WhatsApp group chats • Worksheet preparation • Demonstration lessons 	<ul style="list-style-type: none"> • WhatsApp group chats • Worksheet preparation • Demonstration lessons • More on-site support visits 	<ul style="list-style-type: none"> • WhatsApp group chats • Worksheet preparation • Demonstration lessons
Training methodology	<ul style="list-style-type: none"> • Grouped school workshops • Individual school workshops 	<ul style="list-style-type: none"> • Individual school workshops • Individual teacher sessions 	Group teacher sessions
Training sessions	<ul style="list-style-type: none"> • 18 x total training workshops • At start of Term 2 • At start of Term 3 • Ad-hoc sessions during school downtimes 	<ul style="list-style-type: none"> • 4 x workshops at start of Term 2 • Continuous support visits throughout pilot (± 22 sessions) 	<ul style="list-style-type: none"> • 13 x total training and support workshops • Middle of Term 2 • Continued in Term 3

In 2018, the NECT Edhub and CRSP design implemented an exploratory R&C pilot where CRSP's Low-Cost Educational Robotics Toy (LCERT) kits were used to test the integration of Robotics & Coding content into Grade 6 Natural Science & Technology and Grade 7 Technology classrooms. This pilot was further improved in 2019 to collect an extensive amount of both qualitative and quantitative data to assess the educational impact of CRSP design's learning approach and LCERT resources within two of the schools from the 2018 pilot study. The research evidence from the two

pilots suggested that the CRSP design's approach and educational robotics resources could be successfully integrated into traditional classrooms to support and enhance the existing Natural Science and Technology CAPS curricula. The DBE's draft Grade R-9 Coding & Robotics CAPS curriculum represented a unique opportunity to fully integrate robotics into mainstream classrooms without compromise. The findings from the 2018-2019 pilot studies were also utilised to develop strategic and technical approaches for the 2021 Sandbox Robotics & Coding intervention.



Key Research Insights

The following key learnings and findings emerged from the implementation of the Robotics & Coding pilot studies.

1. Inadequate digital literacy is a bottleneck to effective teacher training

Insights gathered from the 2018-2021 pilot studies have demonstrated that digital literacy levels are very low amongst teachers, presenting a significant stumbling block for teacher development and support in Robotics & Coding. Improving teachers' digital literacy and designing effective means of teacher training are essential prerequisites to the integration of Robotics & Coding into schools. WhatsApp emerged as the most effective digital tool for remote teacher support and communication.

At various stages of the intervention, teachers requested that most of the content (i.e., lesson plans, worksheets, website links and videos) be shared via WhatsApp. Shorter videos shared via WhatsApp yielded greater engagement and positive sentiments from teachers; the videos were most effective when shared right before the teachers needed to implement the specific content that the videos covered (i.e., Just-in-Time training).

2. Practical tutorials were effective teacher development tools

While teachers did not encounter much trouble building simple electric circuits using conducting wires, the majority found it difficult to grasp the fundamental concepts behind building circuits using breadboards. Despite a number of training sessions and tutorials spent on this topic, it proved challenging to reach an adequate level

of competency. Shifting training session focus to practical tutorials instead of theoretical lectures proved to be a more effective teacher development strategy since it facilitated the identification and provision of assistance to address troublesome areas.

3. Most learners expressed positive sentiments toward the R&C group project

Most learners expressed that using R&C kits during the group project elevated their curiosity, excitement and happiness. Robotics & Coding resources, lessons and projects stimulate positive sentiments amongst learners, with excitement and happiness recorded from 62% and 30% of the students, respectively. In addition, more than 94% of learners expressed intrinsic motivation toward

Robotics & Coding after engaging with the content and resources during classroom lessons. Younger learners, when comparing Grades 4, 5 and 6, were identified as more responsive towards Robotics & Coding content and resources, suggesting the following trend: levels of positive sentiment and motivation decrease with an increase in age (grade).

4. Robotics & Coding facilitates the development of competencies for a fast-changing world

Results and observations from the 2018-2019 pilot studies support the claim that Robotics & Coding facilitates the development of competencies for a fast-changing world in learners. During the pilot studies, it was observed that, in general, more learners exhibited competencies for a fast-changing world such as critical thinking and creativity when engaging in informal lessons (i.e., play and exploration), and less when completing formal and project-focused lessons. Nealy 80%

of teachers observed an increase in learners displaying higher levels of learning (according to Bloom's Taxonomy), while 95% of them observed better learner collaboration and communication when implementing Robotics & Coding lessons. Furthermore, it was observed that younger learners exhibit competencies for a fast-changing world such as critical thinking, curiosity and creativity more frequently than older learners.

5. Adequate dosage and ergonomic resources are required to improve learning outcomes

Although evidence from the pilot studies demonstrates that Robotics & Coding can effectively be integrated into Natural Science & Technology CAPS, especially during Terms 3 and 4 of Grades 4-7, the studies also suggest that having a standalone R&C subject is important since this

will ensure adequate dosage and consistent implementation throughout the academic year. Furthermore, learners and teachers have reported that plug-and-play modular electronic components are more ergonomic than discrete breadboard electronics components.

Conclusion

The CRSP design Robotics & Coding pilots have successfully demonstrated that integrating Robotics & Coding into CAPS may be an effective means to foster 21st century learning amongst learners to prepare them for a fast-changing world. Various considerations such as effective teacher training and support and adequate dosage of learner exposure to R&C kits will need to be addressed to facilitate the effective implementation of R&C in classrooms. Thereafter, appropriate ergonomic

resources will need to be made accessible to learners within schools to ensure the content is taught in the most engaging manner to stimulate not only 21st century competencies, but also positive sentiments and intrinsic motivation amongst learners. Once all these conditions are met, learners will develop into citizens that are empowered to innovate and create solutions to uplift their communities and broader society.



Learners showing amazement during a robotics demonstration

RESEARCH STUDY 2



Exploring the Nature of Collaboration in Grade 6 Natural Sciences and Technology Robotics & Coding Learner Group Projects

By Patrick Makhubalo (master's student, University of Johannesburg, Faculty of Education)

Introduction

When learners work together to solve problems using robotics kits, they often explore beyond the task itself, evoking multiple possible solutions before settling on the most viable option. Through such projects, learners develop good attitudes towards scientific inquiry as they design various workable learning artefacts. Using robotics kits in group projects enables learners to develop skills such as problem-solving as they engage in the learning experience and generating new ideas whilst supporting other learners who struggle in using robotics kits, thereby enhancing

collaboration. This study was conducted to answer the question: What is the nature of collaboration in Grade 6 Natural Science and Technology Robotics & Coding learner group projects? Research evidence suggests that learners can develop competencies for a fast-changing world, such as collaboration and computational thinking, through collaborative learning with robotics kits. This research aimed to understand the various patterns of collaboration and what these patterns tell us about learning in Grade 6 Natural Science and Technology using robotics kits.

Description of the Intervention

Four schools participated in the Edhub Robotics & Coding intervention: three in the Waterberg district of Limpopo and one affiliated with the University of Johannesburg. The intervention comprised: training of teachers in Robotics & Coding applications and the in-lesson integration of this knowledge and technology; provision of lesson plans for the curriculum-prescribed practical tasks that the teachers had selected to do with the learners; teacher support throughout the implementation process; and the provision of Robotics & Coding kits which Grade 6 learners used in Natural Science & Technology (NS&T) small group projects in

class. Eight teachers were trained in four online workshops and forty Grade 6 Natural Science and Technology learners were selected to participate in small group projects using robotics kits. Data collection consisted of eight video observations of project-based activities involving eight groups of five learners each, as well as four individual teacher interviews. The teachers were interviewed at the end of each classroom observation to share their impressions of learner collaboration as observed during group work involving the use of robotics kits. Below are images of the silver CRSP ROBO Micro:bit V2.0 Coding Kit.



Emerging Insights

The nature of collaboration with robotics and coding in Grade 6 Natural Sciences and Technology was observed and analysed based on verbal communication, non-verbal communication and knowledge on robotics and coding. To fully understand the nature of collaboration when learners use robotics kits in Grade 6 Natural Science

and Technology group projects, we relied on the computer-supportive collaborative learning (CSCL) framework in the analysis of observations. The main findings and insights from implementing the Robotics and Coding intervention are discussed below.

1. Learners freely shared ideas without fear of failure

One of the teachers made a point to encourage learners to put their ideas together and to give each other a chance. She reinforced the message that it was good to try different things even if some did not work. Another teacher commented,



Engagement was good simply because they were free and wanted to be seen to be working together and not to just dismiss an idea before trying it. Let us not tell each other that it will not work, try it first. If it does not work, let us start afresh. There is nothing wrong with getting it wrong as long as in the end, it works.

2. Learners became increasingly invested in robotics and coding

As the task became more serious and artifacts were constructed, learner interest intensified. One of the teachers stated, "They were so creative and invested. They even asked for more time to keep going at the end of the lesson". A teacher observed some competition between groups and within groups.



If you are telling them what to do, they do not have a view for themselves. You need to tell them what you want in the end, not how to do it. They need to figure it out for themselves and say to each other that when my idea is not working, someone else must get a chance to try as they compete with each other. They were eager to get good results compared to other groups. If all subjects were as practical as the robotics kits, our learners will go far. They touch, they put things in practice, and they get so happy when they get a result.

3. Learners gained their teacher's respect

A teacher was surprised by her learners and commented,



Some of these learners have talents and can go very far using these robotics materials. They showed me as their teacher more than I knew what was possible. They were more knowledgeable than me and I learned something new from them. Because of this, I started to respect them more.

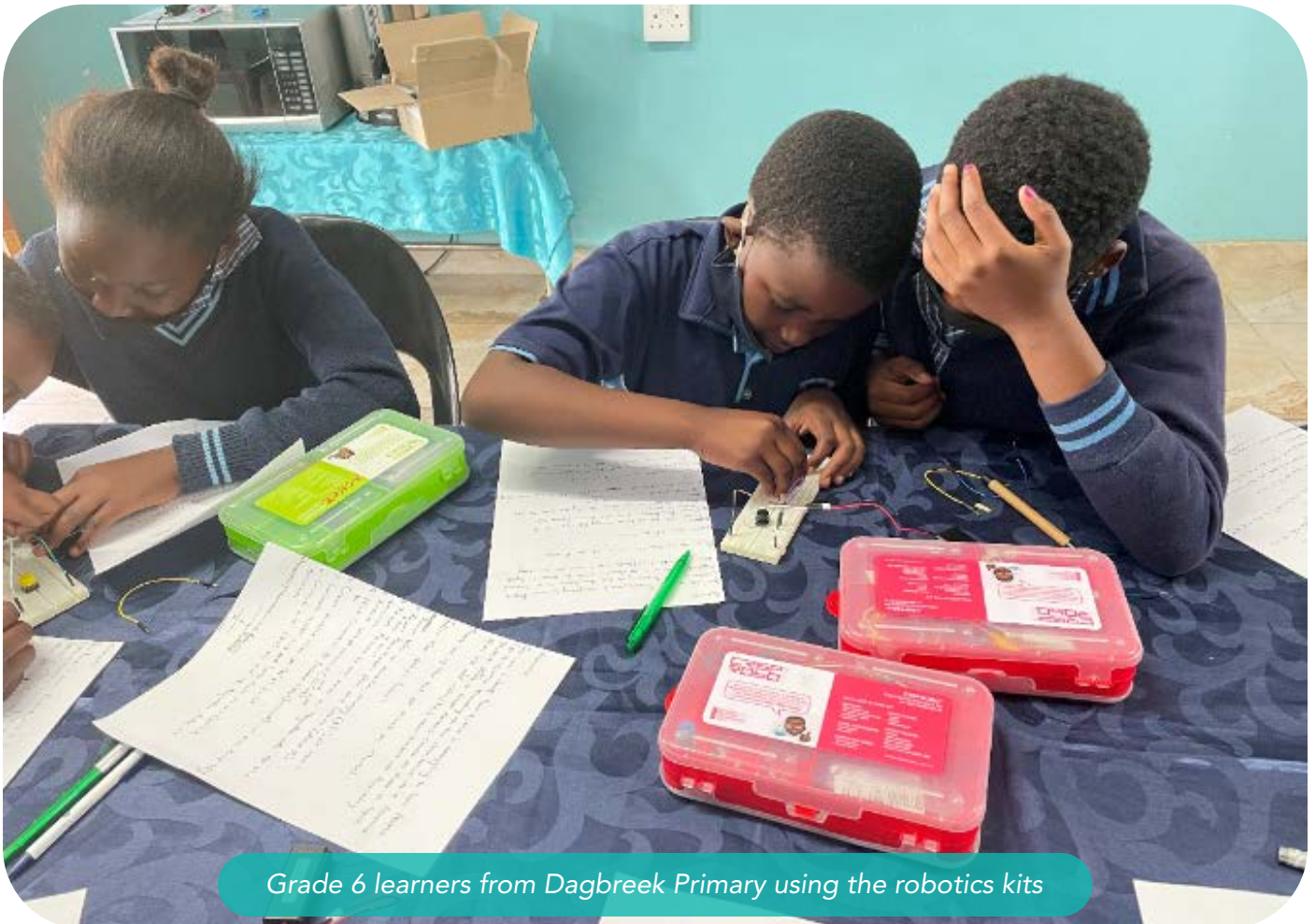
In subsequent data collection phases, we will delve deeper into the nature of collaboration and focus more on the opportunities for project work using Robotics & Coding in Grade 6 Natural Science and Technology. Learnings from this research project can help initial teacher education (ITE) institutions, researchers and practicing teachers understand

the patterns of collaboration when learners use robotics kits in project-based tasks and strengthen the design of such activities. Lastly, research insights from the study can inform the training for in-service teacher development in integrating Robotics & Coding learning tools in teaching and learning.

Conclusion

Collaborative learning is a learning approach whereby learners make meaning of their learning through sharing of ideas, building knowledge together as a team and finding innovative ways to solve problems. Research evidence suggests that collaborative learning encourages learners to engage and participate effectively in their learning. Our research findings highlight that collaborative learning with robotics kits provides learners with

an opportunity to develop and improve their communication and collaboration skills, creativity, computational thinking and critical thinking in solving a problem. Therefore, we recommend that the South African Department of Basic Education (DBE) provides training to teachers on how to incorporate collaborative learning in teaching and to teach STEM subjects with robotics kits as a learning tool.



Grade 6 learners from Dagbreek Primary using the robotics kits

RESEARCH STUDY 3

Using Practical Robotics Experiences to Develop Student Teachers' Knowledge for Integrating Robotics in STEM Lessons

By Kenneth Baloyi (PhD student, Faculty of Education, University of Johannesburg)

Introduction

Educational robotics have affordances for teaching STEM-related subjects and developing competencies for a changing world. Teachers and pre-service teachers need to be trained to use educational robotics to teach content and develop learner competencies. This research was conducted to answer the question: What are the emergent learning design principles derived from a robotics intervention with pre-service teachers

to incorporate competencies for a changing world when teaching STEM subjects? The research aimed to derive learning design principles from a robotics intervention to guide lesson design of intermediate pre-service teachers in STEM subjects. Furthermore, it sought to explore how pre-service teachers integrate robotics knowledge when planning Natural Sciences and Technology lessons.

Description of Intervention

Twelve final-year intermediate phase pre-service teachers at the University of Johannesburg were selected to participate in the research. All participants specialised in Natural Sciences and Technology (NS&T) as a subject in their third year of study. Four workshops were designed over two

months to introduce participants to educational robotics, provide them with practical experiences with the low-cost educational robotics kits, and allow them to incorporate robotics activities when designing NS&T lessons.



A participant's lesson design

Emerging Insights

Six learning design principles were initially derived from literature and then refined in the study. The learning design principles were grouped under knowledge areas based on the Technological Pedagogical Content Knowledge (TPACK)

framework. Findings revealed that pre-service teachers' experiential acquisition of robotics knowledge precedes their knowledge to integrate robotics when teaching NS&T content.

1. Participants gained knowledge of robotics affordances for teaching and learning

Participants reported that before they participated in the research, they had no knowledge of, or previous training in, educational robotics. However, based on their interactions with the robotics kits during the intervention, they reported having learned what educational robotics is and how it could be used to teach subject content

and develop competencies for a changing world in learners. Although they engaged only with the robotics kit chosen for the study, they felt that what they learned could be used with other similar robotics kits. Therefore, what they learned was transferable to other robotics kits.

2. Collaborative learning was the preferred pedagogical strategy

The lesson plans revealed that when pre-service teachers design lessons that incorporate robotics, they prefer using learner collaboration. The lesson plans revealed that they created ample

opportunities for collaboration. Participants also felt that learners should be given enough shared resources and should be allowed to manage their own time when completing group projects.

3. Robotics was intentionally used to teach subject content and develop competencies

Participants were able to align the robotics kit to the content and competency objectives. When they integrated robotics into the NS&T lessons, they first considered the affordances of the robotics kits. They then scanned the subject content to match the robotics kits to relevant topics in the

subject. The lesson plans also showed evidence of a deliberate intent to develop competencies. As already noted above, they saw collaboration as the best strategy to develop competencies such as critical thinking and metacognition.

4. Practical experiences develop the required knowledge for integrating robotics

The majority of the participants felt they gained knowledge of robotics and integrated it to teach content and develop competencies because they had playfully interacted with the robotics kits. Their experiences resulted in the ability to incorporate robotics. Participants advocated for

training that would allow teachers to experience robotics and provide opportunities for reflecting on their experiences. Through reflection, they could transfer their learnings when integrating educational robotics.

Concluding remarks

This research established that pre-service teachers acquired knowledge about the nature and affordances of educational robotics. They learned that educational robotics is helpful for teaching content while also developing competencies for a changing world through collaborative learning as a pedagogical strategy. Furthermore, participant experiences with robotics kits led them to explore creative ways to integrate robotics into their lessons. Teachers of the robotics curriculum and

those seeking to use robotics as a tool within the already existing subject can benefit from the learnings derived above. The findings can also inform the training of pre-service teachers and advance in-service teachers' professional development in teaching with robotics. However, the design of such robotics interventions should create an environment for teachers to learn through experiences with the robotics kits.



Pre-service teachers in a discussion on the use of robotics kits

RESEARCH STUDY 4

Empowering Student Teachers to bring the Fourth Industrial Revolution (4IR) into Classrooms

By Linford Molaodi (PhD student, Faculty of Education, University of Johannesburg)

Introduction

With the onset of the COVID-19 pandemic, the University of Johannesburg (UJ), like many other institutions, implemented a recess that led to students' departure to their respective homes. Teaching was paused while academics prepared for emergency remote teaching and learning. During the full lockdown period, an informal online Scratch Coding club (SCC) for pre-service teachers at the Faculty of Education was introduced. Creating an informal SCC was inspired by student teachers' request for a programme that could address the anxieties, isolation and boredom they experienced during lockdown. The feedback from student teachers on their experience with the SCC was overwhelmingly positive. The lessons learnt during the implementation of the informal club informed the formal establishment of the project, Creative Coding @ UJ Faculty of Education (CC@UJFE), in the second semester of 2020. This project was simultaneously conceptualised as a research project and this research study was intended to address the following question: *What do student*

teachers learn from their participation in a 'Scratch Coding Club' that could enhance their preparation for teaching?

The interest of the Faculty of Education in teaching creative coding to teachers, using the graphical programming language Scratch, stems from wanting to prepare teachers for a rapidly changing world mainly due to the exponential advancement in technology, including artificial intelligence, known as the fourth industrial revolution (4IR).

This study investigated what student teachers learnt from their participation in the SCC to enhance their preparation for teaching. The student-teachers were registered in both PGCE and B.Ed programmes of the institution's Faculty of Education – specialising in varied phases of schooling (foundation, intermediate, senior and FET) and subjects. The areas of specialisation (subjects) included African languages, English, Mathematics, Sciences and Commerce.

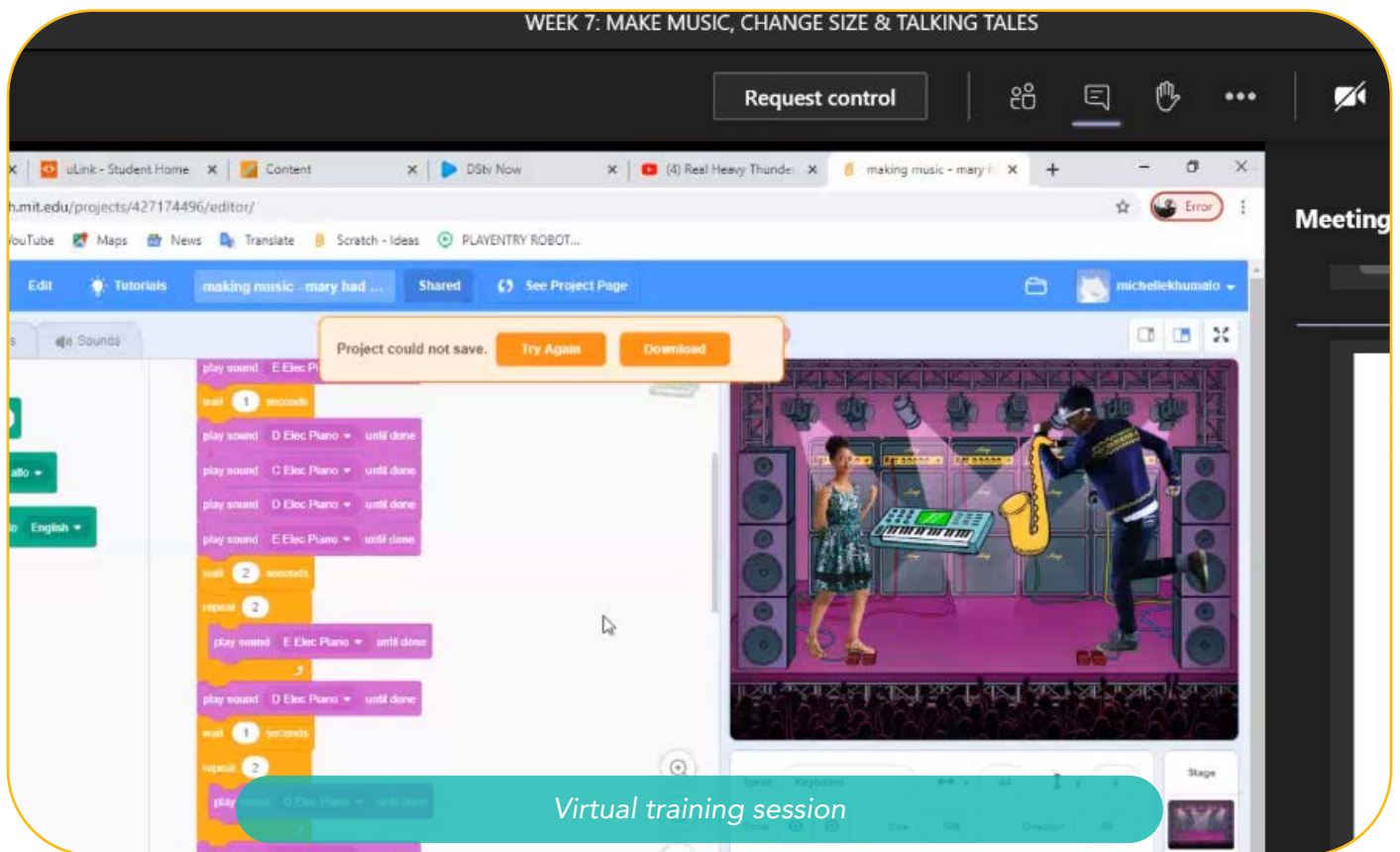


Description of Intervention

The SCC project sessions took place online on Saturday mornings, and Faculty of Education staff members and students facilitated the meetings. The facilitators were also available during the week to support the participants who required additional help with catch-up, should they miss a Saturday meeting. The students involved as facilitators and senior facilitators successfully completed an entire semester of involvement in the SCC (evidenced by the submission of portfolios), showing talent to be

supportive and enthusiastic facilitators.

Data were collected from the 2021 and 2022 cohorts of student teachers who completed the 14-week SCC and submitted portfolios. There were 15 student teachers who submitted portfolios in the second semester of 2021 and 24 in the first semester of 2022. The picture below shows a virtual SCC session where the trained pre-service teachers created their own coding.



Emerging Insights

The findings indicate that student teacher participation in the SCC had a significant contribution to their learning experiences. Student teachers indicated that during their participation in the SCC they experienced joy, received sufficient

support from their peers (including facilitators) and learnt several skills and lessons about teaching. As this study is still in progress, a few emerging findings are mentioned below.

1. Participating in the SCC was joyful

Students stated that participating in the SCC was a joyful experience. They asserted that their experience was fun, interesting, fulfilling and exciting.

2. Student-teachers received ample support from facilitators and peers

Students felt they were cared for and supported by facilitators and peers. Whenever they needed help, facilitators and peers were available to assist.

3. There were several skills learnt

Students learnt several skills during the sessions, including communication, problem-solving, collaboration and creative thinking; the latter two were predominant.

4. Student-teachers learnt some lessons about teaching

Student-teachers learnt that teaching can be fun, it should be flexible, and that teacher demeanour is important.

Concluding Remarks

The establishment of the Scratch Coding Club, which initially commenced as an informal project to address anxiety and isolation during the full lockdown of the COVID-19 pandemic, yielded positive results on the learning experiences of student teachers. Although the study is in progress, student teachers indicated that during

their participation in the SCC they experienced joy, received sufficient support from their peers (including facilitators), learnt several skills and important lessons about teaching. More student teachers will continue benefiting from these learning experiences as the SCC expands annually.

Chapter 6

Evolving School Culture to Respond to the Fast-Changing World

Research on innovative learning environments highlights the important role that school culture plays in supporting learning, particularly as it relates to children's social and emotional development (OECD, 2015; 2017)³. A school's culture consists of the perceived atmosphere in the school, the underlying beliefs and values, and the everyday practices that bring these values to life (GEMS, 2016)⁴. School leaders play a central role in shaping culture through their unique roles and responsibilities in the broader ecosystem. As such, the Sandbox School Culture intervention chose to work closely with school leaders, particularly school principals, to define and co-create the kind of environment and culture they anticipated would support teaching and learning in the 21st century.

The School Culture intervention consisted of a series of catalytic, participatory workshops and meetings with school leaders from ten quintile 1-3 primary schools in Waterberg District, Limpopo. The research on this intervention was conducted from 2020-2023 by master's and doctorate students from the University of Johannesburg (UJ) Faculty of Education. The research reports written by four University of Johannesburg students are highlighted below. In addition to these reports, the School Culture intervention has led to the development of various publications, many of them co-authored with principals, about learnings from this intervention.

RESEARCH STUDY 1

Leading with the heart, head and hands: Social-emotional learning in rural primary schools

By Mariska van Reenen (master's student, Faculty of Education, University of Johannesburg)



Introduction

The background to this study centres on the disruptions caused by the COVID-19 pandemic to the South African education system, specifically in Limpopo. On 25 March 2020, when a lockdown was imposed in South Africa, schooling and food access for approximately nine million learners depending on school meals were severely interrupted. The COVID-19 pandemic posed unprecedented challenges to educational systems globally, including schools in the Limpopo Province of South Africa. During the crisis, schools closed

abruptly and educational leaders were forced to navigate complex educational and emotional challenges.

This research study was initiated to investigate the phenomena of crisis-driven leadership styles adopted by school leaders during the COVID-19 pandemic. Specifically, the study examined how school leaders from low quintile Limpopo schools led their schools and staff members during and after the COVID-19 pandemic. The focus was on

³OECD. (2017). The OECD Handbook for Innovative Learning Environments, OECD Publishing, Paris.

OECD. (2015). Schooling Redesigned: Towards Innovative Learning Systems, Educational Research and Innovation, OECD Publishing, Paris.

⁴GEMS Education. (2016). Schools of the Future. GEMS Intelligence Unit.

exploring the application and effectiveness of social emotional learning (SEL) approaches during the pandemic, using the Head, Heart, and Hands

(HHH) transformational model for leadership. The objectives of this study were as follows:

1

To explore the different social emotional learning (SEL) leadership approaches used by Limpopo school principals;

2

To ascertain how effective these SEL leadership approaches are for maintaining a positive culture of learning within their institutions; and

3

To derive recommendations on how an SEL approach to school leadership can sustain a positive culture of learning in low quintile Limpopo schools, especially during and post crisis periods such as the COVID-19 pandemic.

This report outlines the preliminary research findings from the analysis of qualitative data collected during workshops.

Description of research

The research was a qualitative case study employing a constructivist interpretivist paradigm. It explored the phenomena of crisis-driven leadership in education, specifically during the COVID-19 pandemic, by evaluating the experiences of school leaders in low quintile schools in Limpopo. Two principals were selected to participate in this study using a convenience sampling method. A workshop was organised as the data collection event, where participants utilised research instruments like metaphor drawing and photovoice pieces. A three-hour workshop was conducted online via Zoom, making it accessible despite pandemic-related restrictions. The workshop focused on demonstrating social emotional learning (SEL) approaches to leadership during the COVID-19 pandemic.

The workshops were recorded, and visual artefacts and discussions were analysed. This setting allowed for the creation of a close bond between the researcher and participants, promoting more

natural conversations and better data. Qualitative data were analysed using a thematic data analysis approach. The first round of data analysis occurred during the workshop when participants created their metaphor drawings and discussed what these represented. This approach dismantled the functioning of processes, explored relationships between causes and outcomes, and pinpointed essential components within overarching themes. The transcripts of the discussions, metaphor drawings and photovoice activities were key in formulating relevant codes and themes pertaining to the topic. This process allowed the researcher to focus on core concerns and experiences, which were then examined against the study's framework, leading to a thorough understanding of the given phenomenon which is the impact of the COVID-19 pandemic on leading learning in South African public schools. Reliability and trustworthiness were achieved through rigorous data collection and various data processing methods.

Key research findings and insights

This study provides insights into the challenges faced by school leaders during the unprecedented COVID-19 pandemic and their responses to the challenges. The pandemic significantly disrupted education, introducing myriad logistical and emotional challenges that required urgent attention. The research findings highlight the importance of social emotional learning (SEL)

strategies and the need for school leaders to understand and implement these for effective management during global crises. The research underscores the pivotal role of school leaders in driving change, managing crises and maintaining a culture of learning. The primary research findings and insights derived from a qualitative data analysis are briefly discussed below.

1. Different social emotional learning strategies and training are required

This study identified different SEL strategies that school leaders used to respond to the pressures of the COVID-19 pandemic, including transformational, distributive and vision setting leadership. The importance of understanding all

these strategies emerged as a critical factor for school leaders to develop comprehensive crisis management skills and successfully navigate through a crisis.

2. A gap in knowledge of SEL

Findings from this study suggest that there is a significant gap in knowledge about SEL among school leaders and teachers. This gap can create a divide and render the implementation of SEL more difficult, as many professionals have not taken emotional intelligence classes or participated in programmes designed to improve their social and emotional skills. Furthermore, it is evident that some school leaders were not well-informed about concepts such as stigmatisation and overall staff well-being. This lack of understanding and knowledge about SEL can make it challenging to sustain a culture of learning, especially in crises such as the COVID-19 pandemic. SEL is closely related to a culture of learning as it enhances the overall learning experience and promotes holistic development. By integrating SEL with academic content, schools can create an inclusive and safe learning environment that fosters engagement, open communication and collaboration. SEL

helps learners develop essential life skills such as understanding emotions, empathy, problem-solving and stress management, all of which are vital for personal growth, mental health and social well-being. When SEL is integrated into the education system, it intertwines with academic learning, improving learners' capacities to understand and manage their emotions and stress and engage in the learning process; this increases motivation and engagement. The lacuna in SEL understanding can influence the level of confidence teachers possess when tasked with exhibiting, advocating and conveying vital SEL concepts to their peers. This in turn affects how well they manage their learners and the effectiveness of SEL in the classroom. However, overcoming this gap in knowledge needs commitment from schools and districts. A possible strategy would be to implement emotional intelligence and SEL training during staff meetings.

3. Social emotional learning is just as important as the academic curriculum

The principals emphasised that SEL is as important as academic learning. The learners need more comprehensive education that prepares learners not only with academic skills but also with interpersonal and emotional management skills. SEL helps in the development of life skills such as understanding emotions, empathy, relationship

building, problem-solving and handling stress. These competencies complement academic learning, and are crucial for personal growth, mental health and social well-being – which are important in school, work and life beyond. Total well-being and holistic development that includes social and emotional skills should be part of the primary

focus in the education system. Hence, schools and universities are encouraged to integrate SEL with academic content rather than seeing it as an intervention programme or a supplement to already overburdened academic content. In a balanced education system, SEL and academic learning intertwine. SEL can improve academic

outcomes by improving learners' capacities to engage in the learning process, reducing stress and increasing motivation and engagement. Similarly, a rigorous academic environment that considers learners' social-emotional needs can foster a positive learning experience and cultivate essential life skills.

4. Establishing an efficient environment for learning



In combining these elements, schools can create an effective culture of learning that prepares learners not only academically, but also socially and emotionally. These elements can be developed amongst educators if school leaders encourage a growth mindset, promote self-awareness and emotional intelligence, nurture curiosity and critical thinking, and offer teacher development training in communication, resilience or coping skills.



5. Staff well-being is essential to successful school culture

The findings suggest that building stronger relationships and maintaining open communication between school leaders, teachers, learners and parents is vital to cultivate and sustain a positive culture of learning in educational institutions under crisis. This can be achieved by open communication and building strong relationships, improving staff well-being and integrating SEL. Staff well-being is closely related to school culture and is fundamental to its success. A positive school culture supports staff well-being by providing a nurturing, collaborative and empowering environment. In turn, the well-being of staff members contributes to the development

and maintenance of a positive school culture that benefits learners, staff and the entire school community. Staff well-being plays a critical role in the emotional environment of a school: if teachers are stressed or unhappy this inadvertently creates a tense and uninspiring learning environment, and vice versa. Therefore, prioritising staff well-being is crucial in cultivating an effective, positive school culture. This may involve implementing strategies such as professional development opportunities, providing mental health resources, encouraging work-life balance, and creating safe spaces for open dialogue about well-being concerns.

The Head, Heart and Hands Framework

The research findings suggest that a combination of several aspects of the school influence school culture. The 'Head, Heart and Hands' (HHH) transformative framework is a concept that emphasises a holistic approach to education and personal development. This framework is often

used to guide educational practices, personal growth and organisational development. It focuses on critical reflection, building relationships, fostering emotions and engaging in actions leading to change. The HHH model is elaborated further below.

1



HEAD

(Critical Reflection):

This represents the intellectual aspect of leadership. Leaders should create an environment that encourages critical thinking, questioning and learning from past experiences. It is about analysing problems, identifying what needs to change, and determining who is responsible for the change.

2



HEART

(Emotions and Relationships):

Effective leadership involves emotional intelligence. Organisations should foster a culture where people are empowered to converse openly about their feelings. This aspect also highlights the importance of cultivating strong relationships among team members to create an atmosphere of trust, cooperation and mutual respect.

3



HANDS

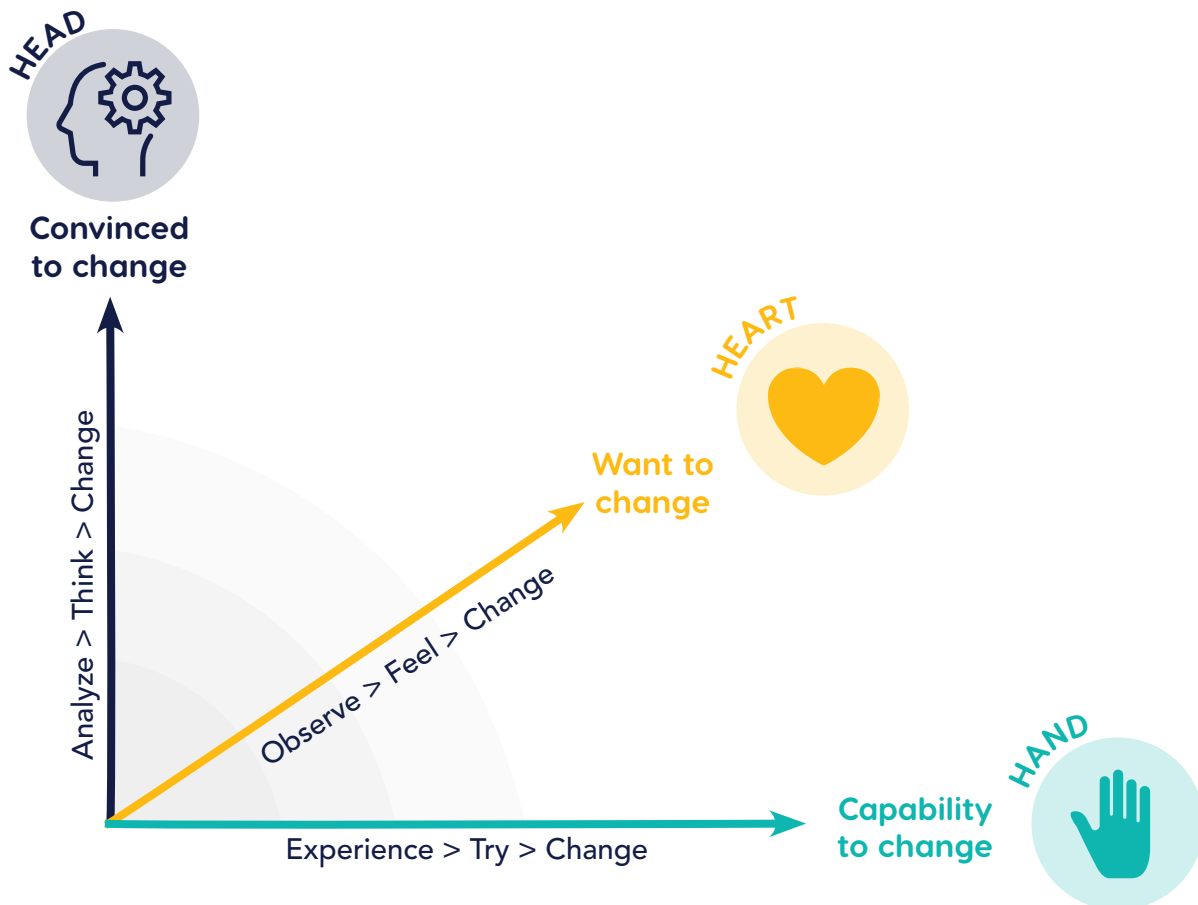
(Action):

Finally, the hands symbolise action taken based on the understanding developed in the head phase and the feelings stirred in the heart phase. The actions represent the practical strategies required to affect change, with the ultimate goal of creating a positive learning culture and long-lasting changes.

For successful integration, all three components of the HHH model need to be meticulously balanced. The HHH model applies to crisis scenarios, such as pandemics or disasters, where robust, agile leadership is essential to navigate through

challenges and drive the organisation towards recovery and growth. Various leadership styles, such as transformational, distributive, and vision setting, can work synergistically with this model to ensure successful and sustainable change.

Head, heart and hands (HHH) transformational model (2021)



Conclusion

The research findings confirm that school leaders faced numerous challenges arising from the COVID-19 pandemic. By implementing various strategies, school leaders can be better equipped to handle social-emotional aspects, navigate surrounding stigmas and promote overall well-being within their educational institutions.

The study acknowledges its limitations due to the small sample size and suggests that for deeper and broader understanding, future research

should consider a wider scope. Overall, the research emphasises the crucial role of school leaders in managing a crisis, the need for support for these leaders and the significance of SEL. Recommendations for future research include exploration into the impact of the pandemic on school leaders' capabilities to manage crises, the investigation of post-traumatic stress disorder in school leaders post-pandemic, and research into stigmatisation and staff well-being.

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RESEARCH STUDY 3



From a teaching culture to a learning culture: School principals leading school culture evolution for a 4IR world

By Ayodeji Michael Adeoye (PhD student, Faculty of Education, University of Johannesburg)

Introduction

School culture influences every aspect of a school and “if the culture changes, everything changes” (Vieira & Barbosa, 2020: 26). This research study focuses on how school principals lead the evolution of school culture in this era of the 4th industrial revolution (4IR). The 4IR is changing the way we live, work and do things; therefore, education must evolve by preparing students for the demands of this new reality (Reaves, 2019: 2).

This research study aims to identify how principals lead school culture evolutionary processes that support the demands of a 4IR world. Using a qualitative approach, this study addresses the following research question: *What are the strategic ways in which school principals design school*

culture evolution for a 4IR world? The sub-research questions are as follows:

1

In what ways do school principals support school management teams (and other stakeholders) in implementing strategies for a school culture evolution that supports 4IR imperatives?

2

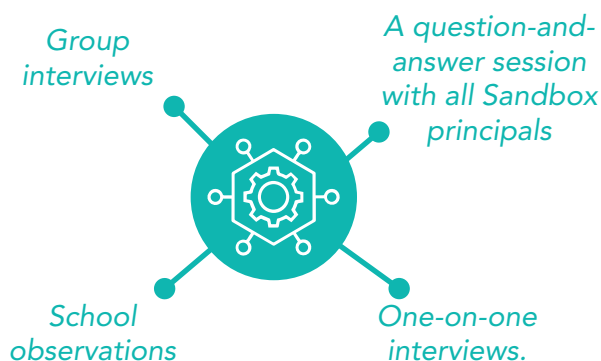
What sorts of leadership learning experiences do school principals describe for an evolving school culture? Addressing these research questions will lead to a better understanding of how school leaders lead the school culture evolution process.

Description of intervention

This research study utilised a participatory research method to investigate how school principals lead the school culture evolution in the era of the 4IR. Participatory research is the co-construction of research in partnerships between researchers and stakeholders, community members or others with insider knowledge who are affected by the issue under study (Jagosh et al., 2012: 312). The sample for this study consists of 10 principals from quintile 1-3 schools in Limpopo that are part of the Sandbox Schools Project.

The principals took part in various participatory activities which include metaphor drawing, interviews, interaction and a group interview (with all participants). This participatory research study spanned over three years. The first process of data collection was a metaphor drawing, wherein participants were asked to draw a representation of their school culture and explain how the drawing

represents their school culture. Additional data were collected through:



Qualitative data were analysed using thematic analysis to investigate how school principals lead school culture evolution in the era of the 4th industrial revolution. Qualitative research refers to the kind of inquiry that is “naturalistic and deals with non-numerical data” (Nassaji, 2020: 427).

Emerging insights

The following findings and insights presented below emerged on how to lead school culture revolution in the era of the 4th industrial revolution, with recommendations made on a wider scale.

1. Importance of creating an atmosphere conducive for nurturing better relationships

Fostering strong relationships with all school stakeholders (parents, teachers, SMT, learners and the community) emerged as an insight on how school principals lead school culture evolution in the era of the 4IR. School principals explained that they created a conducive atmosphere for building better relationships within the school

and this impacted on the culture of the school positively. According to Turan and Bektas (2013), the main task of the school principal is to create a positive atmosphere that contributes to a strong school culture. Creating an atmosphere for better relationships with all stakeholders contributes positively to the culture of the school.

2. Enhanced teamwork among staff members

The principals stated that after the Sandbox intervention they were able to improve teamwork among teaching and non-teaching staff. The improved teamwork among the stakeholders was crucial in dealing with the challenges the school faced due to COVID-19. The school principals emphasised the importance of collective effort by

all staff members in preventing the transmission of COVID-19 within the school. The collective effort involved ensuring strict adherence to COVID-19 rules and regulations by all learners, with staff conducting daily temperature checks, following sanitisation procedures and promoting the practice of social distancing.

3. Improved collaboration with the community

The principals stated that improved collaboration and cooperation with the community, social service and other schools around the community was vital to the school culture evolution process and dealing with challenges arising from COVID-19. For example, some shops in the community were used as places where learners could get information and school assignments during lockdown. Improved collaboration helped to overcome COVID-19 challenges and improve the culture

of the school. The principals also stated that the Sandbox Schools Project has created an avenue for collaboration amongst them. The School Culture intervention, which is part of the Sandbox Schools Project, provided an avenue for sharing ideas and consulting with one another to find solutions to common challenges that their schools face. Improved collaboration or cooperation with stakeholders and other schools is vital to building a positive school culture.

4. Enhanced open-door policy was crucial

The implementation of an open-door policy significantly contributed to improved school management and the building of a positive school culture. The open-door policy facilitated a flow of ideas and suggestions from all team members, enabling the schools to swiftly address many unique challenges presented by the COVID-19

pandemic. Moreover, the principals encouraged other stakeholders (parents, local businesses and other community members) to bring forth suggestions for mitigating the challenges arising due to the COVID-19 pandemic.

5. More effective communication with stakeholders

The principals improved their communication with all school stakeholders and this helped to inform stakeholders regarding the plans and implementation strategies in the school. The improved communication resulted in better decision making and building a better school culture. They stated that regular communication between principals and the SMT, between the departmental head and the teachers, and between

the principals and the SGB knit a substantial bond amongst them which has impacted the culture of the school positively. Also, they believed that effective communication helped in dealing with the challenges of COVID-19 and kept the teaching and learning process going during the pandemic. Principals admitted that they are still open to suggestions and ideas from all stakeholders for improving school management.

6. Employment of innovative strategies

According to the principals, they employed innovative strategies to solve problems facing their schools during COVID-19. For example, to address low parental involvement in the school, one principal invited the learners' parents to school

to receive some of the harvest from the school garden and used that opportunity to engage with the parents. This innovative strategy significantly improved parental involvement at the school.

7. Call for members of staff to rededicate themselves to their work

Following the implementation of the school culture intervention, the principals expressed their encouragement and called the school staff to rededicate themselves to their work. This initiative has led to a renewed commitment among staff members to the teaching and learning process, yielding enhanced dedication to providing high-

quality education to learners. Additionally, this effort has had a positive influence on the overall school culture. The principals stated that the desire to see learners acquire quality education fuelled the staff's rededication to building a positive school culture.

8. Collaborative decision-making

The principals reported that they realised the importance of including all school stakeholders in decision making. Shared decision making helped in combating several challenges facing the schools and school culture. Most importantly, the principals

highlighted that shared decision making reduced the level of resistance from stakeholders because stakeholders played an active part in the decision-making process at the school.

9. School culture represents a living system

According to the principals, a school culture represents a living system (e.g., a tree) which consists of three major parts: the roots, trunk and leaves. The roots represent learning, teaching and the learning environment. The trunk represents the shared vision and mission of the school. The leaves

represent various components such as partnership, empathy, creativity, innovation, collaboration, resources, accountability, efficacy and agency. The tree symbolises the inter-connectedness and inter-dependence of all components in the school and shows how one cannot live without the other.

Conclusion

In summary, while each school culture is distinctive, the elements that drive the evolutionary process of school culture remain consistent. These crucial factors encompass robust relationships, open communication, active engagement of stakeholders and community, shared decision-making, dedication, teamwork and an open-door

policy. As emphasised by Lilliedahl (2021), parental and community involvement plays a significant role in fostering a positive school culture. Therefore, to effectively lead the school culture evolution, the principal must actively engage all stakeholders, including the community and the school as a whole.

Recommendation

The objective of this research was to investigate the strategies employed by principals in leading the evolution of school culture in their schools. Based on the study's findings, it is advised that school principals consistently collaborate with various stakeholders, including school management teams (SMT), school governing body (SGB), teachers, all school staff, the host community, social services and other schools within the community to facilitate a culture evolution. Additionally, it is recommended

that school principals practice an open-door policy, encouraging all stakeholders to contribute ideas and suggestions for improvement, recognising that the principal and school staff alone cannot drive the school culture evolution. Open communication and improved shared decision-making should also be actively practiced between the principal and the school's SMT, SGB, teachers, and parents to foster a collaborative approach to school culture evolution.

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RESEARCH STUDY 3



Future-fit leaders for future-fit schools: Narratives of leading rural primary schools for 4IR imperatives

By Frenchesca June Clark (master's student, Faculty of Education, University of Johannesburg)

Introduction

The national lockdown, in response to the COVID-19 pandemic, led to the closure of many businesses and schools. School leaders had to find ways to continue to educate their learners remotely, which included making use of online and digital learning platforms. Unfortunately, the majority of South African schools lack access to the technology required to facilitate remote teaching and learning (Mukuna & Aloka, 2020). In addition, the challenges included a lack of infrastructure (du Plessis & Mestry, 2019) and qualified teachers who could assist with online learning (Dube, 2020). These challenges forced rural future-fit leaders to be innovative, to come up with unique solutions to ensure that no child was left behind. In face of the COVID-19 crisis, school leaders saw the urgent need to prepare educators and learners to participate successfully in an increasingly 4IR driven world (Zagami et al., 2018). To accomplish this, school leaders undertook several initiatives to ensure that their schools were well prepared to transition into the use of 4IR tools – such as digital devices and online platforms – to resume teaching and learning.

The world that we live in is constantly changing, in part as a result of the 4IR. Therefore, approaches to teaching and learning need to constantly evolve to prepare the next generation to cope in a 4IR world. By taking a holistic approach, schools can prepare their learners for the future by making them future-fit. This involves school leaders continually engaging with industry leaders to determine relevant skills to ensure that graduates are competitive on the global market.

This study explores ways in which 10 school principals, all of whom were part of the Sandbox project, were able to demonstrate future-fit characteristics. These future-fit characteristics led to the development of future-fit schools in severely under-resourced contexts. The Sandbox Project was designed to equip school leaders, teachers and learners with the necessary 21st century skills and competencies for thriving in this volatile, uncertain, complex and ambiguous (VUCA) world (Dhir, 2019). By conducting research with school principals who participated in the school culture intervention, this study addressed the following research questions:

- 1 *What are the kinds of future-fit leadership strategies employed by rural school leaders that result in future-fit schools?*
- 2 *What are the characteristics of rural future-fit leaders that result in the development of future-fit schools?*
- 3 *In what ways do these characteristics support the leadership of rural future-fit schools?*
- 4 *What are the challenges rural school leaders experience that hinder the development of future-fit schools?*



Description of Intervention

Ten principals from rural primary schools in Limpopo were selected to participate in this school culture research study. The principals were asked to give narratives of how they led their schools into being future-fit schools before and during the COVID-19 pandemic. Two meetings were held between the researcher and participants. During the first meeting the intention and procedure of the research study were described to the principals.

Data were collected during the second meeting using five interview-type questions. The principals responded to the interview questions via WhatsApp voice notes, which was convenient considering the strict lockdown during the COVID-19 pandemic. The responses were converted into narratives for each principal, then digital stories for each school, and data were analysed using coding and thematic analysis.

Key Research Findings and Insights

The main research findings emerging from the analysis of the collected qualitative data are discussed below.

1. Effective leaders need to possess four competencies of a neuroleader

Research findings suggest that it would be beneficial for rural school leaders to practice neuroleadership by focusing on the four competencies of a neuroleader. The first competency is performance, which encourages them to focus on balance and prioritise their well-being. The second competency is collaboration which proved to be tremendously effective in helping them lead their schools during the crisis of the COVID-19 pandemic. Improved collaboration and networking amongst the schools helped the principals cope better with the unprecedented COVID-19 crisis. The third competency, innovation, helped principals initiate and implement unique measures

that facilitated teaching and learning during the COVID-19 pandemic. For example, the principals ensured that educators received training in the use of digital devices to facilitate remote teaching and learning during the national lockdown. The fourth competency, agility, enabled principals to make swift decisions and adopt quickly to different challenges arising due to the COVID-19 pandemic. For example, principals upgraded their digital skills and school infrastructure to ensure that learning continued. By embracing these four competencies of neuroleadership, the principals managed to develop their schools for future-fit education.

2. The benefits of professional development and improved infrastructure

Although schools were forced to adapt innovatively in response to the challenges presented by the COVID-19 pandemic, many of the changes are sustainable and have become the new normal. The intensive and continuous professional development during the pandemic significantly improved educators' digital skills. For instance, school leaders and educators learnt how to use

laptops and Smartboards and continue to use these post-COVID. Amongst these educators, leaders emerged who could teach their colleagues about the use of digital devices. However, some challenges such as a shortage of devices and poor internet connection persist in the quintile 1-3 schools in Limpopo.

3. Accelerated move into the 4IR

Rural schools need to move into the 4IR to create future-fit learners who will be globally competitive. To achieve this, principals need to prioritise the upgrade and improvement of the school infrastructure to ensure better internet connectivity and use of technology. During the COVID-19 pandemic, schools that had idle technological devices such as laptops and Smartboards provided training for their educators in the use of these devices; this fast-tracked the move of some rural schools into the 4IR. Thus, both educators and learners became digitally adept at a faster rate than anticipated. The schools also created WhatsApp

and Facebook groups to communicate with learners and parents who had access to Smartphones and computers. Using digital tools and virtual communication helped improve communication across different stakeholders (Department of Basic Education, school governing bodies, principals, educators, parents and students). But even though there were technological improvements, the schools still faced technology-related challenges. One of these was poor infrastructure, which resulted in communication breakdowns during virtual meetings. Furthermore, becoming more digital significantly strained school finances.

4. Collaboration and adaptability led to innovative changes

Collaboration, innovation and agility became essential skills in leading rural primary schools for 4IR imperatives in a time of crisis. All stakeholders worked together to ensure learner safety as well as find innovative ways to ensure that teaching and learning continued during the lockdown. The SGBs got more involved in preparing schools for

the return of learners after the national lockdown. Principals and educators sought ways to ensure that COVID-19 protocols were adhered to in order to ensure the health and safety of everybody in their schools. To achieve all this, they had to be more adaptable because they did not know what to expect from one day to the next.

5. School leaders faced unique challenges

The COVID-19 pandemic presented several unique challenges in the schools. For instance, principals and educators had to adjust quickly to curriculum changes such as using a rotational timetable and finding enough rooms to separate the learners into smaller groups to ensure that social distancing requirements were met. Another challenge was the low attendance of both teachers and learners, primarily due to fear and illness. The psychological

and emotional issues arising due to fear of the pandemic was another challenge that principals had to deal with. There were also challenges in the implementation of National Schools Nutrition Programme (NSNP). With a national lockdown, learners could not go to school so principals had to find innovative ways to get food to learners who relied on the NSNP.



Conclusion

This qualitative investigation showed the future-fit leadership strategies that 10 rural school principals employed to ensure that teaching and learning continued during the global pandemic. Although the principals were unprepared for a national lockdown and the closing of schools, they came up with innovative ways to address the unique challenges that schools faced. They upgraded their digital skills and resources and worked closely with the community to ensure that teaching and learning continued.

The principals reported that it is necessary for school leaders and educators to stay updated with regard to the latest technological changes in education. Due to the national lockdown, school leaders and

educators had to quickly upgrade their digital skills, through training, to make remote teaching and learning possible. It was reported that digital devices which were idle pre-covid in some of the schools are now fully utilised as educators learned how to use them. Thus, the challenges arising due to the COVID-19 pandemic encouraged principals to embrace the 4IR and ensure that their educators have the necessary skills to lead their schools into the future. The principals also became more aware of the importance of mental health and well-being, acknowledging that the emotional and psychological well-being of educators and learners must be addressed to curb the high rate of absenteeism and learner dropout.

Recommendations

The findings from this study may assist in the development of future-fit schools led by future-fit leaders in other rural areas. Below are several recommendations.

Principals and educators need to continually upgrade their digital skills. This will make online teaching and learning a normal practice. Continuous upgrading will ensure that, in case of future pandemics, teaching and learning will not be interrupted.

Educators should continue to use digital tools, for example sending assignments via WhatsApp, as this could improve parental involvement in children's school work.

Schools should adopt 4IR technology.

Schools should supplement learner nutrition by planting vegetable gardens.

DBE should stop spending large amounts of money on textbooks but instead invest the money in the digitisation of schools and improving the infrastructure.

It is important to provide counselling for educators and learners to improve mental health and alleviate feeling overwhelmed and frustrated.

Schools need to reduce class sizes to enable educators to pay closer attention to their learners to improve the quality of teaching and, therefore, learner performance.

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RESEARCH STUDY 4



Learning agility of school principals: Transforming school culture for the Fourth Industrial Revolution during the COVID-19 pandemic

By Lotus Phukubje (PhD student, Faculty of Education, University of Johannesburg)

Introduction

Different times require different sets of skills to lead and manage schools. School principals were faced with unprecedented challenges during the national lockdown due to the COVID-19 pandemic. For instance, curriculum delivery had to be re-designed, as teaching and learning had to be conducted remotely. Furthermore, after the lockdown, learners had to adhere to social distancing at school to minimise the spread of COVID-19. The type of leadership that the school principals exhibited during COVID-19 displayed their learning agility. Due to the challenges presented by the COVID-19 pandemic, principals as leaders, especially those in rural areas, had to provide agile leadership that would ensure teaching and learning took place despite school closures. For example, highly agile principals worked with parents and the wider

community to ensure that learning took place via technology-assisted devices.

The aim of this study was to explore the learning agility of Sandbox School principals who were engaged with school culture transformation during COVID-19 pandemic. The principals had to lead a change process during the pandemic by engaging with their own learning. The COVID-19 pandemic forced the use of technology to enable communication and leadership tasks that could no longer happen face-to-face. In addition, principals had to learn how to collaborate more with the community and entities outside of the school to better support teachers and learners. Despite all the hardships of remote learning, principals responded positively to the crisis.

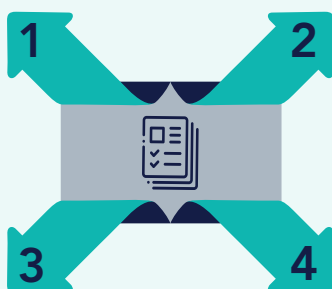
Description of the intervention

This research study is part of the transforming school culture intervention conducted as part of the Sandbox Schools Project. The intervention exposed principals to a transformative learning process which is synonymous to independent thought that principals need in order to critique their own thought processes as well as their points of view. The intention of this study was to evaluate how the task of transforming school culture (for

a 4IR world) would impact the learning agility of Sandbox School principals during the pandemic. Principals were selected from 10 Limpopo province primary schools falling within the category of quintiles 1-3 to participate in this study. Their learning agility was assessed as they worked to transform their school culture in relation to 21st century skills development. The research study was conducted from 2020 to 2022 to:

Examine the learning experiences of Sandbox School principals in relation to school culture transformation during the pandemic

Observe the trajectories of learning (present and future) that the Sandbox School principals identify for themselves in relation to the task of school culture transformation



Determine the patterns of learning agility that can be identified for each Sandbox School principal in relation to school culture transformation during the pandemic

Determine the learning agility frameworks or models that can support school culture transformation for a 4IR world

The study involved a participatory research method - defined as a systematic inquiry, with the collaboration of those affected by the issue being studied, for the purpose of education and taking action or affecting social change. The participatory process enabled the principals (who are co-creators) to plan for a learning trajectory beyond the pandemic and contribute to the creation of a contextually appropriate learning agility framework or model that could be used to develop stronger learning agility patterns in current and future school leaders.

The study began with a virtual meeting with the 10 principals in 2020; due to COVID-19 restrictions it was not possible to meet in-person. The meeting was followed by a series of workshops (both online and face-to-face) and webinars with the principals. The engagements offered principals an opportunity to learn from a panel of speakers and later engage in smaller breakaway sessions where they listened and shared their own lived experiences. During the visual participatory workshop, the principals explored leading a culture of learning. As part of the research process, principals also drew collages which were used in conversations about the kind of learning they displayed as leaders in their varying contexts. Furthermore, the principals defined what they understood was meant by leading a culture of

learning for a constantly changing world:

1. leading through partnerships;
2. researching with “learning leaders”;
3. principal as “culture-builders”;
4. making sense of an upside-down world; and
5. teacher development and well-being.

Emerging as the heart of leading a culture of learning was teacher development and well-being.

This study used both qualitative and quantitative methods. In phase 1, qualitative data were collected using a survey. Phase 2 included in-depth interviews with the principals, the visual participatory methodologies and a survey using the learning agility questionnaire. A 9-item Likert scale, Bedford learning agility questionnaire (BLAQ) adapted from Bedford (2011), was used to assess each principal’s learning agility in transforming the culture of the schools. Questions on the Bedford learning agility questionnaire were administered to all 10 principals to rate their own level of learning agility. In addition, a one-on-one telephonic interview with each principal was conducted to probe their responses to the questionnaire. The BLAQ was also given to 3 circuit managers, 10 school management team (SMT) members and 10 teachers to solicit their rating of the learning agility of their school principals.



Key Research Insights

Collected data is currently undergoing analysis using Atlas.ti software package. Therefore, this report presents preliminary findings and observations from the thematic data analysis. At this stage, the researcher is collating information

collected to draw inferences and conclusions after testing the validity and veracity of the data. The following are the preliminary research findings that emerged during the data analysis.

1. A positive mindset is a pillar of learning agility

There is a striking relationship between learning agility and positive mindset. The study showed that highly learning-agile principals have a positive mindset and are able to deal with unique challenges and situations. Principals with a positive mindset

scored high on the learning agility questionnaire: these are the principals who regarded COVID-19 challenges as an opportunity for them to learn, recover and grow in a crisis.

2. Inadequate digital literacy and technological equipment were a bottleneck to teaching

The study revealed that technology and digital transformation are necessary tools for schools to deal with any form of disruption. During COVID-19, the principals relied heavily on the younger, technologically savvy teachers. It became clear that school principals need to be open to continuous learning of 21st century competencies, more precisely digital literacy, to meet the challenges of the 21st century. The Sandbox Schools principals' ability to use digital technologies was enhanced during the country-wide lockdown because

stakeholder communication had to be done via technological platforms. For instance, principals had to learn to create WhatsApp groups and to conduct meetings on Microsoft Teams and Zoom; they also used WhatsApp to provide teacher support. Moreover, the principals increased the number of digital devices in their schools to facilitate remote learning. Consequently, during the COVID-19 lockdown, more teachers and learners started using digital devices for teaching and learning purposes.

3. Principals expressed positive inclination towards constructive criticism teaching

Learning-agile principals are those who have high acceptance of constructive criticism. Principals had to be constructive in their criticism of their peers but most importantly those who accept criticism show high learning-agility skills. Constructive

and effective criticism by the principal helped to show how one can improve and attain new levels of success. The ability to receive and responded positively to constructive criticism links well with a growth mindset.

4. Principals need to be innovative and try new ideas

To address the challenges presented by the COVID-19 pandemic and national lockdown, principals were forced to be innovative and take risks as they explored new ways of doing things. The challenges presented by the pandemic required principals to find a balance in a new way of working and living. They had to be innovative and agile in decision making about teaching

and learning under the unique circumstances. Challenges included budget alterations, finding ways to provide remote learning during lockdown and ways to minimise the learning losses. With their newfound knowledge about what did not work during the early days of the lockdown, principals were able to utilise the collected data to generate new ideas.

5. Strengthening community support helps to effectively address unique challenges

Effective school management played a critical role throughout the pandemic; this was made possible by building and maintaining strong connections with members of the school community. Principals who had already built a culture of loyalty, mutual trust and commitment within their schools and communities were able to leverage the existing

structures to better support their schools. The most learning-agile principals were those who consistently modelled the ideals of a professional culture and strove to build loyalty, mutual trust and commitment amongst themselves, staff and the community at large.

6. There is need to develop targeted interventions and training to empower principals

The management of schools during the COVID-19 pandemic proved to be a challenge to principals because they lacked a script for referral. The strict standard operating procedures (SOPs) that had to be implemented in everyday school life due to the pandemic were challenging. Principals encountered challenges in attempting to ensure that social distancing protocols were

adhered to and masks were worn in classrooms. The study revealed a need to provide principals with training for crisis management and 21st century skills. Important skills that were found to be lacking amongst the principals include: stress management, relationship management, anxiety management and crisis management.

Conclusion

Although the study has not yet reached its finality to draw concrete conclusions, it is clear that 21st century principals have the enormous job of being learning-agile leaders and life-long learners. Effectively addressing the teaching and learning challenges arising from natural disasters and pandemics such as COVID-19 requires principals who are agile change agents. Principals must possess a set of learning-agility skills which include innovating, performing, reflecting and risking. They must embrace opportunities when they arise and rely on past and present experiences to make sense of an uncertain situation.

To this point, the study showed that rural school principals have the potential and willingness to find opportunities and solutions to problems despite the disadvantaged environment in which they operate. Rural schools suffered learning losses as a result of lockdown and it seemed this could have been mitigated through online learning. It can be concluded at this stage that learning agility, with all its facets, is a concept defining the 21st century principal. Only those principals who are able to let go of skills, perspectives and ideas that are no longer relevant, and are equally willing to learn new ones, will thrive under any crisis situation.

Recommendations

Upon completion of this study, recommendations will be made in line with the overall contribution of the study to the body of knowledge, particularly the type of principal leadership required in the 21st century and beyond. Thus far, based on research insights, learning agility is recommended as a necessary competency for principals to successfully approach and solve issues in unfamiliar situations.

Furthermore, a blended teaching and learning approach is recommended for future education delivery. Blended learning is a technology-based education method that combines in-person instruction with online learning; this will be made possible by providing more digital resources to schools.



Chapter 7

A South African Competency Framework

Research Insights from the DBE Consultative Workshops (August to October 2022)

Context

Learnings emerging from the Sandbox Schools Project, along with in-depth secondary research on the role of transversal skills and social and emotional learning in unlocking deeper learning, led to the involvement of the Edhub in the Department of Basic Education's (DBE) Curriculum

Strengthening initiative. This article shares insights emerging from research conducted with a broad range of education stakeholders in 2022 to assist the DBE in conceptualising a framework that might guide the Curriculum Strengthening process.

Introduction

There is growing acknowledgement and a body of evidence to suggest that education systems around the world are not adequately equipping young people with the knowledge, skills, attitudes and values needed to succeed in a fast-changing world (World Economic Forum, 2022). As a result, many education systems are becoming more deliberate about developing a broad range of social, emotional and cognitive competencies in learners alongside relevant conceptual understanding and content knowledge (Care et al., 2017).

While the current South African curriculum statement contains many competencies needed to thrive in a changing world, particularly in its preamble, these competencies are not deliberately and systematically realised in classrooms (Care et al., 2017). As part of the ongoing evolution of the South African school curriculum, and in light of the continued impact of the COVID-19 pandemic on schooling, the Department of Basic Education (DBE) has commenced a curriculum strengthening process. This process intends to build on the work undertaken to produce and implement the Recovery Framework 2021-2024 by conducting more comprehensive curriculum strengthening that will foreground the competencies that learners need to thrive, socially and economically, in a fast-changing world.

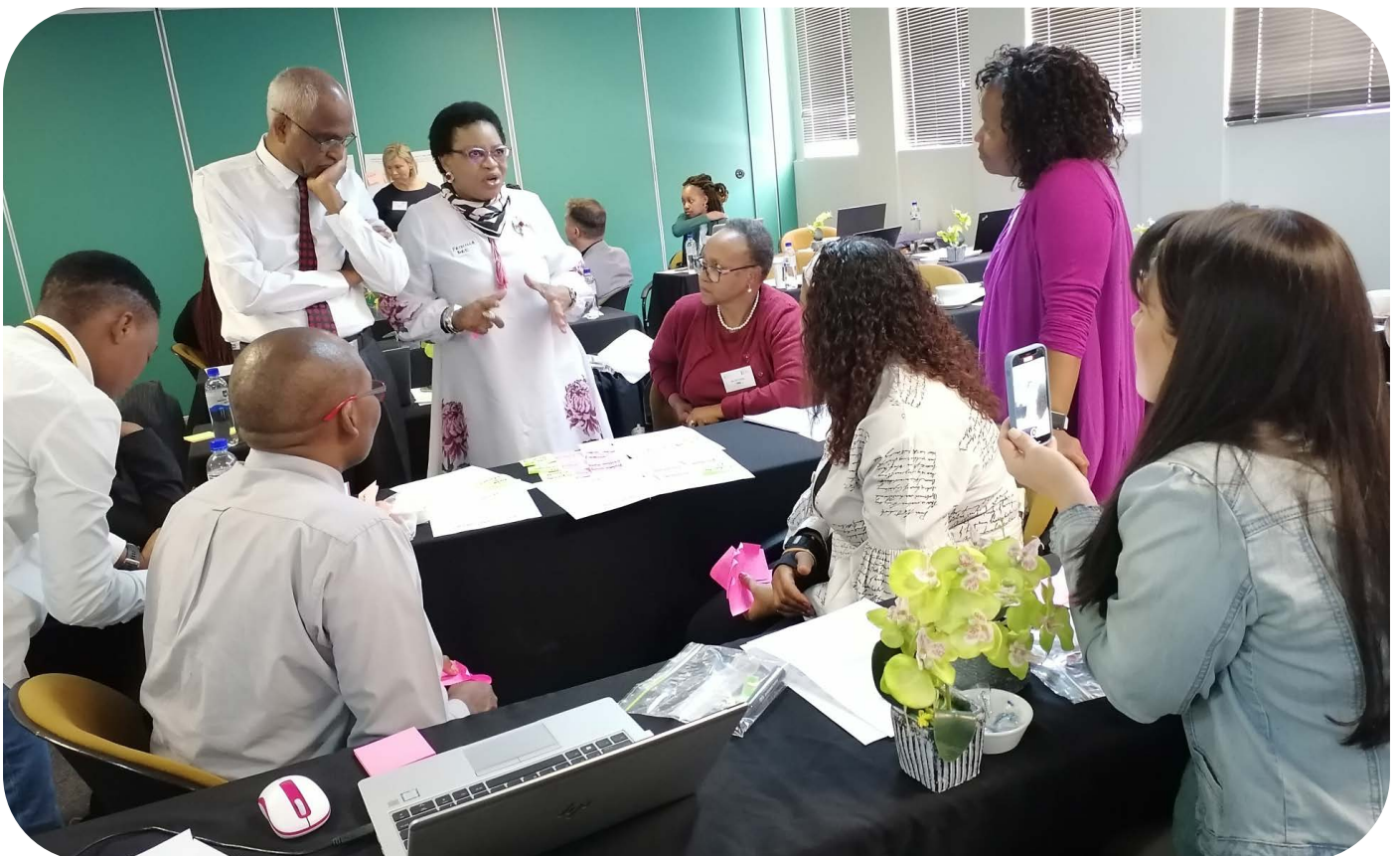


As part of the curriculum strengthening process, a decision was made to develop a South African competency framework to guide the deliberate and systematic infusion of competencies for a changing world into the existing curriculum, as well as to guide updates to teacher development, assessment, and learning and teaching support materials (LTSM). Frameworks are organising tools for ideas that help to provide a foundation for thinking, communicating and acting around a particular issue. The aim of the South African competency framework is to identify, define and prioritise the competencies that should be developed throughout schooling, to foster greater alignment between research, policy, practice and evaluation in line with the demands of the changing world. To develop a framework that includes input from a range of South African education stakeholders and incorporates the latest research,

the framework development process to date has included the following steps:

- 1 Analysis of existing global frameworks for 21st century learning/ whole-child development
- 2 Expert consultations and presentations on competency development, the learning sciences, the future of work and related topics
- 3 Consultative stakeholder workshops
- 4 Iterative design process with expert input

This document outlines the rationale, process and insights emerging from a series of 36 national consultative stakeholder workshops held between September and November 2022, with 491 participants across nine provinces. The insights derived from analysing the data collected during the consultative workshops were used to inform the development of a draft *South African competency framework*.



Consultative Workshop Format

The DBE conducted a series of consultative workshops in 2022 with education stakeholders to identify what they think are the most important attributes, tools, skills or competencies that South African learners need to develop while in school. The format of the workshops was highly participatory and encouraged active engagement from participants.

The overarching sampling framework that was used to select workshop participants was

purposive, followed by convenience sampling. The stakeholder categories were selected through consultation between the researchers (from NECT, JET & Save the Children SA) and the DBE, to gain insight into the perspectives and priorities of a wide range of education stakeholders. The numbers of participants in adult workshops and learner workshops were 314 and 117, respectively. **The workshops comprised the following key activities:**

ADULT WORKSHOPS	
Topic	Description
Changing World exercise	Brainstorming activity: How has the world changed since 1950?
Introductions	Participants introduced themselves and their organisations
Setting the Scene	Facilitators shared the context of Curriculum strengthening and the goals for the workshop
Learner Profile	Participants were asked: What 'tools' should learners have upon exiting Grade 12 for them to thrive in a fast-changing world?
Buckets	Participants shared their 'toolkits' and categorised them into designated 'buckets': knowledge, skills, values, character + attitude, cross-cutting themes, not sure
Prioritising	Participants selected their top 5 essential tools, and top 5 important tools
Survey	Participants completed a survey, which asked for feedback on terminology and potential levers of change in the education system
Uniquely South African	Participants were asked to select any tools or attributes they thought were 'uniquely South African'
Check out exercise	Closing comments and reflections

LEARNER WORKSHOPS	
Topic	Description
Introductions and ice breaker	Participants introduced themselves and engaged in an ice breaker activity
Setting the scene	Facilitators shared the context of curriculum strengthening and the goals for the workshop
Learner Profile	Participants were asked: What 'tools' should learners have upon exiting Grade 12 for them to thrive in a fast-changing world?
Prioritising	Participants selected their top five tools through discussion and negotiation by the full group of participants
Changing the education system	Participants articulated what changes they think need to occur in the education system to support the development of these skills and tools
Survey	Participants completed a survey which asked about their motivation for going to school and the type of skills and competencies they are currently learning in school
Closing Remarks	Closing comments and reflections



The research questions for this exploratory study guided the design of the consultative workshops and the choice of data collection instruments. The primary research question was: Which skills/competencies/attributes are important for all South African learners to develop during school, so that they can advance to higher tertiary studies, find or create work, and thrive in a fast-changing world? The research sub-questions were as follows:

A

What skills/attributes/competencies do education stakeholders think should be developed in learners while in school for them to thrive in a fast-changing world?

B

Which of these skills/attributes/competencies are priorities for us to focus on and which of them are uniquely South African?

C

What word or statement can be used to best describe this group of skills and competencies?

Research Methodology

A mixed-methods approach was used to explore education stakeholder perspectives and concerns regarding the attributes/tools/skills/competencies that learners need to develop while in school. To gather data on education stakeholder perspectives and concerns, workshop observations were conducted, participants wrote their views on sticky notes during facilitated activities, and participants completed a survey. The workshop observation prompts focused on the exploratory study research questions. The survey questions focused on identifying:

1

whether or not participants think there are gaps in the current education system in terms of equipping learners with attributes they need to thrive in a fast-changing world, and

2

potential levers that participants think might be used to improve the education system.

Both the workshop observation sheet and survey questionnaire captured qualitative and quantitative data. The method used to analyse the qualitative data was deductive thematic analysis, where close attention was paid to the data relative to the research questions.

Key Research Findings

The key research findings and insights from the analysis of both qualitative and quantitative data collected suggest similarities across stakeholder groups in the tools and attributes highlighted as

necessary for learners to develop while in school. Findings are discussed below in response to each research question.

Question 1: What are the tools or attributes that learners need to have developed by the time they complete Grade 12 for them to thrive in life beyond school?

The workshop participants were asked to write on sticky notes the tools or attributes that they thought a Grade 12 learner should have in order to succeed in a fast-changing world. Across participant groups, several attributes were highlighted as important for learners to leave Grade 12 with, including *agile, innovative, professional, relationship-orientated,*

trustworthy, value-driven and vocationally-orientated. Participants agreed that learners should have acquired knowledge on a number of cross-cutting themes (e.g., environmental awareness, historical awareness, internationalism, literacy and numeracy, career awareness).

Question 2: What do you consider as 'essential' tools or attributes that learners need to have developed by the time they complete Grade 12?

After listing the attributes that they thought learners should have, participants in the adult workshops were asked to prioritise the top five tools or attributes they deemed essential for learners to develop while in school. The participants highly prioritised the following learner tools or attributes: communication, critical thinking, technological competence, problem solving, financial competence, resilience, respect, digital literacy, organisational competence and collaboration. Participants in the learner workshops were asked

the same question. They ascribed the highest priority to self-reliance, morally inclined and self-awareness. However, in contrast to the adult workshops, learners were asked to list, as a group, the top five most important tools or attributes they thought every learner should possess. This was done through discussion and negotiation by the full group of participants, and in some instances where consensus could not be reached, learners were each given one vote to select their most important tool.

Summary of the tools/attributes prioritised as top six by each stakeholder group

Stakeholders	List of tools/attributes – (Essential Top Six)
Teachers	critical thinking, technological competency, communication, respect, personal well-being, independence
Provincial officials	communication, critical thinker, problem solving, collaboration, personal well-being, lifelong learner
NEET	school content, computer skills, financial competence, pedagogy, leadership, career awareness
Unions	adaptable, organisational competency, resilient, communication, lifelong learner, responsible
CSO	personal well-being, critical thinker, adaptable, problem solving, resilient, assertive
University students	communication, digital literacy, organisational competency, financial competency, driving, personal well-being
HEI	cross-cutting themes, citizenship, financial competence, communication, respect, problem solving
Businesses	collaboration, resilient, communication, adaptable, critical thinker, entrepreneurial, problem solving
DBE	resilient, problem solving, confident, empathic, digital literacy, critical thinker
Learners	morally inclined, self-reliance, self-awareness, communication skills

Some learner attributes or tools, although with different rankings, were prioritised as the top six most important by the majority of stakeholder groups. The most common learner tools prioritised across stakeholder groups include communication,

critical thinking, resilience and problem solving. More commonalities are observed when the top 10 learner tools or attributes are compared across stakeholder groups.



Question 3: Which of these tools or attributes are uniquely South African?

Participants were also asked to highlight the tools, attributes, skills or competencies they deemed as uniquely South African. The table below shows that, across stakeholder groups, several participants think that certain tools or attributes are uniquely South African. A close look at the responses suggests that some participants potentially misinterpreted

the question: they may have thought it was asking them to highlight the attributes that are most needed in South Africa. During the workshops, a number of participants strongly suggested that the tools or attributes highlighted as essential applied not only to South Africa, but globally; thus, none were uniquely South African.

Uniquely South African tools/attributes

Stakeholders	List of tools/attributes considered uniquely South African	Quotes
Teachers	citizenship, agricultural competence, communication	
CSO	adaptable, lifelong learner, communication	<i>Being adaptable is the most uniquely South African code.</i>
Provincial officials	agricultural competence, practical skills, communication	
NEET	basic education, computer skills, career guidance	<i>Students needed basic literacy skills.</i>
University students	cultural values, agricultural competence, safety	
HEI	lifelong learner, personal well-being, respect	<i>Lifelong learning is a uniquely South African issue.</i>
Businesses	perseverance, collaboration, communication	<i>With the abundance of social, political and economic woes, resilience and perseverance is required for learners and students to be tenacious and not give up.</i>
DBE	integrity, empathetic, respect	<i>The value of integrity because we have a problem of corruption in this country.</i>

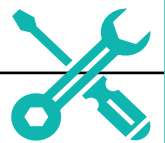
Question 4: What word or statement can be used to best describe the group of attributes, skills and competencies that learners need to thrive in a fast-changing world?

At the end of the workshop, participants were asked to complete a survey. The first question of the survey was designed to determine whether or not the same terminology is used across education stakeholder groups. The participants were asked to suggest or choose two words or phrases they felt best describe the list of the tools or attributes that a learner needs to develop while in school. The

most common phrases used by the participants to describe this group of tools or attributes are (1) skills, and (2) 21st century skills. The term competencies was preferred by university students and higher education institutions. Only the business and higher education institution groups suggested unique terms, namely non-cognitive skills and character traits, respectively.

Terminology used to describe the tools/attributes

Stakeholders	Words used to describe the group of these tools/attributes (Top 2)
Teachers	skills; 21 st century skills
Provincial officials	21 st century skills; skills
NEET	abilities; 21 st century skills
Unions	21 st century skills; skills
CSO	skills; abilities
University students	competencies; skills
HEI	competencies; character traits
Businesses	non-cognitive skills; abilities



Question 5: Are learners currently leaving school with the attributes/skills/tools they need to advance to higher tertiary studies, find or create work, and thrive in a fast-changing world?

Through the survey, workshop participants were asked whether they thought that learners in non-fee-paying or fee-paying schools are currently leaving school with adequate tools to advance to higher tertiary studies, find or create work, and thrive in a fast-changing world. They were given the closed-ended options of "adequate", "more than adequate", "inadequate", "not sure", and "no response" and were asked to provide a reason for their answer. The majority of participants (80.5%) thought that learners in non-fee-paying schools leave school with inadequate tools or attributes. According to the participants, the two key reasons why learners leave with inadequate attributes or tools are:

- 1 *Inadequate resources at the schools; and*
- 2 *Teaching that is too theoretical.*

Most participants (62.5%) indicated that they believed learners leave fee paying schools with adequate tools or attributes. The two main reasons highlighted for learners leaving with adequate attributes were:

- 1 *well-trained teachers; and*
- 2 *exposure of learners to practical activities.*

When workshop participants were asked to substantiate why they think learners leave non-fee paying schools with inadequate schools, their responses included the following:



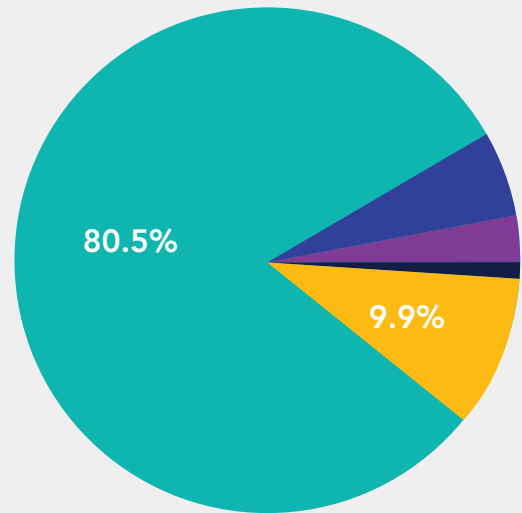
The lack of resources and the overcrowded classrooms which do not afford individual attention.

They mostly taught theory and not really know how to practically apply the taught skills.

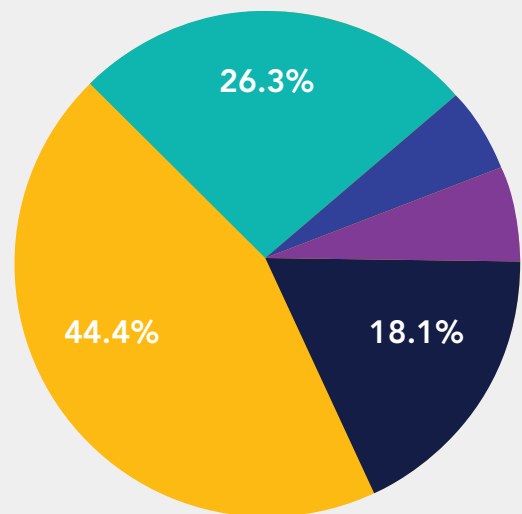
Lack well-trained teachers and relevant teaching and learning materials.

Although the above quotes are from three individuals, these are representative as similar sentiments were expressed across education stakeholder groups.

Non-fee Paying Schools



Fee Paying Schools



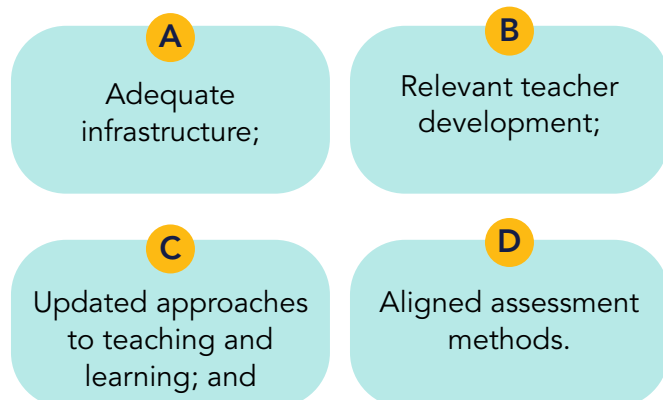
- They leave school with more than adequate skills/tools for a changing world
- They leave school with adequate skills/tools for the changing world
- They leave school with inadequate skills/tools for the changing world
- Not sure
- No response

Question 6: How do you think these skills/ tools can be developed in all learners at school?

Through the survey, workshop participants were asked to rank, according to importance, a list of 8 levers of change, and were instructed to provide comments regarding their ranking and suggestions on other potential levers to help all learners develop the tools or attributes needed. The levers that the participants were asked to rank were as follows:

- ✓ Adequate infrastructure
- ✓ Relevant teacher development
- ✓ Aligned assessment methods
- ✓ Appropriate curriculum adjustments
- ✓ Supportive home environments
- ✓ Pertinent policy amendments (beyond the curriculum)
- ✓ Supportive national, provincial, district, and school management
- ✓ Updated approaches to teaching and learning

The most highly ranked levers of change by stakeholders include:



On balance, the levers of change were noted as equally important, given that they all link to form a well-balanced system.

Levers of change suggested by each stakeholder group

Stakeholders	Levers of Change
Unions	Stronger teacher upskilling and development; curriculum prioritising skills
CSO	Improve curriculum; learner exposure to practical skills; stronger teacher upskilling and development
University students	Improve curriculum
Businesses	Learner exposure to practical skills; stronger teacher upskilling and development; provide schools with funding and essential resources
Teachers	Curriculum that prioritises skills; stronger teacher upskilling and development; provide schools with funding and essential resources
Provincial officials	Curriculum that prioritises skills & competencies; stronger teacher upskilling and development.
NEET	Teacher development; psycho-social support; provide schools with funding and essential resources
Learners	Improve curriculum (i.e., technical subjects); learner exposure to practical skills; provide schools essential resources

Conclusion and Next Steps

Workshop participants, including learners, suggested that the key attributes school-leavers require to thrive in a fast-changing world are communication, critical thinking, technological competence, problem solving, financial competence, resilience, respect, digital literacy, organisational competency and collaboration. They also agreed that learners should have acquired knowledge on a number of cross-cutting priorities, such as numeracy, environmental awareness and historical awareness, when they exit Grade 12. Participants acknowledged the systemic nature of change and highlighted various areas within the education system that should be considered to develop learners that can thrive in a fast-changing world. As such, they identified several potential levers to facilitate the development of these attributes or competencies in learners; on balance, the levers were noted as equally important, given that they all link to form a well-balanced system.

Led by the DBE, a draft framework has been developed following the analysis of input from the workshop participants, insights from the learning sciences, a review of local research on in-classroom experiences, case studies on competency-embedded education reforms, insights on the future of work in South Africa,

and existing international frameworks. A working group was established to design and refine the draft framework. This working group is comprised of several education stakeholder groups:

- 1 DBE officials from Curriculum; Assessment; Teacher Development; LTSM; Inclusive Education; Three Stream Model project; and Research, Monitoring and Evaluation,
- 2 labour unions,
- 3 academics,
- 4 technical & advisory organisations.



The draft framework was developed for presentation to, and input from, the sector at the 2023 Basic Education Lekgotla and other key forums. A further consultation process took place in September 2023, with the aim of revising and finalising the framework. The final version of the framework is intended to inform the strengthening efforts across curriculum policy, assessment, teacher development, LTSM and the learning environment.

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Chapter 8

Concluding Remarks

As we conclude this compendium, we find ourselves at the intersection of knowledge and transformation, where theory meets practice and innovation intertwines with tradition. The Sandbox Schools Project has illustrated the potential for change within South African schools and classrooms. From the structured competency-based learning programme, which illuminated the power of competency inclusion in daily teaching, to the sensorially enriching experience of tinkering, proving the efficacy of play as a learning tool, each intervention bore witness to the remarkable adaptability of educators and the curious spirit of learners. The Mindful Classroom intervention showed how simple, short mindful moments interspersed throughout the day can settle and prepare learners for learning, while Robotics & Coding provided a multitude of opportunities

to practice important competencies like critical thinking, problem-solving and creativity. Insights from School Culture for a Fast-Changing World interventions underscored the importance of social-emotional learning and adaptable leadership. The Department of Basic Education consultative workshops provided crucial insight into what South Africans consider important when it comes to skills and competencies, painting a vivid picture of the collective aspirations for the learners of South Africa. Together, we hope that these interventions provide a chronicle of exploration, progress and possibility. As we look forward, may this work contribute to an education system that not only imparts knowledge but also nurtures adaptable, creative and empathetic citizens poised to thrive in an ever-evolving world

Thank you

The Sandbox Schools Project would not be possible without the collaboration of many individuals and organisations who share a vision for the future of education in South Africa. Thank you for your time, effort, enthusiasm and active engagement in this project since 2018. We appreciate your partnership and applaud the role you played and continue to play in pioneering the future of the South African education system.



We especially thank

★
*Sandbox Schools:
principals, SMTs, SGBs,
teachers, support staff,
care givers and learners*

★
*Waterberg
District Education
Department*

★
*Limpopo Provincial
Department of
Education*

★
*Department of
Basic Education*

★
*University of
Johannesburg Faculty
of Education: academic
staff and postgraduate
students*

★
*Students focusing
their studies on the
Sandbox*

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*Colleagues from the
University of South
Africa (UNISA)*

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*The Centre
for Curriculum
Redesign*

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*Class Act
Educational Services*

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CRSP dsgn

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E³

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*NECT colleagues
who contribute to the
Edhub's thinking and
give continuous support*

