THE BRETEAU FOUNDATION

The Breteau Foundation
Impact Report 2017

Contents

THE
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FOUNDATION

Executive Summary

Over the past 5 years we have been on an amazing journey, developing our Digital Education Programme programme to reach over **17000 students in 10 countries** worldwide. We feel proud of the Breteau Foundation's achievements to date and are pleased to be sharing this Global Impact Report with you.

This report consolidates the knowledge and learning from our programme. We started 2017 with a renewed vision - **to improve academic engagement of disadvantaged children worldwide** - and set strategic goals to: deepen our programme quality; develop partnerships and innovation; measure our impact and share our learning. This report contributes to these goals, sharing our impact findings with the aim to better support Education Technology programmes both within our own organisation, and others.

To develop operational consistency and improve our impact measures, this year we established a *Theory of Change model* as a template for our Digital Education Programme. At the centre is the academic engagement of children, focusing our programme on each child to ensure they have access to the best digital education opportunities. While our programme is global, our delivery is local. Our in-country experts ensure our programme is relevant to national contexts, mapping apps to national curricula and curating content in local languages.

To measure our impact, we have created a range of **bespoke impact measurement tools** for our programme which we have used across South Africa, Colombia and Lebanon. We have been trialling methods to measure technology's impact on learning outcomes, monitoring teacher progression and hearing students' views in surveys and focus groups. Hearing from our students and teachers encourages us in our work, and we thank them for their commitment and effort to make this programme a success.

During 2017, we extended our reach, deepened our programme quality and developed our app offering. Our suite of apps now includes Literacy, Numeracy, Critical Thinking, Citizenship, Creativity and Toolbox apps, and caters for a range of children's home languages. We have also been trialling exciting innovations with new partners, and this report shares our findings from a number of innovation pilots. In South Africa we worked with partners to pilot an **after school coding programme** which saw a 100% attendance rate and advances in technology competencies, coding and programming. In Colombia, we responded to the requests of teachers in our project schools for improved resources by developing an **offline resource portal** that enables teachers to download **over 1500 educational resources** – already demonstrating positive impacts on learning.

Responding to the overwhelming call for education development amongst Syrian refugee children, at the end of 2016 we entered the emergencies sector and set up operations in Lebanon. Our programme aims to accelerate progress in basic literacy,

numeracy and Arabic skills for children who have missed vital years of schooling due to conflict. Our **Mobile Education Bus for Syrian refugees** has gone from strength to strength, impacting 821 children to date. Our impact findings from a recent action research project are shared in this report and demonstrate positive numeracy results for children and we are delighted to see the Bus project's positive impact on student engagement.

Children's development is at the heart of our work, and we are pleased to see some of the positive impacts that technology has had on both children's academic improvement and engagement. In-app progress data in numeracy, literacy and critical thinking has shown us positive outcomes in academic improvement but also areas that require further intervention - providing key learnings for our organisation. And, our surveys of over 1500 students bolster previous anecdotal evidence that technology improves student engagement.

This report provides a review of 2017, demonstrating our impact and showing the improvements in academic engagement of the thousands of children we have worked with in our project schools. We are grateful to all partners, schools and friends who have supported us to deepen our core educational services to children in the most disadvantaged circumstances.

With thanks,

Highlights

Student engagement and progress

In 2017, we reached
17837
students

75%
of students felt that apps significantly supported their learning

80%
of students believe that tablets make learning easier

81%
of students felt that apps supported their numeracy progress

80%
of Senior Leaders felt that technology had contributed to good student attendance levels

Students across our global programme showed **high levels** of basic technology competence

Empowering educators

Empowered **535** teachers with training and in-class support

53% of teachers made learning engaging and enjoyable using technology

55% of teachers were assessed to be overall confident in the use of technology

92% of Senior Leadership Teams engaged positively with our Digital Education Programme to help raise standards in students' learning

Increasing access to innovative technology

We now provide education technology to children living in **10** different countries

Offline resource portals provide Colombian teachers with over **1500** resources

Our global app offering includes educational content in **10** different languages

Our Mobile Education Bus provided digital education to **2587** refugee children

Our School Contexts

We deliver our support in complex school environments of poverty and displacement. From urban townships, to rural villages and refugee settlements, we work with over 60 schools around the world. While all our schools are unique, our work across our global programme has many similar challenges for delivering quality education support.

Poverty

Poverty is prevalent across our schools and greatly impacts on students' access to education, affecting both attendance and learning. Economic hardship is a catalyst for social deprivation, and our country teams cite issues such as child labour, and gender-based challenges of prostitution, early marriage and teen pregnancy as impacting on school attendance and causing school drop-out. Moreover, the cycle of poverty often means that our students' parents are uneducated and this can play into cultural gender norms of prioritizing boys education. Our learners may not gain the support from home, impacting motivation.

Violence

Violence is often linked to situations of poverty and is apparent in some of our schools. UNICEF state that violence is Colombia's biggest challenge with issues of domestic, street and school violence impacting some of our communities. Gender-based violence, both physical or structural, is also prevalent in some of our schools – disproportionately limiting girls' access to education.

A Rural School in KwaZulu Natal, South Africa

Conflict and Displacement

We work in a range of current and post-conflict contexts as war has a huge impact on education systems and schools. Education can be used as both a victim and perpetrator of conflict and we have experienced this in our work with Syrian refugees in Lebanon.

Now in its 7th year, for some of our students the Syrian crisis has quite literally lasted their lifetime. School closures in Syria, and barriers to school-access in refugee communities, have led children to miss vital years of education. This is compounded by the challenges we find including differences in curriculum standards, a lack of appropriate education certification and impoverished living conditions - all which impact on our learner's wellbeing and their ability/readiness to learn.

The emotional wellbeing of our students is of utmost importance and our education support requires careful consideration, ensuring the schools and education centres we work with are safe places for children, teachers and the staff we provide.

We work with partners on the ground to ensure that our work spaces are safe and that psycho-social support is embedded in our programmes where needed.

Saida Education and Empowerment Centre, Lebanon

Teachers

In many of our partner schools, we find that teachers - the most fundamental resource in education, are often strained under heavy workloads; limited training opportunities; large class sizes and a lack of resources. In our rural South African schools it is common to observe class sizes with ratios of one teacher to 70 children. This pressured working environment can lead to teacher absenteeism, high levels of staff turnover and challenges for schools to build and maintain teacher capability.

Infrastructure

Poor infrastructure and limited resources are key factors impacting both access to and quality of education across all our schools. Basic and wider infrastructure such as sanitation, school transport and/or lack of critical community services such as healthcare can cause high absenteeism and school dropout rates.

Access to power remains a major barrier to accessing digital education in low-resource contexts. Effective use of digital learning kits relies on a consistent power source, limiting our programme reach to schools with on-grid/off-grid electricity.

Limited Resources

Teaching and learning resources are typically inadequate and there is either none or very restricted school budgets for technology. This limitation is reflected in the wider community surrounding our schools and therefore the security and safety of resources, in particular technology can hinder programme success. Working with schools to develop logistics or infrastructures such as secure storage is paramount in our programme delivery.

A further limitation is the multitude of languages present in our partner schools. The dominance of the English language in digital content is a big challenge – and for children learning in languages such as Xhosa and Zulu content can be minimal. We work with partners to find relevant language content for learners (although often limited) and undertake translations from English to local languages in order to offer breadth of resources.

Connectivity

Connectivity is increasingly understood to be a global equality divider, yet the vast majority of our schools are not connected to the internet. In some programme regions, we develop content to be used offline in our partner schools, however we are well aware of the limitations of this process. Given the ongoing connectivity challenge, our students' access to the best digital innovations and educational opportunities will continue to be restricted.

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Our Vision

We improve academic engagement of disadvantaged children worldwide by empowering primary school teachers through digital technology & training.

What We Do

Providing digital kits mapped to local curricula

Teacher training and in-class support

Developing and sharing resources

The Breteau Foundation is a charitable foundation committed to improving the academic engagement of disadvantaged children worldwide. Our education programmes align with **Sustainable Development Goal 4: Supporting access to quality education** for primary-aged children through the provision of digital technology and training.

To achieve this, we deliver three core programme areas:
- Provide access to technology
- Develop, curate and provide quality educational content
- Train and develop teachers and school leaders to improve teaching and learning, and integrate technology across their schools.

Our programme is a global model implemented with bespoke elements to suit local contexts. Our teams of in-country education experts ensure local relevance by mapping apps and education content to the local curricula, ensuring resources are contextually relevant to national education systems and developing resources to local languages.

We believe our support drives school improvement and learner progress and we measure our developments working as partners with our project schools.

Why Technology?
Leaps in technological innovation have been fundamental in the 21st century and education technology innovation continues to evolve. However, innovation in education technology exacerbates the division between the world's learners. It is therefore imperative that all children are afforded the opportunity to learn through technology, developing digital literacy for a technologically advanced future.

Why Teachers?
We champion teachers, as we understand the importance of the teacher in the classroom. We believe in empowering teachers to use technology as an advanced pedagogical tool, supporting them to tailor learning to the needs of every learner.

Why Now?
As technology advances, the gaps in quality world-wide education provision widens. We advocate for fairer access of digital education to vulnerable populations in order to raise the chances of education equality.

Our Goals

Deepen Core Services

Deepen the education experiences we provide to learners in order to raise educational outcomes.
To ensure children accessed contextually relevant content we aimed to increase our app offering and provide more content in children's home languages. Given teachers are paramount to the success of education technology, we focused on developing our teacher training programme including new workshops and in-class support.

Partnerships & Innovation

Effective partnership working increases our learner impacts and supports sustainability.
The equality gap in access to education technology remains vast. We set our targets to work with innovative partners to find solutions to key contextual challenges such as the connectivity divide. We aimed to expand our partner network to further reach more countries, more schools and more learners through innovative technologies.

Measure our Impact

Embedding more rigorous monitoring and evaluation across all our work.
To be a learning organisation that is continuously improving services, we aimed to develop more robust systems and processes for measuring our impact through ongoing monitoring, as well as undertaking pilot studies and action research projects prior to wider implementation.

Share our Learning

Sharing our successes, challenges and learnings for continuous improvement in all our operations.
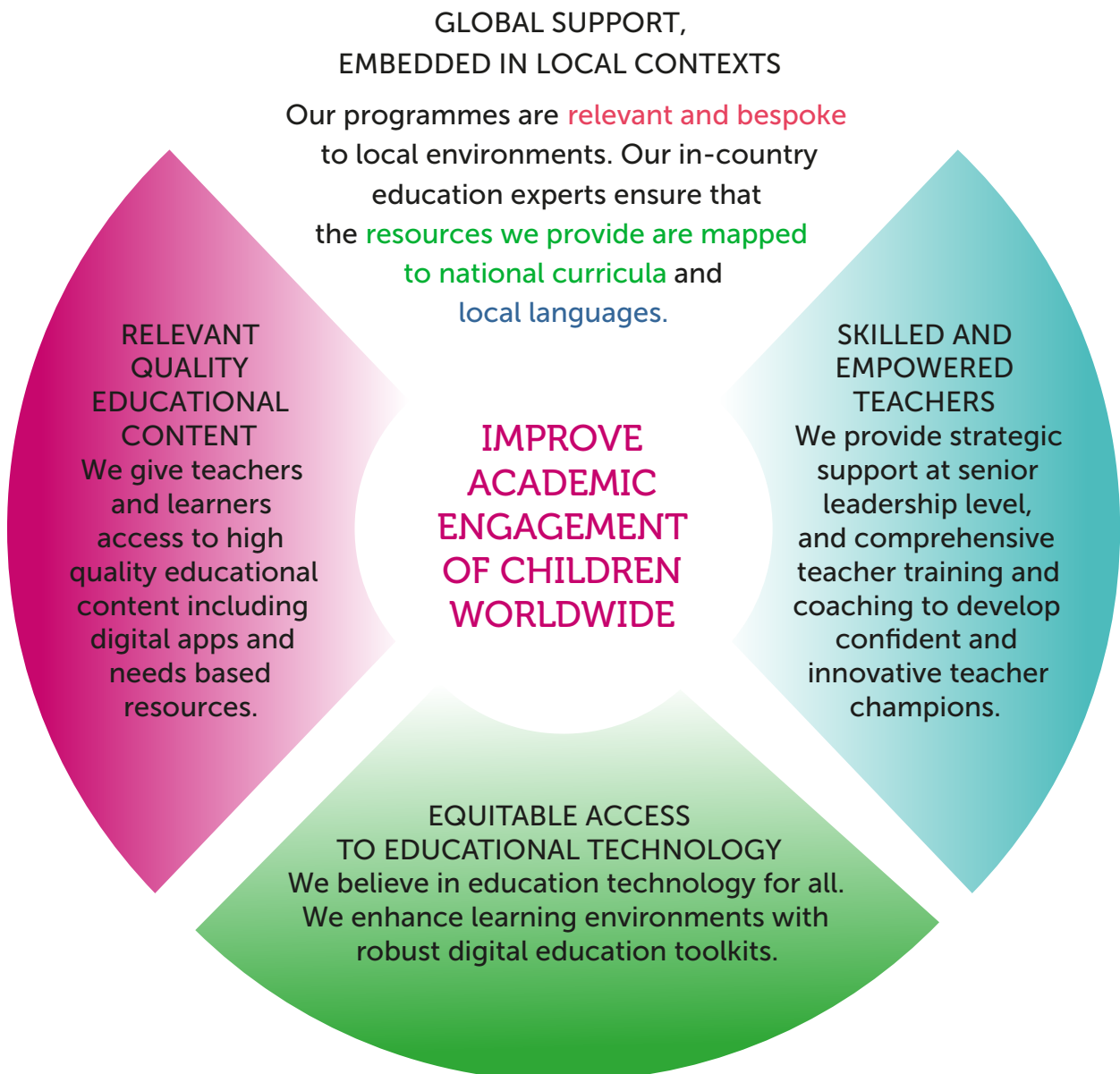To champion the digital educational needs of our learners we aimed to share our experiences with like-minded organisations and individuals who share our passion for education innovation. It is through sharing that we can evolve to better support our programme beneficiaries.

Our Theory Of Change

Our Theory of Change guides the implementation of our work, ensuring that our global programme delivery remains consistent. Centred around the academic engagement of children, we curate bespoke materials and content to ensure we fit within national educational policies, languages and the contexts we find. This model is designed with clear measures so we can monitor the effectiveness of our education programme, and remain dynamic in acting on constant feedback from our teams and partners in the field.

GLOBAL SUPPORT,
EMBEDDED IN LOCAL CONTEXTS
Our programmes are relevant and bespoke
to local environments. Our in-country
education experts ensure that
the resources we provide are mapped
to national curricula and
local languages.

RELEVANT QUALITY EDUCATIONAL CONTENT
We give teachers and learners access to high quality educational content including digital apps and needs based resources.

IMPROVE ACADEMIC ENGAGEMENT OF CHILDREN WORLDWIDE

SKILLED AND EMPOWERED TEACHERS
We provide strategic support at senior leadership level, and comprehensive teacher training and coaching to develop confident and innovative teacher champions.

EQUITABLE ACCESS TO EDUCATIONAL TECHNOLOGY
We believe in education technology for all. We enhance learning environments with robust digital education toolkits.

How We Measure Our Impact

In the emerging field of Education Technology, understanding 'what works' is paramount to ensuring high-quality programme outcomes to motivate students and improve their learning outcomes.

To measure our impact, we continuously monitor programme quality and evaluate our outputs using a range of quantitative and qualitative research methods. We understand the challenges in attributing impact to specific education interventions, and so we triangulate quantitative and qualitative data with observations in order to gain a holistic view.

Quantitative Tools
- Student surveys
- Classroom observations
- In-app progress monitoring
- Academic testing

Qualitative Tools
- Student Focus Group Discussions
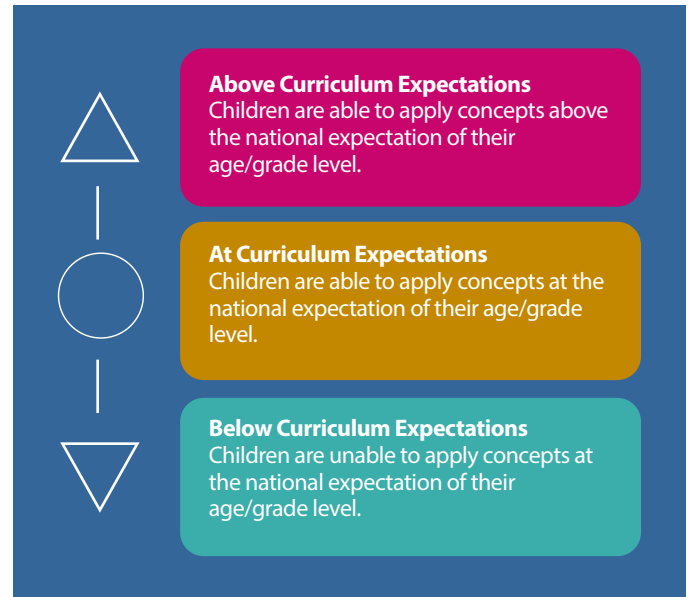- Senior Leadership Interviews

We applied this set of research tools targeting three key stakeholder groups – students, teachers and leaders to measure our programme at all input levels.

Measuring Student Progress and Engagement
We measured two areas of impact: 1) learner engagement and motivation, and 2) improvements in learning.

Engagement and motivation was measured through surveys, focus groups and comprehensive teacher and senior leader interviews. Improvements in student learning outcomes were measured using a range of quantitative tools including curriculum aligned assessments, in-app level data and teacher judgement scores. In some projects, we have undertaken specific research using randomly sampled learners to test unique hypotheses and comparing outcomes to control groups. While inn other areas of our research, we have assessed learner development using in-app level data as a proxy for student progress. Our country teams benchmarked in-app levels against national curriculum expectations. These benchmarks were defined as three broad progress levels:

Above Curriculum Expectations
Children are able to apply concepts above the national expectation of their age/grade level.

At Curriculum Expectations
Children are able to apply concepts at the national expectation of their age/grade level.

Below Curriculum Expectations
Children are unable to apply concepts at the national expectation of their age/grade level.

Measuring Teacher Empowerment
We developed an observation model to systematically assess teachers using our own level assessment criteria. Teachers were initially scored against Breteau Foundation levels for effective education technology implementation. At a future time teachers were then observed teaching, and were appraised against the same criteria allowing the two scores to be compared.

Measuring School Leadership Development
To assess progression in leadership for whole school technology implementation we engaged our country teams in a confidential audit of senior leader 'buy-in'.

Data Samples and Analysis
When collecting data, we focused on three countries: South Africa, Colombia and Lebanon. We selectively sampled school sites based on their consistent usage of technology and their ability to participate in our research.

During data analysis, we noted country and school level variations and recognised that app usage levels were not uniform across our programme, and in some instances the apps did not provide progress data. We therefore enforced sample size rules requiring a minimum sample size of 60 data points for app-level analysis - this was to represent the equivalent of two standard size classes of 30, or a larger class of up to 60. Therefore, students with no app data (either from low use, or unsaved progress) were discounted.

Managing Contextual Factors
In some instances the environment was too challenging for us to undertake the monitoring and evaluation of our programmes. In all our project schools we experienced data instability and research was sometimes delayed or paused due to high absenteeism, teacher turnover, issues of connectivity and/or the many typical challenges noted in the environments we work.
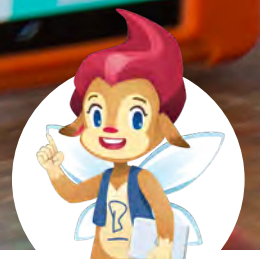
It was also noted that some of our mature project schools (those in our programme for two years or more), have been more positively influenced by our interventions, no matter the deprivation level.

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Global Programme Impact

Our Reach

Countries
10

Teachers
535

Students
17837

Tablets Deployed
2476

Our network of schools

- South Africa
- Colombia
- Sri Lanka
- Myanmar
- UK
- Ivory Coast
- Laos
- Lebanon
- Ethiopia
- Dominican Republic

In 2017 our country teams spent over 1300 hours training teachers in workshops and supporting in classrooms around the world.

This year, our global app offering has increased to 86 apps. We offer a tailored suite of apps for each context, and now host content in 10 different languages.

Our programme is now run in a variety of educational institutes worldwide. We support schools in rural and urban areas, refugee settlements and child daycare centres.
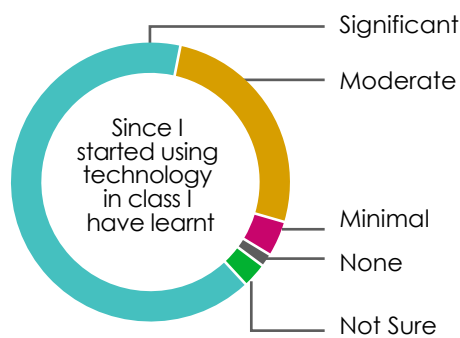
Student Engagement

Improving the academic engagement of disadvantaged children is the core mission our Digital Education Programme. To measure motivation and engagement we asked the key stakeholders in our programme, our students and teachers, to learn how technology impacts motivation.
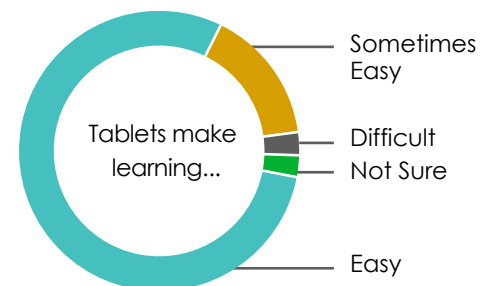
75% of students felt that apps significantly supported their learning.
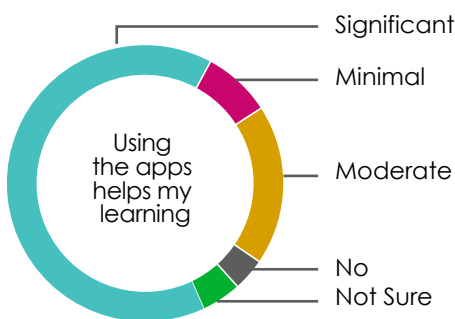
92% of children agreed that since using technology in class they had learnt a significant or moderate amount.

80% of students thought technology made learning 'easy'.

Using the apps helps my learning

- Significant
- Minimal
- Moderate
- No
- Not Sure

Since I started using technology in class I have learnt

- Significant
- Moderate
- Minimal
- None
- Not Sure

Tablets make learning...

- Sometimes Easy
- Difficult
- Not Sure
- Easy

Attendance and Enrollment

Teachers and leaders in our schools often talk about attendance/enrollment as a proxy measure for student motivation. Anecdotal evidence from our partner schools suggests that positive increases in attendance and enrollment can be attributed to the inclusion of education technology.

During semi-structured interviews with Senior Leadership Teams we asked their opinion on technology's role in increasing motivation, attendance and enrollment. 11 out of 25 respondents placed a 70% value on technology's influence on enrollment in their schools. Similarly, regarding increases in attendance at a whole school level, 80% of Senior Management respondents noted that technology had been a positive and contributing factor to good student attendance levels.

"The technology offered in school has been very important at the time of enrollment because new families show interest in getting to know the school and the Breteau Foundation programme … The way technology has been implemented makes more students come, and the ones that are already enrolled never skip class "
- Senior Leader, Colombia

Student Progress: Global Trends

Learners' academic development is a key focus of the Breteau Foundation programme. Measurement of student progress provides insights into digital education's impact on education quality. Working closely with our project schools we sampled data across a number of curriculum areas and programme applications. This section shows a global snapshot of our impact on student learning outcomes. Please note – for specific country data, see the Country Spotlights pages.

Numeracy
77% of sampled app levels showed positive increases in student progress.

Numeracy is often seen as more objectively measurable than other curriculum subjects. In-app progress data was collected from a cross-section of apps that provided linear progression levels.
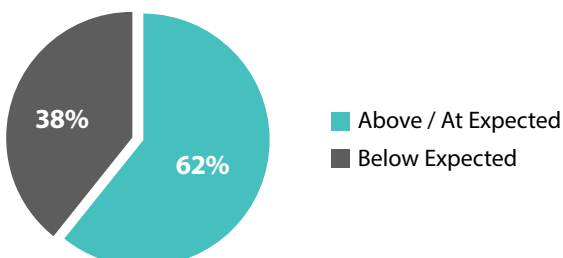
Out of the 22 numeracy app levels studied, 17 showed higher numbers of children achieving at or above their associated national curriculum levels than below. In key maths objectives such as place value, fraction and shape data showed the most

positive student progress with approx of children achieving at or above expected curriculum level across a range of numeracy curriculum foci. Interestingly, data showed minimal progress in core operations of Addition, multiplication and division focused app levels on a global scale. Students progressed better in subtraction focused activities, with Colombian students performing highest.

Both positive and negative outcomes could be due to reasons including app's curriculum suitability, teacher pedagogy or simply the amount of student time allocated to app level. More in-depth data is provided in the country spotlights section of this report.

Average Numeracy App Level Progress by Country Curriculum Objective

- Above/At Expected
- Below Expected
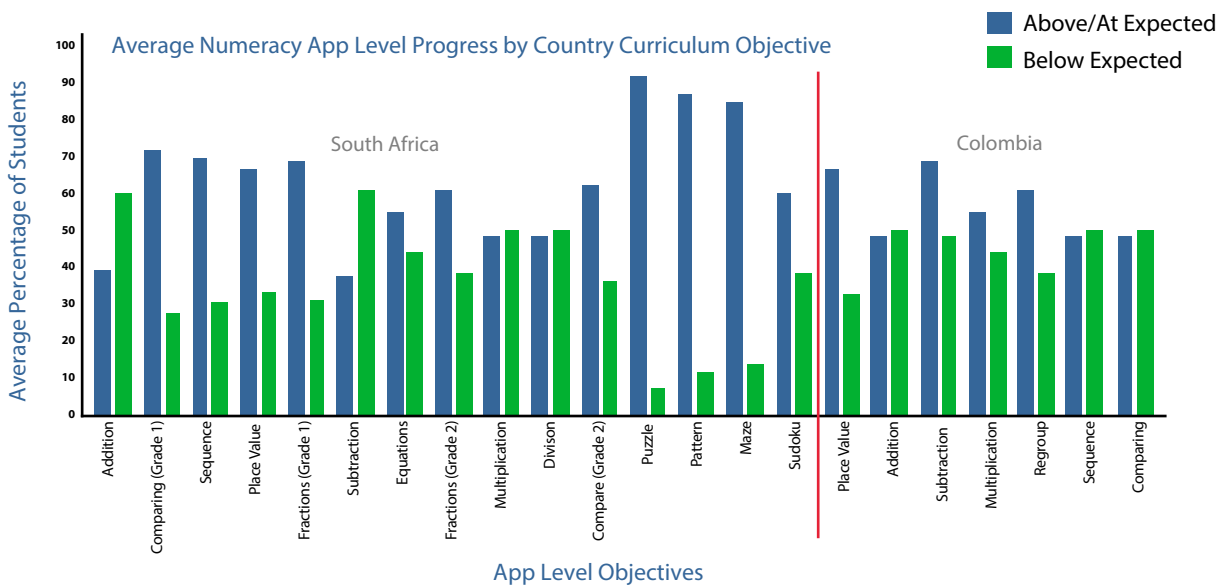
Average Global Thinking Level of Achievement

- Above / At Expected — 62%
- Below Expected — 38%

Critical Thinking
Critical thinking is widely recognised as an important 21st century skill, and yet receives limited focus in many national curricula. Apps provide opportunities for children to develop problem solving skills and apply these across the curriculum. Critical thinking games add an element of play-based learning, engaging and motivating students to learn.

In-app level data from two of our most popular critical thinking apps revealed that an average of 62% of learners showed expected or higher than expected development in their critical thinking skills.

English As An Additional Language

Over half of students showed applying their English learning At or Above their in country expected National Curriculum Levels.

Our project schools use a variety of languages of instruction dependant on their local context. Therefore English apps incorporated into our tablets are often used to teach English as an Additional Language. To measure children's ability to apply their English knowledge, apps that were predominantly based on vocabulary, phonics and grammar were used.

Home Language Learning
Digital education content for the home languages in which our students learn can often be limited. We work with app publishers around the world to provide high quality content in children's home languages.

We have partnered with exciting apps in South Africa to cover the official languages of Afrikaans, Xhosa, Zulu, Swahili, Tswana, Shona and Sotho. In Colombia we ensure to provide both the Spanish versions of apps, as well as original content in Spanish. And in Lebanon, we have curated a suite of apps to support Syrian refugees in Arabic reading and writing - to catch up with the more advanced levels of the Lebanese curriculum.

A student learns to write Arabic letters on our Mobile Education Bus in Lebanon

App level data showed an average rate of 56% of students applying their English learning At or Above their in-country expected National Curriculum Levels. Considering that children's language of instruction at our sample sites is not English, this more limited progress was to be expected.

There was an interesting comparison point in the data in the difference between the average percentage of children achieving at/above curriculum standard in English app-levels in Colombia and South Africa – 39% and 64% respectively. From Grade 4 onwards in South Africa the language of instruction for schools switches from home language to English, which could explain a greater focus on English as an Additional Language in our South African partner schools.
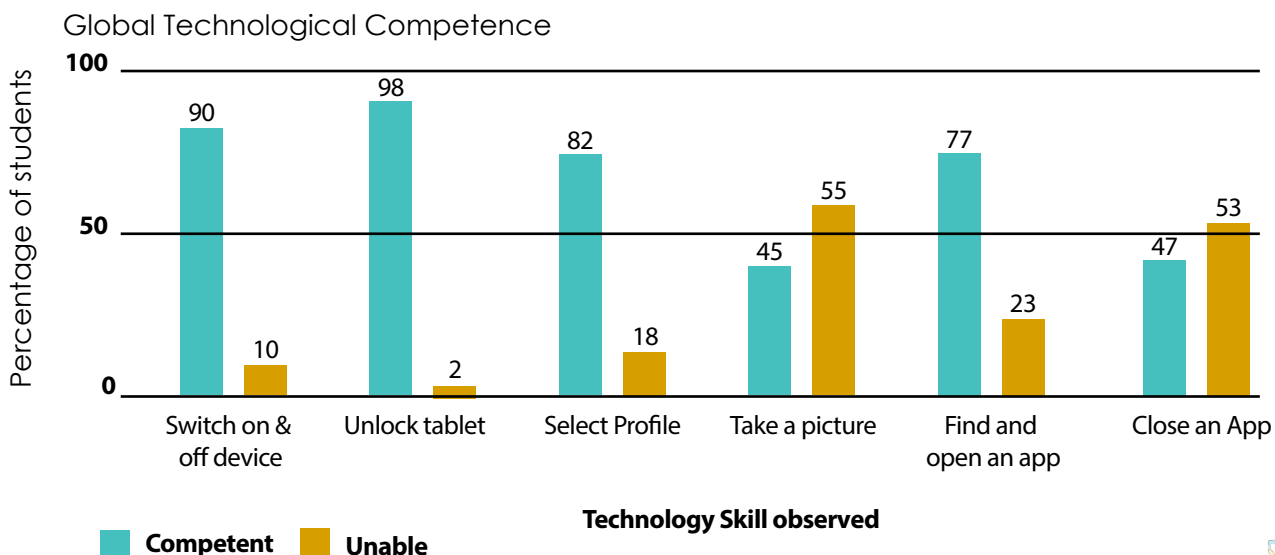
Technology Competence
Developing students technological competence through the access and use of tablet technology is one of the most fundamental progression points of our programme. For many students, access to technology is limited and our digital education programme provides the opportunity to navigate technology, and gain technological intuition and digital literacy.

In order to measure development, the most fundamental basic functionality of the tablets were used to measure learners' confidence. Students were asked to navigate these controls and their capabilities were monitored.

Across our global programme we saw very high levels of technological competence. The majority of children were confident using technology independently after their increased access to tablets through our Digital Education Programme.

This exercise also provided future learning points for teachers and our training. It was noted that students were less able in two key functionalities - taking a picture, and closing an app. This may be due to the way that the tablets are often used in class for subject support, and could reflect the need to support teachers in using the apps for multidisciplinary creative projects.

Global Technological Competence

Technology Skill observed	Competent	Unable
Switch on & off device	90	10
Unlock tablet	98	2
Select Profile	82	18
Take a picture	45	55
Find and open an app	77	23
Close an App	47	53

Percentage of students

■ Competent   ■ Unable

Teacher Empowerment

*Good teachers are fundamental to raising education quality in the classroom.*

A key component of our theory of change, we monitor teachers' professional development to test that we are developing teachers to their fullest potential. Using pre-defined levels, (Level 1 - 5) teachers are measured against 11 assessment areas including lesson preparation, differentiation and behaviour management.

We observed 100 teachers in 27 schools in South Africa and Colombia, all who were originally assessed at a starting Level of 1 or 2. We were interested to monitor the individual teachers' progress, not to make comparisons between teachers, as class profiles differ significantly from school to school. For example in some of our classes we had teacher/-student ratios of 1:84 compared with other classes of 1:22. Other data variations included the quantity of time teachers had been in our programme.

The results of our observations are shown below, highlighting both the successes and challenges of our teacher training programme. These results positively demonstrate the importance of ongoing teacher training, and its integral role in ensuring that technology is used effectively in the classroom to raise standards of education quality.

Level 5	Teacher is at BF Level 4+ and has the ability to train and support other teachers to become proficient at teaching and learning with technology.
Level 4	Teacher is proficient at teaching and learning with technology and has ability to train & support others.
Level 3	Teacher requires minimum further support to be proficient at teaching and learning with technology.
Level 2	Teacher requires a moderate level of support to be proficient at teaching and learning with technology.
Level 1	Teacher requires a high level of support to be proficient at teaching and learning with technology.

Successes

Overall, teachers' technology confidence levels were raised - critical for in-class technology utilisation.	**50%** of teachers were able to differentiation learning to target students using technology	**74%** of teachers improved in the preparation of technology prior to a lesson by at least 1 level.
57% of teachers had a good grasp of the apps used in the classroom.	**53%** made learning engaging and enjoyable using technology (Level 3+).	**54%** of teachers were judged as able to ensure learner's used technology for the intended classroom activity (Level 3+).
44% of teachers improved technology management and moved from Levels 1/ 2 to Levels 3, 4 or 5.	**55%** of teachers were assessed to be overall confident in the use of technology (Level 3+).	**47%** of teachers were scored Level 3+for integrating technology in lesson delivery.
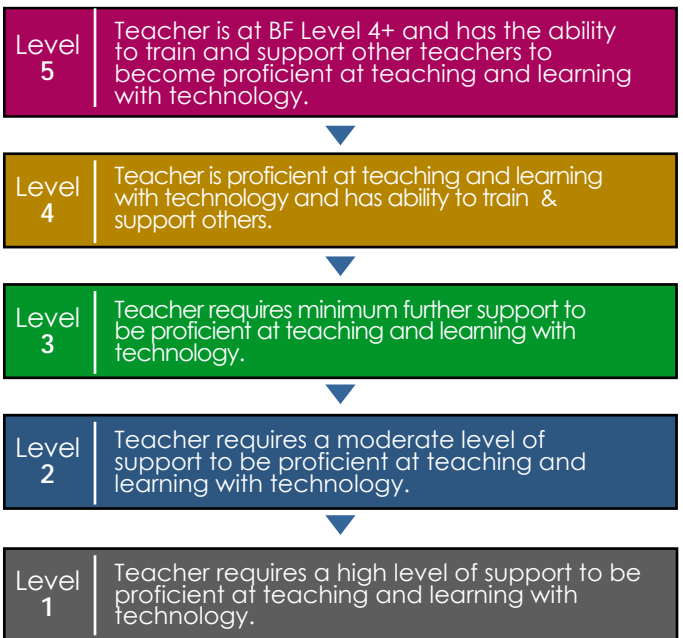
Challenges

Through our observations and teacher feedback we also noted some key challenges which impact teachers' ability to integrate technology in the classroom:

- 55% of teachers were observed explaining technology activities clearly, this therefore requires future development training to ensure all teachers are competent in this area.

- Teachers noted issues with tablets arriving 'ready' for lessons and the challenge of maintaining tablet charging.

- Engaging learners in Education Technology learning activities required improvement.

- Challenging and overcoming some student perceptions that technology is for 'fun' rather than a learning tool.

- Managing disruption and counterproductive learning between children who share technology.

Supporting School Leaders

To achieve sustainability, we require committed school Senior Leadership Teams (SLTs) to strategically manage our school support and to remain committed to promoting and developing the use of technology throughout their institutions. Our in-country teams work directly with SLTs and appointed 'Teacher Champions' to ensure that our project schools incorporate a vision for whole school implementation of technology.

During 2017, our global team spent over 200 hours supporting school SLTs - developing strategies for successful education technology implementation. This support is tailored to the needs of each school and can range from establishing clear programme logistics; setting visions and goals; ensuring teacher professional development raises standards and monitoring programme quality. We evaluated our support and SLT's commitment to technology by auditing 39 project schools in Colombia and South Africa at the end of 2017.

92% of Senior Leadership Teams engage positively with the Breteau Foundation to raise standards in students' learning.

- Engaged
- Partially Engaged
- Not Engaged
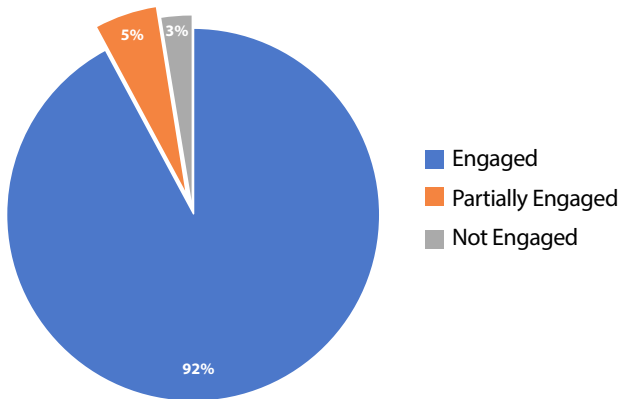
Overall, this audit showed high levels of SLT engagement, and positive progress in the development of whole school technology implementation. Positive engagement translated into the development of whole school strategies for technology implementation. We found that 76% of SLT's had successfully worked with the Breteau Foundation to develop a vision for Education Technology in their school.

79% of Senior Leadership Teams have embedded technology in the learning ethos of their school.

- Engaged
- Partially Engaged
- Not Engaged
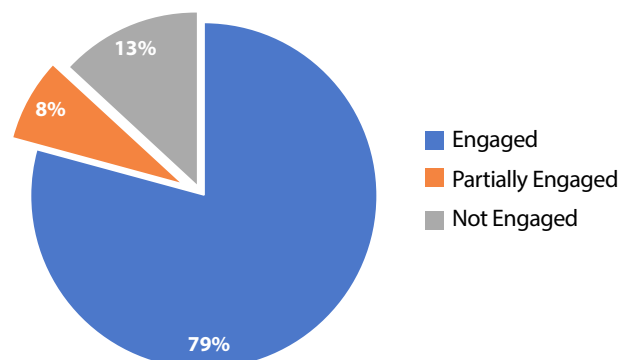
The vast majority of SLTs were deemed to support the use of technology throughout the school, pointing to positive attitudes to technology - fundamental to establishing effective whole school implementation of digital education opportunities. This was corroborated in interviews with Senior Leaders. Out of 25 respondents, 19 gave a value of 60% or above for technology being a top priority for their school. And 40% of Leaders valued technology prioritization at 90%. Other key priorities for Leaders to raise standards were the improvement of classroom facilities; more qualified teachers and smaller class sizes to name a few.

89% of SLTs support the effective logistical management of the programme at a school-wide level.

- Engaged
- Partially Engaged
- Not Engaged
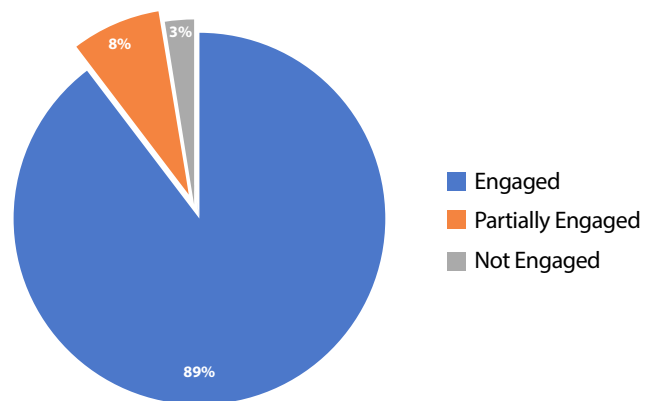
The logistical management of the technology at a school-wide level is paramount to ensuring that all students receive equal access to digital opportunities. Making effective use of timetables, rotas and monitoring usage are all key to programme success. Security is also important, and 82% of SLTs were thought to maintain the safety and security of tablets at the school.

SLT support for teacher training is wholly necessary for the professional development of our programme teachers. In 85% of our schools SLT has engaged positively to take up professional development for teachers with 90% of SLTs providing a fair amount of time for teachers to take up BF support.

Looking to the Future
In order to raise the education standards, 22 respondents suggested that some form of increased technology presence would develop teaching and learning in their school. This could be either through the provision of more technology for students and teachers, more apps or establishing dedicated technology rooms.

Finally, SLTs mentioned the need to increase parental motivation to ensure that standards are raised. This could be a future programming consideration - to support with parental engagement through technology and digital opportunities with the potential to raise standards, attendance and motivation.
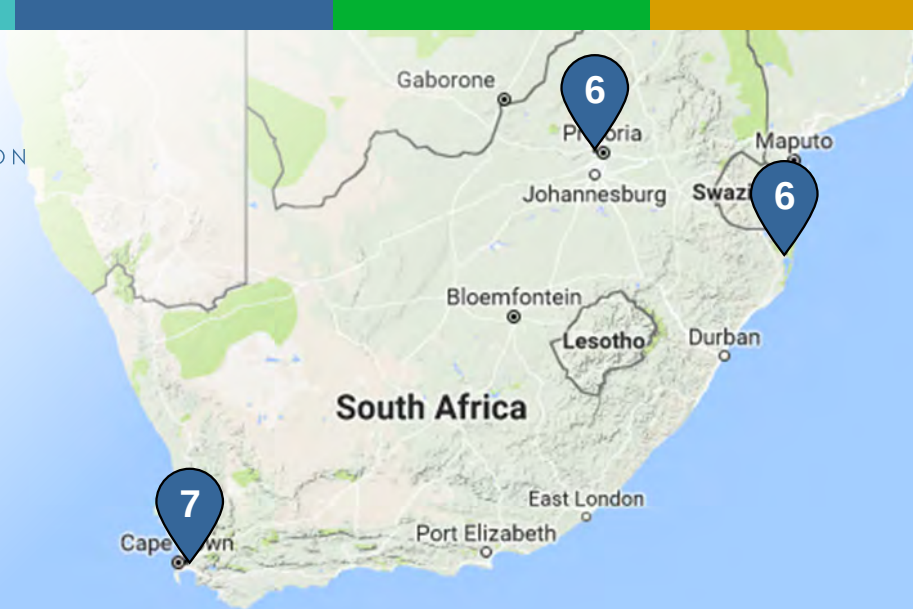
Country
Spotlights

South Africa

The Breteau Foundation has supported South African schools since 2014, and is currently in partnership with 19 primary schools across the country. Our partner schools include urban township schools, rural village schools, and urban suburb schools in the three provinces of the Western Cape, Kwa-Zulu Natal and Gauteng. There are 11 official South African languages, all of which are spoken in our partner schools. All of our partner schools teach at least two languages in the foundation phase, Grade R to 3, which use our tablets daily
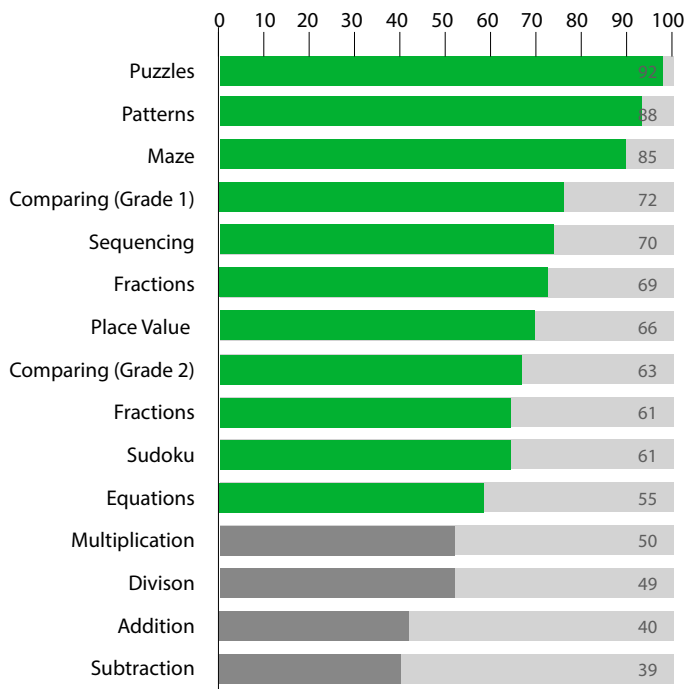
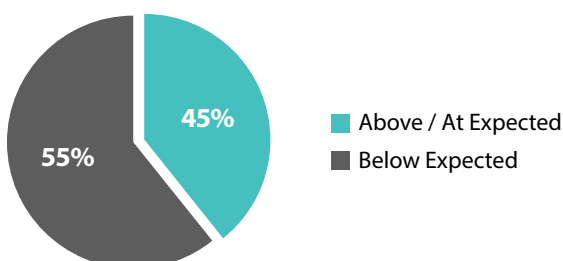| Students	Teachers	Schools	Tablets	Apps
7411	224	19	1015	65

Numeracy

65% of students believed that learning with tablets significantly supported their numeracy level.

Numeracy app data showed positive student outcomes with an average of 64% of students applying in-class learning at or above the curriculum level through app-based play. 11 out of 13 numeracy curriculum objectives showed positive outcomes with a key curriculum success area being the application of shape in which up to 80% of sampled children achieved above the expected curriculum level.

This graph depicts positive trends in the numeracy curriculum along-with key areas for development. These findings provide core learnings for our team to effectively target teachers' professional development. Areas such as sequencing, place value and fractions saw positive results in comparison to more limited progress seen in the core operations of addition, subtraction, multiplication and division. Both positive and negative outcomes could be due to reasons including app's curriculum suitability, teacher pedagogy or simply the amount of student time allocated to app level.

Puzzles	92
Patterns	88
Maze	85
Comparing (Grade 1)	72
Sequencing	70
Fractions	69
Place Value	66
Comparing (Grade 2)	63
Fractions	61
Sudoku	61
Equations	55
Multiplication	50
Divison	49
Addition	40
Subtraction	39

South Africa Average Progress Data

45% Above / At Expected
55% Below Expected

Critical Thinking

Data compiled from critical thinking apps showed limited progress highlighting this as a programme development area. 45% of children had achieved levels at or above the age-expected expectation, with 42% achieving in the area of problem solving.

Languages and English

Students in our South African programme are taught in home languages, speaking English as an additional language. Apps are therefore provided in both home languages and English, to ready children for Grade 4 in which teaching is in English.

"In Term 1 there were six students failing Language, at the end there were only two. I believe it is because of [Home Language apps] because it contains listening, speaking, phonics, handwriting and reading. It has it all."
- South African Teacher, 2017

Data showed a positive overall trend in student progress, with an average of 64% of children achieving at or above expected level across the apps including in vocabulary and phonics. Drilling into the data, specific curriculum areas were found to be high achieving such as syllables and word recognition (as shown). Equally, phonics was a high area of performance with the majority of children achieving above curriculum expectation in over half the letter sounds. In particular, students excelled at the short vowel sounds of with over 80% of children achieving at or above expected in on the short I and U.
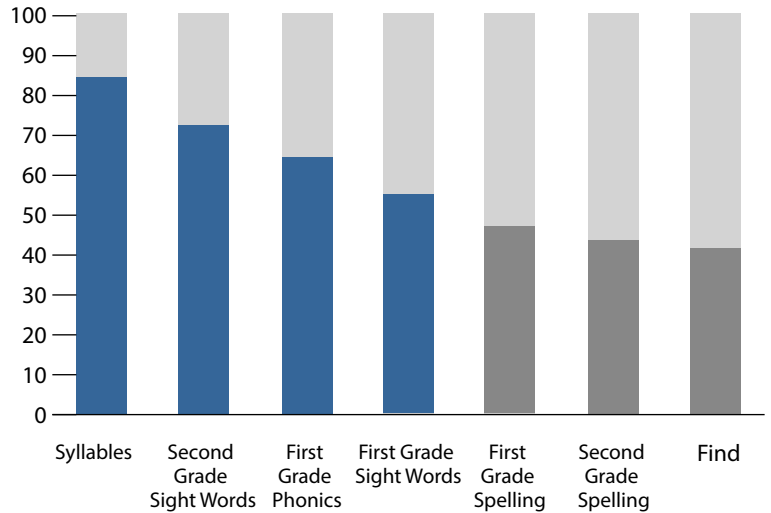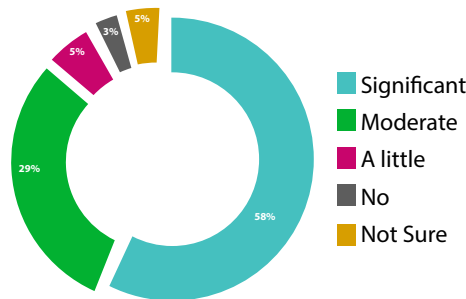
Comparatively less progress was made in areas of spelling, in both first grade and second grade level apps, with under 50% of children achieving at expected level. This data, coupled with teacher feedback, identifies the immediate need for more high quality apps in local languages.
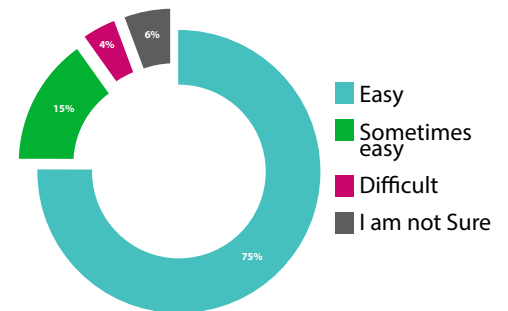
69% of students felt that apps significantly supported their learning.
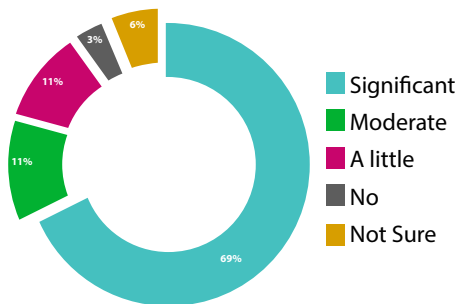
- Significant
- Moderate
- A little
- No
- Not Sure

69%
11%
11%
3%
6%

87% of children agreed that since using technology in class they had learnt a significant or moderate amount.

- Significant
- Moderate
- A little
- No
- Not Sure

58%
29%
5%
3%
5%

75% of students thought technology made learning easier.

- Easy
- Sometimes easy
- Difficult
- I am not Sure

75%
15%
4%
6%

Teacher Empowerment

Observations were made of 73 Grade 1 - 3 teachers in 13 different project schools. 39 of these have been with our programme between 1 - 2.5 years (with the remainder under a year). Class sizes ranged significantly, from 24 - 84 learners, a key consideration for technology implementation and classroom management.

Data showed positive progress for teachers participating in the training programme, with increases in teachers' confidence, improved technology management and the integration of technology into classroom practice. In most criteria, the majority of teachers were assessed at a Level 2 or 3 highlighting that despite great progress ongoing professional development will be required to reach optimum education technology practice in the classroom.

Criterion	Value
Teachers increased their overall technology confidence by min. 1 level	89%
Teacher showed good technology preparation prior to the lesson, with 28% increasing 2 Levels	74%
Teachers integrated technology with fair proficiency to deliver lessons	82%
Teachers explained technology activities clearly to learners	74%
Teachers showed progress in app understanding, with 44% at Level 3+	79%
Teachers observed making technology lessons enjoyable, 41% at Level 3+	82%

Colombia

The Breteau Foundation has worked in Colombia since 2015, working in partnership with 21 schools across the country. Our school are situated in six geographical areas: Bolívar, Atlántico, Boyacá, Cundinamarca, Meta and Quibdó, where we reach over 4000 students. There are many challenges to programme implementation in Colombia including the frequency and safety of accessing schools with some rural schools located up to 10 hours away from Bogotá. Additionally, 80% of our urban partner schools are situated in areas marked by high rates of violence. The social ecosystems surrounding the schools set invisible restrictions for our team and students, including limited time periods allowed in communities and avoidance of gang members.

| Students	Teachers	Schools	Tablets	Apps
4127	131	21	885	60

Numeracy

61% of Colombian students surveyed believed that learning with technology significantly supported their mathematics learning.

In-app numeracy data showed positive trends in learner's ability to apply age-expected numeracy concepts, particularly in the subject areas of place value, subtraction and regrouping as demonstrated in the graph. On average, 57% of students achieved at or above expected curriculum standards in-app levels.

˅Comparatively, in topics such as subtraction and sequencing, progress was limited with approximately a 50% average of students achieving below expected level. Curriculum areas with more limited progress could signal misconceptions in numeracy knowledge or suggest that students require more time to apply their knowledge in these app areas. Understanding areas for improvement is key for our country teams, who can guide teachers to effectively use technology to target students' gaps in knowledge.
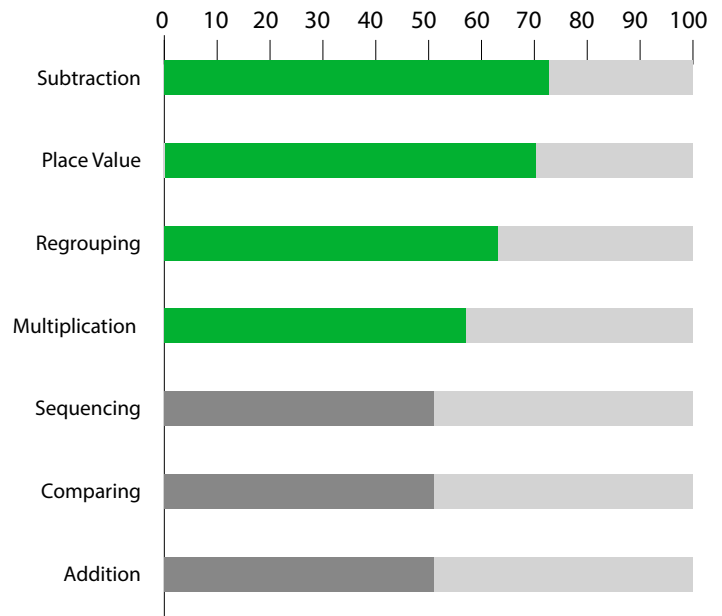
Colombia Average Progress Data

29%
71%

- Above / At Expected
- Below Expected
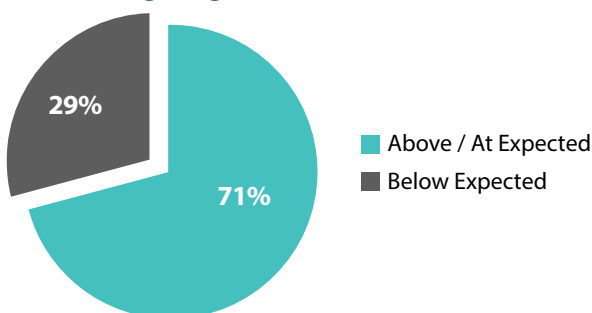
Critical Thinking

Collated data from selected critical thinking apps in Colombia, showed positive outcomes for learners. Taking the average percentage across the three subject areas, we found that 71% of learners were on average above or at expected age level. In particular, 67% of Grade 1 children were at or above their curriculum expectation in the area of problem solving - with 56% of Grade 2 students also meeting the curriculum expectation benchmark.

Languages and English

In Colombia, apps are provided in both Spanish and English for literacy, and second language learning. Therefore apps were sampled in both areas.

Literacy apps showed application of both letter construction and text construction. In the available app data, it was evident that students were able to apply their knowledge of letters, with an average of 61% of sampled students achieving at or above curriculum level.

Comparatively, students underperformed in the area of text construction with an average of 31% of students achieving at curriculum expectation. This data, however, does not show the positive benefit that technology plays in encouraging students (particularly boys) to write. Anecdotal evidence from the Colombian programme has shown young boys, normally disengaged from writing - engaging with text construction through the use of literacy apps on the tablets.

Literacy Focus Areas

Text Construction

Letter Construction

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ Above / At Curriculum Expectation
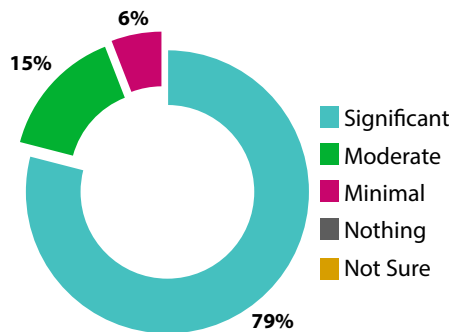■ Below Curriculum Expectation
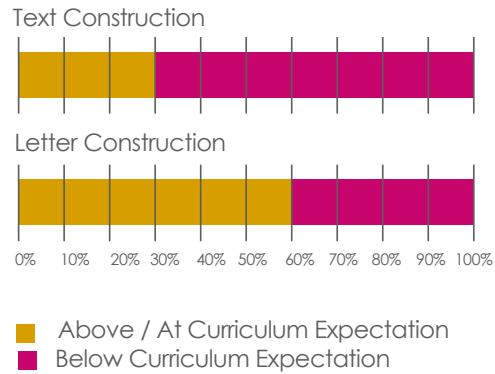
In English, we saw limited progress in the app-level data, with the majority of students underachieving against national standards. Although English is taught in our partner schools, as per national expectation, our Country Teams highlighted key limitations on the quality of English lessons - including teachers' language confidence. Looking forward, this could be a key area in which Breteau Foundation training, and quality app content could raise standards of teaching and learning.
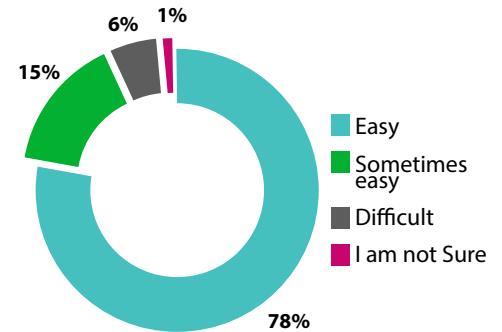

66% of students surveyed indicated that apps significantly helped their learning.

2% Not Sure
4% No
10% A little
18% Moderate
66% Significant

■ Significant
■ Moderate
■ A little
■ No
■ Not Sure
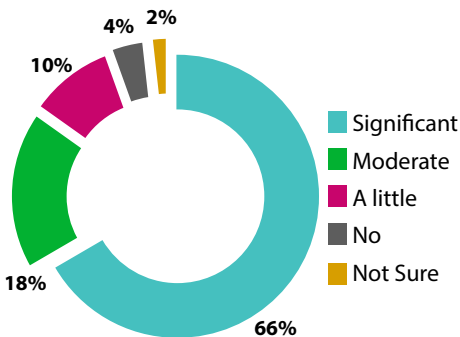
94% of children believed that since learning with technology in class they had learnt moderately or significantly more than 'usual'.

6% Minimal
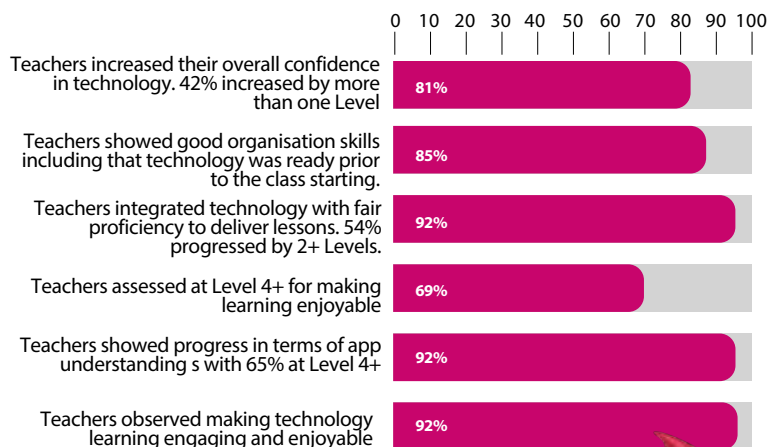15% Moderate
79% Significant

■ Significant
■ Moderate
■ Minimal
■ Nothing
■ Not Sure

78% of students felt that tablets made their learning easier.

1% I am not Sure
6% Difficult
15% Sometimes easy
78% Easy

■ Easy
■ Sometimes easy
■ Difficult
■ I am not Sure

Teacher Empowerment

Observations were made of 27 teachers across 15 different schools to measure the impact of teacher training in Colombia. Teacher student ratios ranged from 1:22 up to 1:40 learners in Colombia significantly lower than other project countries.

Data showed positive progression in many criteria areas including app understanding, technology management and the integration of technology into classroom practice. Teacher confidence was high in Colombia, with 24 teachers assessed at Level 3 or above.

0 10 20 30 40 50 60 70 80 90 100

Teachers increased their overall confidence in technology. 42% increased by more than one Level — **81%**

Teachers showed good organisation skills including that technology was ready prior to the class starting. — **85%**

Teachers integrated technology with fair proficiency to deliver lessons. 54% progressed by 2+ Levels. — **92%**

Teachers assessed at Level 4+ for making learning enjoyable — **69%**

Teachers showed progress in terms of app understanding s with 65% at Level 4+ — **92%**

Teachers observed making technology learning engaging and enjoyable — **92%**

Lebanon

In Lebanon we conducted a focussed, time-bound action research project to ascertain how education technology supports in-class learning. Students on our Mobile Education Bus were targeted with a 7 week numeracy intervention at the beginning of the new academic year in October. Lessons were designed to compliment the in-class curriculum, developing students numerical understanding and allowing the application of maths concepts using apps. Numeracy baseline and endline tests were carried out with 410 children (ranging from Kindergarten to Grade 2) with tests developed against the terms" upcoming curriculum objectives.

Students 2587   **Teachers** 47   **Schools** 7   **Tablets** 104   **Apps** 40

Student Progress

In Lebanon we conducted a focussed, time-bound action research project to ascertain how education technology supports in-class learning. Students on our Mobile Education Bus were targeted with a 7 week numeracy intervention at the beginning of the new academic year in October. Lessons were designed to compliment the in-class curriculum to develop students numerical understanding and allow the application of maths concepts using apps. The team performed numeracy baseline and endline tests on 410 children (ranging from Kindergarten to Grade 2) with tests developed against the students' upcoming curriculum objectives to be taught in class.
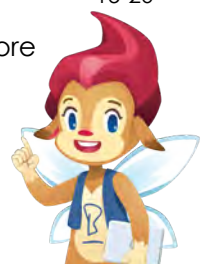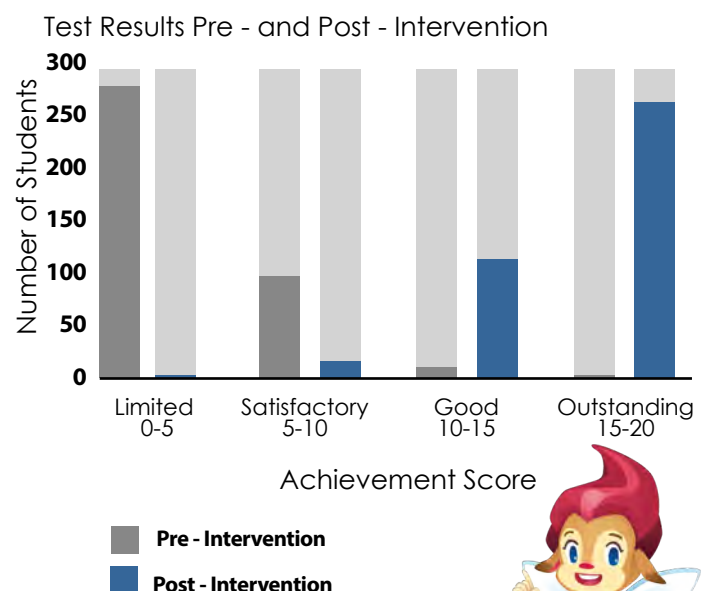
Results

The interventions' results were very positive with children making substantial numeracy progress in the taught objectives. Within the 20 mark tests, on average students increased their point score by 12.5 points, moving from an overall average baseline of 3.4 to an average endline of 15.9 points.

Due to the gender-based challenges present in refugee contexts, including child labour, early marriage or cultural gender norms - data was disaggregated by gender to check for potential differences in progress. Minimal difference in the average progress for boys and girls was found and girls on average performed slightly higher in the assessments overall. However, no large discrepancy was found between girls' and boys' achievements.

	Average Baseline	Average Endline	Average Progress Improvements
Boys	3.3	15.7	12.4
Girls	3.5	16.1	12.6

The distribution of test scores was also analysed to compare pre-tests and post-tests. Compared to pre-test results, where the vast majority of students achieved below 5 points, the majority of students achieved either good (between 10-15) or outstanding (15-20) scores in their post-tests.

Test Results Pre - and Post - Intervention

■ Pre - Intervention
■ Post - Intervention

Finally when broken down to school level, interesting comparative results emerged (schools have been anonymised). The largest average improvement was in School 1 - in which the intervention targeted only Kindergarten grades. As expected, Kindergarten children began at a lower average baseline perhaps contributing to the higher average progress. Our additional interventions in settlements also achieved higher average progress - which could be linked to the set-up of this programme as an additional educational intervention, rather than incorporated into the school day. School 4 had the least (albeit good) average progress, indicative of the shorter intervention timeframe due to a later school term start date.

|	Average Baseline	Average End line	Average Progress Improvement
School 1 KG only	0.3	15.0	14.7
Settlement 1	3.7	17.7	14.0
Settlement 2	3.1	16.5	13.4
School 2 - Grades 1 & 2	5.2	15.7	10.5
School 3 - Grades 1 & 2	5.2	15.7	10.5
School 4 - Grades 1 & 2	4.2	13.2	9.1

Technological Competence

When surveyed 74% of students stated that they never used technology at home, suggesting that for the majority of our learners, access to technology is only provided through the Mobile Education Bus. Despite this, sampled students were very competent in using basic tablet functionality with 100% of observed students able to turn on and unlock the tablets. And, 99% able to select an app.

Progress in National Curriculum Area
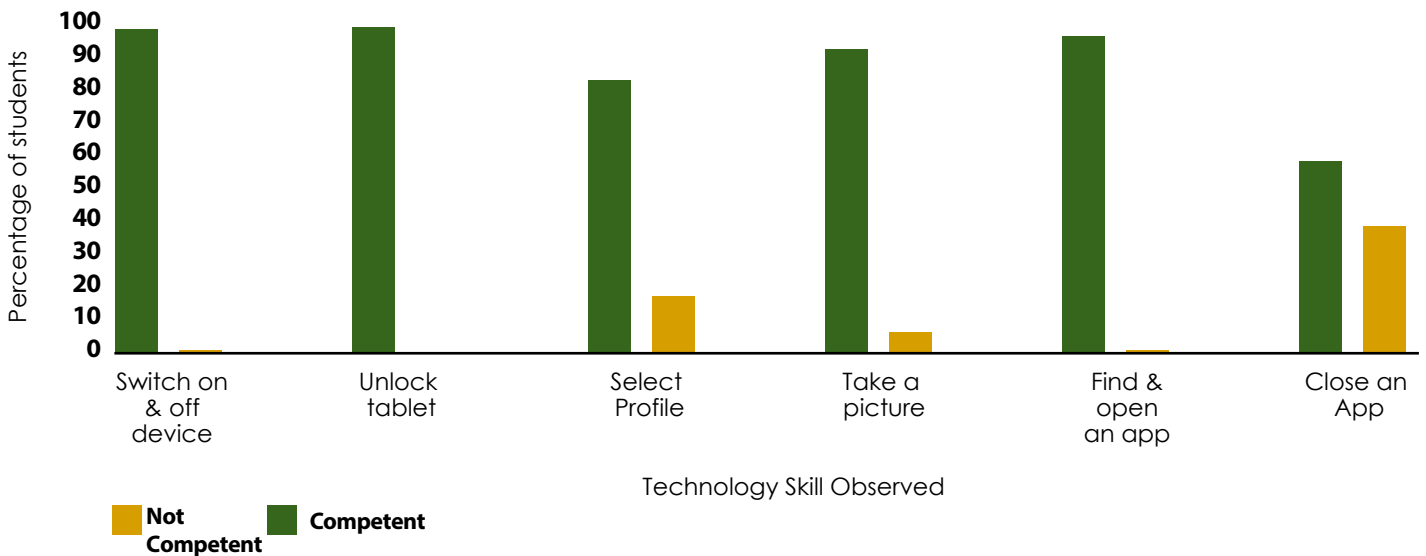
Using apps helps my learning
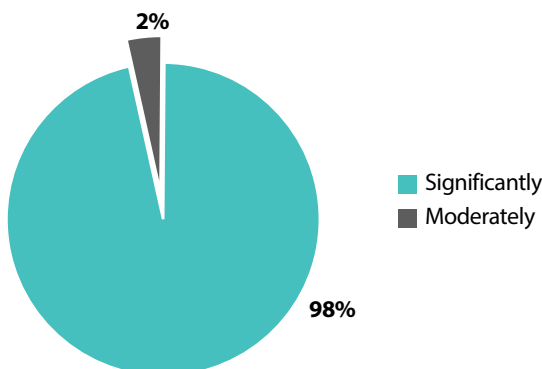

Student Engagement

Over 400 students across our Lebanon programme provided their views. 98% of these students believed that using apps significantly helped their learning, with 91% of students stating that tablets made learning 'easy'. An overwhelming 100% of students surveyed thought that since using technology they learnt a substantial or moderate amount.

Innovation
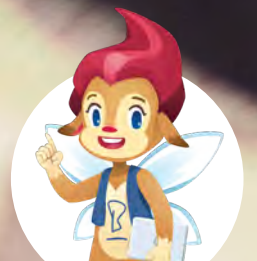
Offline Resource Platforms

Internet connectivity is a determiner of inequality with 85% of the world population lacking access. Lack of connectivity impacts education quality, with learners unable to access information, teachers limited for quality resources and schools limited to the distribution of national educational programmes. We collaborated and listened to our project schools to resolve issues highlighted by our Colombian teachers of a lack of access to education materials. As we cannot 'copy and paste' solutions due to the lack of connectivity, we designed a local solution – an Offline Resource Portal enabling resource distribution.

We undertook a pilot in two classes in one of our urban project schools - Gimnasio Santander. Pilot details are provided below.

Profile	Year 2	Year 2
Pilot learner numbers	26	-
Pilot learner numbers	-	31
Learner experience with technology	Medium	Medium
Math lessons per week	3 (2 hour lessons)	3 (2 hour lessons)
Other maths support	No	No
Teacher - years of teaching	3	4
Teacher trained	Yes	Yes
Teacher level of technology confidence	Low	Medium
Amount of time on pilot	2 hours	2 hours

Learner Responses
The greater majority of learners found the worksheets easier to work on with only 1 student amongst both Grades 2 and 3 learners who found the worksheets more difficult. The greater majority of learners stated that the classes were more enjoyable with only three learners in total seeing no difference.
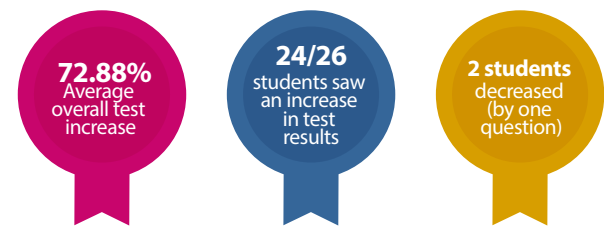
Teacher Responses
While working alongside the teachers we also undertook a qualitative study of their responses to a series of questions. In summary, the teachers described the platform as functional because it is well organised and allows teachers to share worksheets with students in just one click. Teachers also described the platform as having a positive effect on learning and motivation amongst students. One suggested that students like to interact with technology and they were motivated by the simple task of allowing them to download worksheets and upload homework. Teachers also stated that they were pleased by the training, support and manual we provided and looking across the survey results it appear maths worksheets were deemed the most popular.

Looking to the future one teacher suggested "We hope in the future it will be less about uploading and downloading and more about viewing documents online." Until connectivity is no longer a problem we envisage increasing resources and enabling access to other schools in particular those in hard to reach unconnected areas.

Academic Results
Students were provided with a math test at the start of the pilot and retested with the same test (with different ordering) at the end of the pilot. We removed any student where there was absence. Students were provided with resources and followed a designed learning programme to improve their maths. Teachers were given support throughout. It would appear that the interventions had a highly positive effect on the student's academic results with results showing:

Year 2

| 72.88% Average overall test increase | 24/26 students saw an increase in test results | 2 students decreased (by one question) |

Year 3

| 47.55% Average test increase | 28/31 students increased results | 2 students showed minor decrease |

Mobile Education Bus: Lebanon

Breteau Foundation's Mobile Education Bus is a much-needed innovation to provide access to Digital Technology for Syrian refugees learning in Lebanon. Launched in December 2016, in partnership with Help Refugees and Salam LADC, the Bus acts as a mobile digital classroom delivering education classes to students who would otherwise have limited or no access to education technology, in an exciting and safe environment. The bus is currently based in West Bekaa, near the Lebanon-Syria border and visits three informal learning centres, the Dar al Hanan orphanage for vulnerable children and two refugee settlement communities. The bus is now entering its second academic year of operation in the region and has reached 821 students to date.

Providing Access to Education Technology

Syrian children learning in West Bekaa's informal learning centres have often missed vital years of education due to conflict and displacement. The Mobile Education Bus provides children in accelerated learning programmes with access to education technology lessons directly linked to their in-class learning. Our school bus teacher works closely with teaching staff at learning centres to create a complimentary school bus curriculum. This allows our team to differentiate learning, targeting individual children's needs. Play-based digital education content supports children, who need to make accelerated progress, to learn at their own pace and promotes independent learning. Results of a short-term research intervention into Education Technology's impact on maths can be found on page 23.

The programme also empowers local teachers, to develop digital literacy and confidence to incorporate technology into teaching. The long-term aim is to provide teachers with opportunities to teach on the bus, creating long-term sustainable benefit beyond the life of the project.

Additional Education Support for Refugee Settlements

The School Bus not only visits education centres during the school day, but from July 2017 onwards has been providing extra educational support to selected settlements as an additional education intervention in out-of-school hours and school holidays.

Average Progress of Students by Schooling
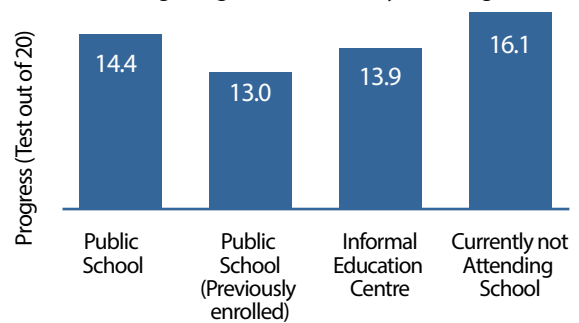
Children attending our settlement numeracy intervention improved in numeracy by an average point score of 14 points (out of 20) over the 7 week period. On average, children who did not currently attend any form of schooling made the most progress with an average improvement by 16.1 marks (out of 20) in endline assessments. This increase in comparison to other students may be linked to the limited marks gained in pre-tests.

Progress Level		Percentage of Students
Confidence	**Excellent**	24
	Good	57
	Fine	19
Readiness to Learn	**Excellent**	19
	Good	30
	Fine	60
Engagement	**Excellent**	11
	Good	31
	Fine	63
Problem Solving	**Excellent**	6
	Good	26
	Fine	65
Perseverance	**Excellent**	8
	Good	26
	Fine	67
Peer Collaboration	**Excellent**	7
	Good	40
	Fine	52
Independent Learning	**Excellent**	18
	Good	71
	Fine	11

Psycho-social support and soft-skills development

A key component of our programme in Lebanon is the psycho-social support provided to children who have been displaced by conflict. In addition to their technology lesson, each class participates in a 'Play with purpose session' in the buses extendable awning. These sessions focus on supporting Syrian children with psycho-social needs through creative play activities.

At the start of this academic year we observed students soft skills development. We selected sample children to monitor during the first 8 weeks of the Mobile Education Bus intervention, with teachers monitoring children's development in the areas of: Confidence, Readiness to learn, Engagement, Problem solving Perseverance, Collaboration with other students and independent learning. Student progress was measured on a scale of 1-10 with levels of progress categorised as 'Fine' - 1-3 points, 'Good' - 4-6 points and 'Excellent' - 7-9 points.

We were pleased to see that, in line with our core mission, 94% of students had made good or excellent progress in engagement, with 81% of students appearing more confident by a good or excellent progress level.

Women's Health Awareness Sessions

The bus provides additional community impact, doubling as a health awareness service, particularly focussed on women. Throughout 2017, we funded a nurse to support the bus, utilising the bus to enter settlements in the West Bekaa area and deliver sessions including breastfeeding, skin cancer, dehydration, gastroenteritis and hepatitis support. To date our nurse has reached over 1000 women with vital health education sessions.

Coding Club: South Africa

The Breteau Foundation aims to prepare children for a bright future. We believe in the importance of developing children to have '21st century' skills that match up to rates of innovation, despite limited access to technology in their communities.

2017 saw the launch of a collaborative partnership between the Breteau Foundation and Kano, to deliver a coding and numeracy after-school programme to Grade 4 children at a South African partner school. Kano provides children with the opportunity to 'build their own computer and to then immerse in coding and programming within Kano World. As part of this study, Kano designed a bespoke and engaging set of cross-curricular lessons each aligned to National Mathematics curriculum objectives. 20 children participated in the 18-week intervention, aimed at improving digital skills, numeracy and problem solving.

Impact measurements were focused on student progress against South African numeracy curriculum objectives. Baseline and end line numeracy tests were carried out with all Grade 4 children to provide a control group. Additionally, non-verbal reasoning tests, technological competence screening and hardware recognition tests were completed with children in the coding club.

Engagement in the coding club was high, with positive feedback from the participating students. Students' motivation to attend the coding club was overwhelmingly clear in the 100% attendance rates achieved by all participants.

An understanding of hardware components is an essential development area for children using Kano. Children were facilitated to independently build their computer, using the pictorial instruction manual. Children were positively challenged by this deliberate lack of teacher support, which built independence. Measurements of children's recognition of hardware equipment introduced showed that all children could recognise the majority of components with 13 of the 18 children recognising between 11 and 14 parts (out of 14).

During the intervention, facilitator feedback noted progression in children's coding and programming skills. Observation data shows that all children improved in technological competency, demonstrating ability to manage basic software and hardware functions. This shows progress, but it was also noted that development is needed to encourage children to become consistently competent - a key aim of any future clubs. Future clubs could also focus measurements on the progression of coding skills, to demonstrate the curriculum added value gained through Kano.

Numeracy Results

Very Good Progress (10+ marks) - 3 students

**Good Progress** (6 -10 marks) - 6 students

Fine Progress (1 - 5 marks) - 8 students

Limited/No Progress - 3 students

Test data comparisons showed that 18 of the 20 children progressed in numeracy during the intervention, with 9 making good or very good progress.

However, compared to the control group, children in the coding club did not make additional numeracy progress above the Grade 4 average. Kano club attenders made an average progression of 5, in comparison to the control group of 7.
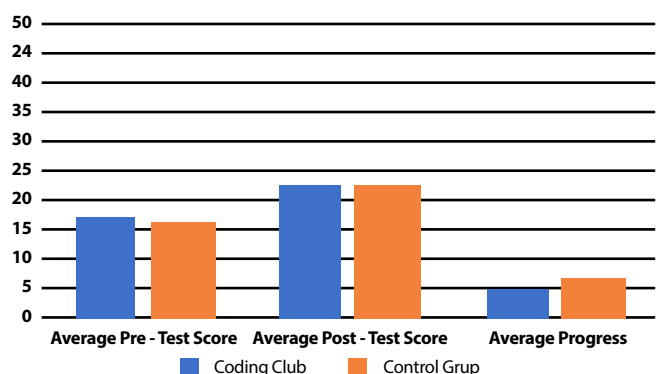
This could be attributed to a number of factors including the limited intervention length, and the small sample size of children. Considering the qualitative feedback from the school it is clear that the Kano club added great value in terms of engagement and applying curriculum objectives in a practical and meaningful way - making maths concepts real for the children. It would be pertinent to repeat this study with larger sample sizes, to gain a full understanding of Kano's potential.

What We Know

The fact remains that while the Education 2030 agenda advocates for inclusive quality education for all, disadvantaged children continue to lack access to technology, and therefore access to education and opportunity. Through our field work we can see how technology has the potential to support inclusive education reducing gender inequalities, differentiating learning and supporting children with special educational needs. We recognise that access to information, knowledge sharing and connectivity is not only a necessity, it is increasingly a human right.

Measuring the impact of technology interventions must be a priority. Yet, attributing cause to the technology itself remains challenging in an area with constant multi-faceted interventions occurring. The question remains, how can we truly know whether the technology has made the impact? Or is it the teaching style, student ability, home life or indeed any other factor that has supported the progress of the child? We believe that the conversation around impact, and 'what works' needs to be a priority in the education sector in order for organisations to share best practice in Education Technology as well as discuss the continued challenges that we face. It has been exciting to see a range of organisations focusing on this area recently, and the discussion is certainly developing – we encourage the sector to continue talking and hope that this report can add to the discourse.

We also know that English educational content and app creation continues to dominate the EdTech landscape. Our teams continuously search to find linguistically suitable content for their country programmes, and in some of our more remote schools we have undertaken major translation projects to provide schools with educational materials. For children with Mother Tongues that are not of the mass majority, such as our students in South Africa, content remains limited. To support our schools we need to identify and partner with app developers who are designing content that reflects the contextual needs of regions such as Sub-Saharan Africa and the refugee crisis. We thank innovative app partners for their work in this area, but realise that more must be done to support the translation of materials into lower population languages.

Our programme champions teachers as the key implementers of technology and the fundamental tool in providing quality education to all. We have developed a comprehensive teacher training programme to support teachers with the effective use of technology in the classroom and see benefits in student outcomes in class. However, high teacher turnover often impacts our work as teachers move to other schools not in our programme. Ensuring a sustainable continuity of the program and investing in senior management is fundamental to ensuring that technology supports learning beyond the life of the programme.

Our Partners

We work with partners around the world to deliver our Digital Education Programme in schools. Ranging from our partner schools to innovative content developers; from technology entrepreneurs to grassroots organisations on the ground - our partners are fundamental to the success of our programme.

We would like to thank all our partners for their continued collaboration and support, and look forward to continuing our work together where it is most needed.

With special thanks to,

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