2024 LEAP Challenge

LEAP

Project Host:

Inspiring Teachers

Inspiring Teachers

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TABLE OF CONTENTS

Executive Summary

Inspiring Teachers is a globally recognised nonprofit organisation committed to empowering educators, especially within low-resource contexts. Its core program Tools for Foundational Learning Improvement, combines integrated structured pedagogy with technology to to enable data-driven teacher support and adaptive program management. This program has two components, an instructional leadership program based on peer coaching and a foundational literacy program.

The Inspiring Reading programme provides structured pedagogy and assessments for foundational literacy (Basic 1-3) to teachers in Ghana. The programme consists of user-friendly lesson guides, integrated student workbooks, and the SmartCoach app, which supports School Leaders and Teachers in running in-school coaching programmes and getting real-time insights on teaching via dashboards, enabling prioritisation and progress tracking, making targeted support and adaptive management possible.

Mission

Their mission is to equip and empowering educators with tools to guarantee world-class learning in African Schools.

Vision

Inspiring Teachers envisions a world in which Governments across Africa equip teachers to guarantee foundational learning and fulfill the promise of education.

Need Summary

The Inspiring Teachers team aimed to ensure their teacher-led 1-1 reading assessment data collection methods generated information that was both valid and reliable in preparation for an upcoming Randomised Control Trial (RCT) study. They also wanted to explore ways to make their work in Ghana more sustainable and deeply aligned with Ghana's Ministry of Education long-term priorities.

Solution Summary & Next Steps

Following a few discovery sessions with the Inspiring Teachers team and reviewing their organisational objectives, we suggested the following:

- **Deliverable 1:** Research and Measurement Guide
- **Deliverable 2:** Assessment Strategy
- **Deliverable 3:** Analysis of User Feedback & Recommendations

- **Deliverable 4:** Competitive Analysis
- **Deliverable 5:** Future-Focused Roadmap

Inspiring Teachers Objectives	**Deliverable 1:** Research & Measurement Guide	**Deliverable 2:** Assessment Strategy	**Deliverable 3:** Analysis User Feedback & Recommendations	**Deliverable 4:** Competitive Analysis	**Deliverable 5:** Future-Focused Roadmap
Reliable & valid data	✓	✓	✓		✓
Alignment with Ministry			✓	✓	✓
Ensuring product/market fit before scaling				✓	✓

Table 1. Alignment of LEAP objectives to Inspiring Teachers goals and priorities.

Irrespective of the path Inspiring Teachers may choose to follow in the future, establishing a robust foundation of evidence is crucial to enable the organisation and the programme to thrive. As such, all deliverables are oriented towards growing their evidence base.

Deliverable 1- Research and Measurement Guide

This deliverable provides an overview of key principles in measurement theory to support the Inspiring Teachers team in effectively assessing their literacy programme's impact. By clarifying the concepts of validity, reliability, and scale development, it offers foundational insights to enhance the robustness and credibility of the programme's evaluation methods. This guide summarises relevant research and theory, illustrating these measurement concepts through practical examples directly related to the Inspiring Teachers literacy initiative.

The Research Process

Visualising the research process and all the steps involved helps to understand what open questions remain at each step and how previous decisions may affect later ones within the research process. Understanding these processes and terminologies helps facilitate effective communication among different stakeholders involved, such as development teams and external researchers.

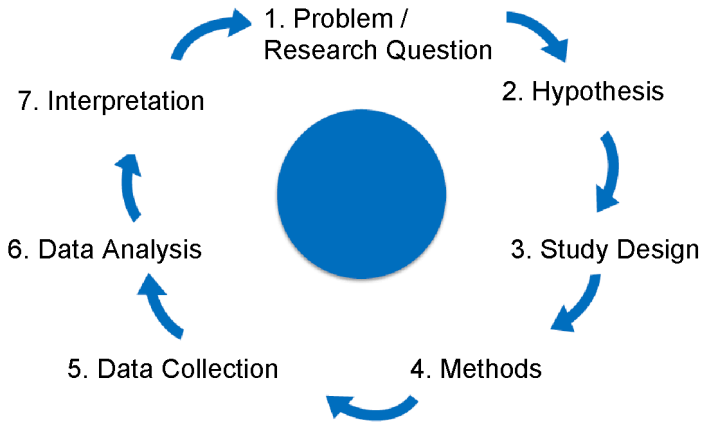

Figure 1. Graphical outline of the research process

Briefly, the steps and questions to ask / decisions to make can be summarised as follows:

1) Background and open questions
   a) Identify the problem: What is the problem?
   b) Identify the research question: What do I need to know to solve the problem?
   c) Identify previous knowledge: What is already known? → *Literature review*

2) Theoretical Framework and Hypotheses

a) Identify the theoretical framework
   → *This is the theoretical background based on previous evidence backing up your theory of change.*

b) Generate hypotheses based on previous knowledge and theoretical framework
   → *for example, do you expect differences in change in a core construct (in reading skills) over time? Or differences between groups at a specific time point?*

3) Study Design - Design the study/experiment:

- What are the key variables?
- What are the control variables?
- How are the variables operationalised?
- Identify the sample: Who will be tested? What is the sample size?
- What are the effect sizes you expect? Do you have enough statistical power to find this effect with the specified sample size?
- Is there a control group? Is there randomisation? What kind of randomisation do you need to test your hypotheses? Are there any ethical considerations? Do some people need to remain blind about parts of the research process?
- Select a design that is suitable for testing your hypotheses: e.g., comparing two groups over time or at a specific time point.
- Consider a *pre-registration* of your study hypotheses and study design.

4) Methods

a) Design the measures:
   - How are the key variables operationalised?
     → *ideally this substantially overlaps with the indicators specified in your theory of change to measure change.*
   - What type of data do you want to collect?
   - Are there previous valid & reliable instruments/measures and scales?
     If not, construct scales.
     → *check for validity and reliability, see measurement section*
   - Consider randomising your measures and avoid order effects or priming

b) Conduct a pilot study or pre-test to ensure your procedures function effectively and to confirm that your measures are both valid and reliable, especially when introducing new measures or working within a new context.

c) Get ethical clearance and consent/assent from participants (and their guardians).

d) Create standardised instructions, provide thorough training for your research assistants, and ensure sufficient tools are in place to accurately document the data collection process, including any deviations from established protocols or challenges encountered.

e) Create an *analysis plan*, specifying what kind of analyses you will use to test your hypotheses with the instruments operationalising your hypotheses – be mindful of the scale levels of each variable (depending on the measures used you can use different analysis strategies).
→ *add all these documents to the preregistration if you intend to pre-register your study.*

5) Data Collection
   a) Conduct field research, experiments, observations, etc.
   b) For surveys: consider online & offline survey tools.
   c) Make sure that you have good monitoring tools for the data collection.

6) Data Analysis
   a) Clean the data: Are there missing variables? Why? Did everything work well?
   b) Analyse the data using different tools, for example, SPSS, Excel, R, and MPLUS based on the research question and your analysis plan.

7) Interpretation
   a) Interpret your findings, answer your hypothesis and then answer your research questions.
   b) Integrate your previous knowledge into previous theories, extend, confirm, or change your theoretical assumptions.
   c) Consider the limitations of your design and methods and what generalisations you can make with your sample.
   d) *Make sure to use null findings in an informative way* – if you have not found an effect it does not mean that there is no effect, but that you did not find it with the power of your study (in your current sample) --- use the confidence intervals to garner more information and discuss potential reasons why you did not find an effect, for example:
      - The intervention was only helpful for certain schools / specific teachers / specific students.
      - Not all schools in the intervention groups received the full intervention or teachers made adaptations.
      - Effects may have been there only at the beginning of the programme or at a specific time point.
      - There were differences between your control and intervention group that you could not control for with your randomisation.
      - The measures used were not suitable to detect potential outcomes.

→ it is helpful to document how the intervention was implemented and collect qualitative data on the progress / additional data on schools, teachers, and students.

Operationalisation of Key Variables

In line with the theory of change, *key variables* are operationalised. This means that they are made measurable through indicators. Some variables are directly observable and serve as *manifest variables* (e.g., school attendance rates). Other data are not directly observable and represent *latent constructs* (e.g., intelligence, attitudes, personality, reading skills). These latent constructs are measured with multiple indicators that serve as proxies. Hence, a good first step would be to define the key variables and what kind of data will be collected to measure those (Carpenter, 2018).

Scales try to capture latent concepts—such as reading skills—that cannot be directly observed, by using a series of statements known as items (Carpenter, 2018). A scale comprises multiple indicators (items), each reflecting aspects of the underlying latent variable (see Figure 2).

Differences between individuals are reflected in how they respond or score on these items. Typically, the sum or average of these item scores represents each person's level on the underlying latent construct. For example, comprehension, a subsection of reading competence, is captured by multiple questions regarding a text that students read. The idea of multiple items measuring one latent construct is to prevent cultural influences, biases, item order and additional measurement error (Morrison, 2001).

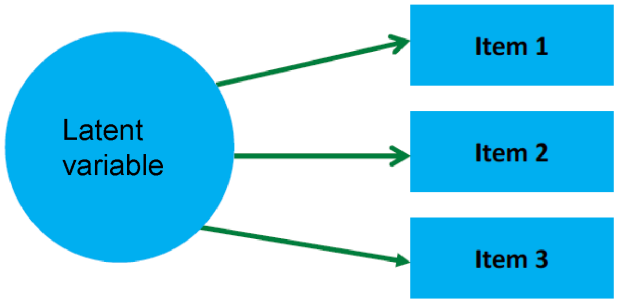

Figure 2**.** A latent variable with three items (e.g. subtasks of a comprehension test).

When deciding how to best operationalise key variables, the first step is to review the literature and determine whether there are scales or even larger instruments/measures that have been previously used in the specific research context and where information about reliability and validity exists. Before searching for scales, it is helpful to *agree on a shared definition for each construct/variable*. A *scale documentation* should clearly outline the constructs being measured, including their definitions, as well as detailed information on each scale—such as the response format, variable names, and coding schemes used for measurement.

If no scales exist or if scales are adapted or used in a new context, *scale development and validation* are necessary. As best practice, information about the *reliability* and *validity* of each scale used in a study is reported for the specific sample.

Scale Development and Validation

Scale development is part of step 4 in the research process, designing measures. It is a complex process and relies on a sound theoretical foundation and methodological and statistical competencies (see Flake & Fried, 2020 for a quick overview of Dos and Don'ts). If scales are not well developed, scientific knowledge may be imprecise. Therefore, it is essential to account for best scientific practices when developing scales or even when choosing and adapting scales for a new scientific study or context. Importantly, scale development decisions and practices should be well documented (in a scale documentation).

Important Aspect: Multidimensionality of Scales

Constructs that are reflected by latent variables can be unidimensional or multidimensional. For example, reading skills represent a multidimensional construct, including multiple dimensions, such as phonological awareness, phonemic awareness, phonics, reading fluency, vocabulary, and comprehension, among others (see Figure 3).

When a construct is multidimensional, each dimension should be measured by specific subscales. A literature review can help to determine the different dimensions involved when researching a psychological construct. As a rule of thumb – the more abstract a construct is – the more dimensions it may be comprised of (Carpenter, 2018). Important is that constructs and subconstructs are well-defined before operationalising them.

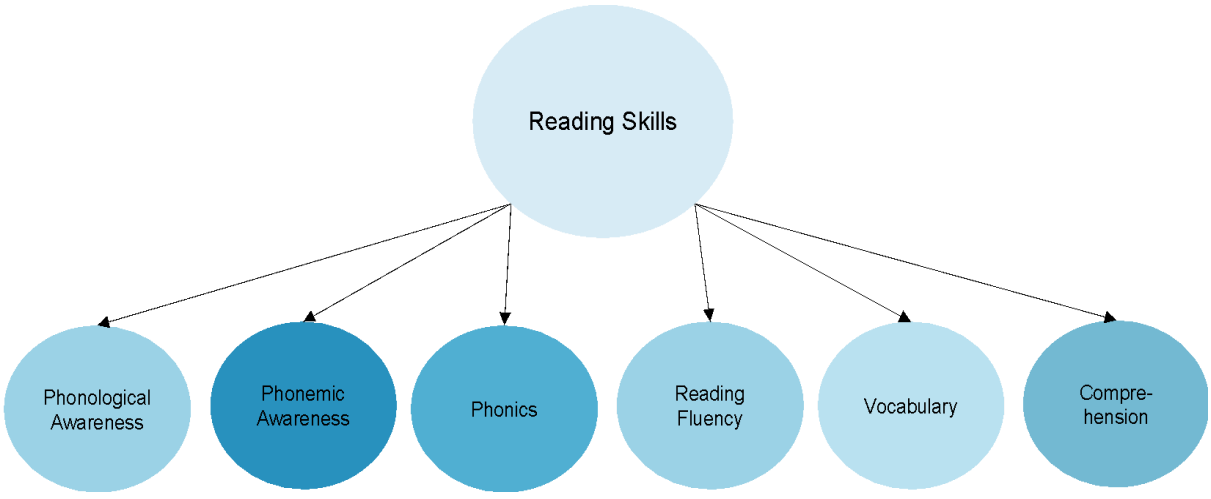

Figure 3. The multidimensional construct reading skills with 6 of its subdimensions.

Procedures Involved in the Development of Surveys - Checklist

- ☐ Literature review – Definitions of each construct and subconstruct
- ☐ Focus groups or interviews with experts or other stakeholders
- ☐ Scale development or selection and potential adaptation of established scales
- ☐ Selection of answer formats:
  Open questions (e.g., open writing task, reasoning, qualitative questions) versus *closed formats*:
  - Rating/Likert-scales: consider the specific number of options, neutral options and options for no answer; consider not using too many different Likert-scales.
  - Correct or incorrect answers.
  - Order tasks and other formats
    → *it is important to consider the type of planned analyses and make sure that the scale level of the collected information matches the analyses*
- ☐ Considerations about the order of questions, priming, and social desirability
- ☐ Pre-test of new scales
- ☐ Pilot test of the questionnaire:
  - Are all instructions and items clear to research assistants and study participants?
  - Look at the data:
    - Were there any items that were too hard / too easy?
    - Check the validity and reliability of the scales (see below for details)
- ☐ Necessary adaptations → reconsider another pilot
- ☐ Create *scale documentation* where you add a row for each construct and list all the indicators, answer formats, original citations, adaptations made, and information on reliability and validity.

Classical Test Theory and Psychometrics

A short summary of classical test theory – the foundation for psychometrics:

Classical test theory accounts for the variation of the results of the same person within the same test/measure across different measurement opportunities. For example, if we measure the reading skills of the same student on different days, the results will not be exactly the same on each day. This is due to different effects, such as training/transfer, and unsystematic influences that can be external (e.g., it is a very hot day) or internal (e.g., tiredness, the hunger of the student).

These unsystematic influences create a so-called *measurement error* that is captured in addition to each measurement's so-called "true" value. This means that each observed score in a measurement consists of a true value and a measurement error (Allen & Yen, 2002).

There are some important assumptions within classical test theory. Two core arguments are:

- If a measure were assessed within an infinite number of trials, the average measurement error would be zero (if we would assess the reading skill of the same student at an infinite number, we would get closer to the true value as the error would be averaged out).
- The true value and measurement error are not correlated. This means that the error is independent of the true value and should be the same for different levels (for example, for faster or slower learners, the assessment should be equally imprecise, independent of their skills). More recent work on psychometrics shows that this assumption does oftentimes not hold.

To determine the quality of a test/measure, it is important to keep the measurement error as small as possible. This is where psychometrics come into play, with the three golden criteria of objectivity, reliability, and validity. Additional criteria are the standardisation of a test (available norms/benchmarks), freedom from bias, economy (easy handling, time used), acceptance (is it accepted in the field and by the sample), ethics, comparability, and usefulness of the test (is there a need for this assessment).

Before looking closer at these three core concepts, it is important to understand what **variance** means. Variance captures the differences between individuals, precisely the squared differences from the mean of all individuals. When conducting a test, it is important that the test can assess these differences between individuals. Thus, high variance is an essential component when determining the quality of a test (Allen & Yen, 2002; Bühner, 2006).

Objectivity

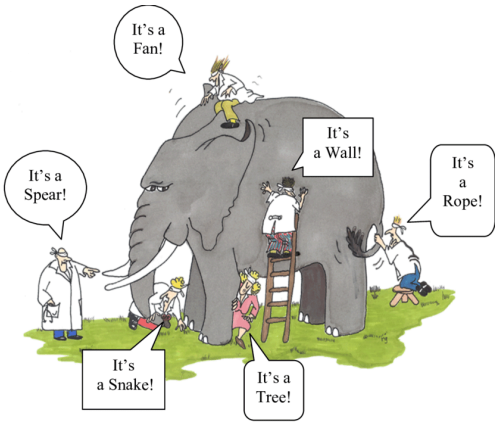

Figure 4. Example to highlight objectivity

Objectivity means that a construct is measured independently of who conducts or analyses and interprets the assessment. The goal is to reduce partiality, biases, and other (systematic) external influences that can lead to measurement error.

For example, when looking at Figure 4, it becomes clear that, depending on the place of the different researchers, they make different conclusions about what they measure. However, if objectivity was high, they would all come to the same conclusion.

Note: From *The Blind Men, the Elephant, and Knowledge,* by Patheos, 2008

There are different types of objectivity. Some of them are related to the procedure, the analysis, and the interpretation (among other aspects):

- Procedure: Standardised instructions, materials, etc.
- Analysis: Standardised analysis
- Standardised interpretations: possible if there are norms/benchmarks
  → this is the case for *diagnostic tests*

Reliability

A measure is reliable if it measures accurately and without error. Reliability is thus revealing the amount of "true" variance in the total variance. Thus, the estimate tries to determine the measurement error of a test.

An important condition for reliability is **objectivity** as this helps to avoid systematic influences that could bias a test. Still, we cannot rule out unsystematic influences and this is why – according to classical test theory – there will still be some measurement error.

Since the amount of "true" variance cannot be captured, there are only proxies for determining it. Hence, reliability is assessed by looking at whether different ratings of the same person align. There are different types of reliability (see Figure 5).

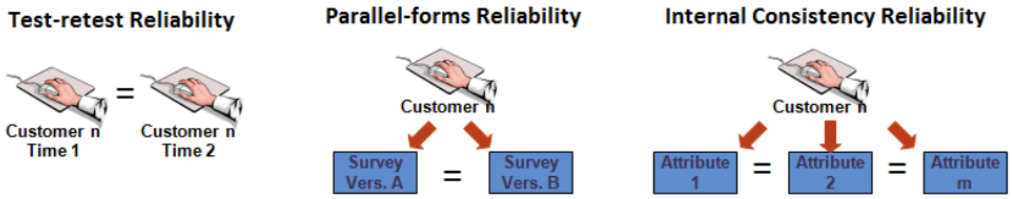

Figure 5. Types of reliability (Gakuu et al., 2016, p. 201)

Test-retest Reliability: This type of reliability is indicated by the correlations of the same construct at two or more time points and tells us if a measure is stable over different measurement occasions. This implies that an individual scoring highly on the first measurement occasion should similarly score highly on the second occasion.

Consequently, if individuals are ranked based on their scores from the initial measurement, their ranking should remain consistent during the subsequent measurement, and this principle applies similarly to all participants.However, this type of reliability depends on recall and there can be effects of practice.

Moreover, the effect depends on the time interval between the assessments and whether there was an intervention between different time points that could differently affect students (for example, a reading training that could be more effective for students with initially lower reading skills).

Parallel-forms Reliability: This type of reliability is indicated by the correlation of two test versions of a test at the same time-point, whereby the "true" value should be the same in the two tests. However, the construction of two equal tests is time-intensive and it is hard to achieve two equal versions. That is why this approach is rarely used.

Internal Consistency Reliability: This type of reliability is indicated by the correlation of all the items pertaining to the same scale. Some indicators are Cronbach's alpha or Omega (Orçan, 2003). However, the value depends on the number of items (and is likely to be higher if there are more items) and on the sample size (it is easier to achieve high internal consistency with a higher sample size). A minimal number of three items is required. This value is high, if all items are highly correlated with each other (i.e., measure the same construct). The correlation of a single item can be determined by the item-total correlation.

To reach a high internal consistency, there must be enough variance within a test. Thus, a test should not be too difficult (so that only a few students can solve the task correctly) or too easy (so that almost all students can solve the task correctly).

Important: Reliability is independent of what is assessed. A measure can thus be reliable but not valid. A measure with a low reliability cannot be valid (see Figure 6).

Figure 6. The relation between reliability and validity.

Other forms of reliability - important considerations: There are also other forms, such as interrater or intercoder reliability, for example, when different researchers code the same qualitative answers (the meaning of a text) within a more quantitative framework or when observations are coded (for example, observations of teaching quality in a classroom). For more information, see the article by Conry-Murray et al. (2024).

A **limitation** of reliability testing is that it cannot be applied effectively to items that are not measured on at least an interval scale. Since reliability in this form is about differences between measurements, an interval scale is necessary as otherwise differences cannot be interpreted (this means that reliability cannot be assessed with Classical Test Theory (CTT) for binary or nominal answer formats, or for single items assessed with a Likert-scale). It is also important to know that Classical Test Theory has many limitations. For determining the quality of a test and for single items, there are more sophisticated models, such as Item Response Theory (IRT), since many of the assumptions of Classical Test Theory do not hold (for details, see for example, Borsboom & Mellenbergh, 2002).

IRT is part of **Probabilistic Test Theory**, which is the theoretical and mathematical foundation for determining the probability that an item is solved correctly / receives a high score. This depends on a person's ability/characteristics and the difficulty of an item. For a comparison and further discussion of PTT and CTT see Brennan (2024), Cai et al. (2016), Meguellati et al. (2024) or Hu et al. (2021) and the examples listed under "Advanced" in the resource section.

Validity

A measure is valid if it measures what it's supposed to measure and not another construct. For example, if reading skills were measured with a mathematical test, this would mean very low validity. If reading skills were measured with multiple standardised tests, this would create high validity. A good question to ask here is: Do the measures capture the construct in a good way?

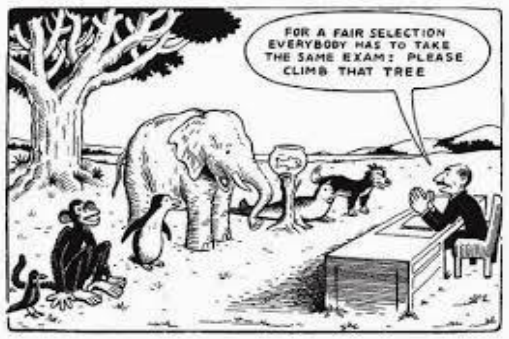

Figure 7. Example for highlighting validity.

For example, in Figure 7, tree climbing is used as a selection criterion; however, most animals are unable to climb trees, which indicates poor validity. Even if this measure accurately assesses climbing skills (demonstrating high reliability), it fails to effectively capture the intended construct across the diverse group of students. Like reliability, objectivity is essential for validity, and reliability itself is a critical component of validity (see Figure 6).

There are different types of validity:

Content validity: The items represent the latent construct well – depending on the theoretical framework and construct definition. This cannot be statistically tested but depends on the logical association of the test/measure with the construct. For example, it helps to create a table with all the specific constructs including all relevant subdimensions to be measured and then have the specific measures and items next to it. In addition to a sound literature review, expert groups (for example, professionals and educators) could help to further validate that these measures are a good representation of the constructs.

Construct validity: The test correlates with other relevant constructs. There are subtypes of construct validity.

- *Factorial validity* means that the items of different subdimensions of a multidimensional scale are only related to those subdimensions they were meant (ideally tested in confirmatory factor analysis, see below).
- *Convergent validity* means that there are positive correlations with constructs that are similar (for example, additional/different tools for measuring reading skills).

- *Divergent validity* means that there are negative correlations with dissimilar constructs (for example, tools measuring numeric skills or even better, a more similar construct where it is important to differentiate, such as for example spelling).

Criterion validity: The test correlates positively with a corresponding construct. For example:

- A standardised reading test and earlier scores in a reading test at school. This is *retrospective validity.*
- A standardised test with scores in a reading test simultaneously as the assessment. This is *concurrent validity*.
- Correlates of constructs with later scores. This is *predictive validity*.
- Moreover, *incremental validity* shows that the measure can predict a later outcome, controlling for the variance that is already predicted by a similar measure (for example, intelligence could be such a variable).

Potential reasons for low validity are – among others:

- The use of different methods to capture the core construct (e.g., reading skills) and a core criterion (e.g., a school reading test)
- Contamination of the criterion by using the wrong indicators to measure it (e.g., how reliable are school reading tests?)
- Not enough variance in the measurements that leads to restrictions in the possible prediction (e.g., if only the students with the strongest reading skills can pass the test not much variance can be explained of the reading test later on)
- Low reliability of the measures (as the measure contains too much measurement error).

Statistical Analyses

The approaches and analyses for assessing validity and reliability should be carefully designed, as they must account for additional constructs beyond the core measures and include considerations for different measurement occasions.

Factor analysis (for validity and reliability):

To evaluate scales, one can use factor analysis. This helps to determine whether the items and scales map onto the specified constructs and subconstructs (construct validity – factorial validity). The procedure uses corrections among observable variables (items of a scale) and reduces these into fewer dimensions (factors; Brown, 2015).

One distinguishes between Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), whereby CFA is preferred for scale validation as EFA can be biased. It requires a sound theory about the measured constructs and tests assumptions about the specific factor numbers (e.g., the scales or subconstructs) and the items that are best summarised under

specific factors. Even previously published scales should be validated within a CFA to avoid evidence resulting from invalid scales (Brown, 2015).

If multiple constructs are included in the CFA, one can also test for convergent and discriminant validity, accounting for the correlations of the latent variables. Similarly, latent factors that well-represent the core construct (e.g. reading skills) can be used to predict related outcomes measured earlier, at the same time, or later on (criterion validity).

A different and more complex approach would be a Multitrait-Multimethod-Approach (for details, see Helm, 2022). This approach accounts for differences that may result from using different measurement approaches (e.g. observation and standardised tests) or different informants.

Measurement invariance tests:

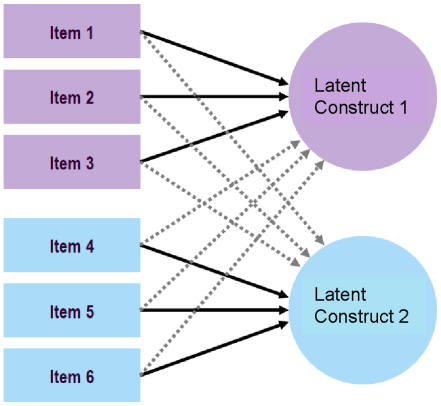

Figure 8. Simple example of two latent constructs with the respective items mainly loading on the intended construct.

If a measure is compared across different time points or in different groups of people or different cultural contexts, it is important to test for measurement invariance. This reveals the consistency with which the constructs were measured across different samples or over time. There are different levels of invariance, testing 1) whether the same items are measuring the same constructs in different samples,

2) whether people are using the questionnaire in the same way / interpreting the items in a similar way (as seen in the strength of the relationship between each item and the latent variable), and 3) whether they are using the answer scale in the same way (important for the comparison of mean scores, i.e. an answer of 4 in one culture also means 4 in another culture). See Meitinger et al (2020) for details or Grütter & Buchmann (2021) for an example see the supplementary materials for details on the analyses.

Reliability testing and item analysis:

When conducting CFA, reliability can be inferred from the factor loadings of the specific items onto the latent factor (Hancock et al., 2001). More complex models can test whether the error variance of the indicators can be deemed equal (see Brown, 2015 for more details).

More simple tests include Cronbach's alpha or Omega (Hayes & Coutts, 2020). Values higher than .8 are recommended, whereby a value of .7 can be deemed acceptable. It is

recommended to look at the item-total correlations to understand which items may need to be excluded from the scale as they are not strongly correlated with the rest of the items. High item-total correlations are coefficients >. 50 and medium between .30-.50. It is important to consider if some items were phrased differently than the rest of the scale (e.g. one item being negatively phrased while the other items are positively phrased). These items need to be re-coded before conducting Cronbach's alpha or Omega.

Ideally, items should have high variance (e.g. represent differences between students of all levels) and not be too easy (so-called ceiling-effects) or too difficult (so-called bottom-effects). Thus, it is recommended to investigate the variance, range (maybe there are values that are not possible or plausible), mean, median, and distribution (skewed items show that the items were too easy/difficult) of all the items (Finch & French, 2018). For dichotomous items (e.g. an answer can be correct or not in a reading test), the number of correct answers divided by the total number of answers represents the item difficulty (whereby different approaches can be included to control for random answers). If more than 80% of the answers are correct, the item is deemed as too easy and if less than 20% of the answers are correct, the item is deemed as too difficult (Quaigrain & Arhin, 2017).

Alongside reliability indicators such as Cronbach's alpha, Omega, or similar measures, the stability of the assessment over time can also be evaluated (though practice effects may influence results—see test-retest reliability). Alternatively, the measure can be split into separate parts to assess consistency.

Examples and Additional Resources

Some example papers for how the validation of a scale works can be found here:

Reading Assessments (recommended literature very relevant for Inspiring Teachers):

- https://link.springer.com/article/10.1007/s44020-023-00039-1?fromPaywallRec=false
- https://www.researchgate.net/publication/371253460_Validation_of_an_instrument_for_assessing_elementary-grade_educators'_knowledge_to_teach_reading
- https://link.springer.com/article/10.1007/s11881-007-0011-0
- https://link.springer.com/article/10.1007/s11145-017-9748-y?fromPaywallRec=false

Advanced:

- https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2021.786612/full
- https://link.springer.com/article/10.1007/s10763-023-10434-2
- https://link.springer.com/article/10.1007/s11145-018-9880-3?fromPaywallRec=false

Other Measures and Assessments (recommended to understand the procedures):

- https://www.sciencedirect.com/science/article/pii/S0022096515001782
- https://www.researchgate.net/publication/241843512_The_need_inventory_of_sensation_seeking_NISS

- https://bmcnurs.biomedcentral.com/articles/10.1186/s12912-023-01244-6
- https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0175381

Additional resources (if working with the statistical open source program R):
Sabbag, A. G. (2019). Handbook of educational measurement and psychometrics using R.. *The American Statistician, 73*(4), 415-416. https://doi.org/10.1080/00031305.2019.1676110

Applied online tutorial on psychometrics (YouTube channel):
https://www.youtube.com/playlist?list=PL-kVjeOVYChqsOwi1oFMJqPOznh9KxEGe

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Deliverable 2 - Assessment Strategy

The purpose of this deliverable is to offer detailed guidance on developing an assessment strategy for evaluating reading skills. It presents an overview of various types of reading assessments, provides literature-based recommendations for measuring different subcomponents of reading, and suggests how to select and adapt existing assessments based on specific objectives.

Different Types of Reading Assessment

Assessments provide important information regarding each student's strengths and areas where additional practice and support are needed. There are **formal and informal tests** for measuring reading skills.

Formal tests are standardised with a norm – for example, all students of Grade 2 in Ghana. This means that there are benchmarks that allow for a comparison of a student's skill relative to the skills of peers in the same reference group (all Grade 2 students in Ghana in the example). If available, those formal tests are widely used by many schools in a context.

Important note with regards to early reading: Some authors (for example, those of TPRI Early Reading Assessment) would not recommend a comparison of a single child to Grade level because early reading development has a very high variability between children and progress may not be linear.

Informal tests are flexible and about a student's individual progress. The benchmark is individual development, and the goal is to show the process of skill acquisition in different areas. The scores are not compared between students as this is not the main goal. Qualitative data can be collected in addition to quantitative data.

There **are four major types of assessments**: Screening tools, diagnostic tools, progress monitoring tools and summative assessments. These types map onto a multi-tiered model of support, which is individualised support for each student with the complexity and intensity of the support targeted to each student's specific needs (that vary over time).

Screening Tools – Universal Screeners

These tests aim to identify students at risk of reading difficulties who need additional targeted support, according to a multi-tiered model of support (for example, see Medda et al., 2024).

Here is a list of academic screening tools that are used in the American context, including reading and numeric/math skills: https://charts.intensiveintervention.org/ascreening

An example that may be interesting for Inspiring Teachers is the TPRI Early Reading Assessment, whereby details and psychometric criteria can be found here: https://charts.intensiveintervention.org/screening/tool/?id=7274cdcc68462937

Another interesting example is ERA (Early Reading Assessment) with the three core subtests written word vocabulary, rapid orthographic naming, and silent orthographic efficiency for competencies regarding the alphabet, word identification, and word comprehension in silent and oral forms. Additional tests are available for phonological awareness and receptive vocabulary (understanding of common words). Those tests reveal an Early Reading Index that can be compared to norms/benchmarks.

Some free resources to check out are:

- DIBELS: Dynamic Indicators of Basic Early Literacy Skills https://dibels.uoregon.edu/materials and recommendations for dyslexic screenings:
- https://dibels.uoregon.edu/sites/default/files/2021-06/DIBELS%208th%20Edition%20Dyslexia%20White%20Paper.pdf
- The rapid online assessment of reading (ROAR, Yeatman et al., 2021)

→ It's important to recognise that effective screening involves multiple subtests covering a range of skill areas. As such, oral reading fluency alone is not sufficient. For example, in preschool assessments, skills like letter naming, letter sounds, phoneme segmentation, and nonsense word fluency are typically evaluated. In Years 1 and 2, widely recognised assessments often include measures of word reading accuracy, spelling, phonemic decoding efficiency, and sight word reading efficiency (see for example, Ives et al., 2018-2019).

Diagnostic Tests

These are more extensive tests that provide a *detailed profile* of each student's needs. Based on the profile that includes (if possible) all subdimensions of reading, *targeted support* can be planned. The diagnostic test is recommended if difficulties are observed or the scores of the screening tool were low.

An example of a detailed diagnostic tool is again the TPRI Early Reading Assessment, which consists of a screening section (with the subtests of letter sound, blending onset-rimes & phonemes and word reading) and the diagnostic/inventory section that results in a detailed profile of a student's skill. The subdimensions assessed include book and print awareness, phonemic awareness, graphophonemic knowledge, word reading, reading accuracy, fluency, and listening/reading comprehension. Importantly, there is a *toolbox with intervention activities* that are recommended *depending on a student's profile*, some of them can be downloaded under open access: https://childrenslearninginstitute.org/resources/tpri/

They also provide information on how they developed the test (more than 10 years of development) that may be of use to Inspiring Teachers.

Progress Monitoring Tools
These tools measure student progress throughout a period of time, for example during the school year or as part of an intervention. Tests can be administered weekly, monthly or between other intervals depending on the intensity of the training/instruction a student receives. This is a **formal test/part of formative assessment** and can be used to see whether an intervention is working well during the programme. See the overview of progress monitoring tools used in the American context.

An interesting novel testing approach to consider is **dynamic assessment**, which is different from static assessment and provides additional information (Spencer Kelley et al., 2025). This approach helps to better account for the possibility that some children will learn more throughout the programme (depending on their initial needs).

To address this issue, previous studies have examined progress over time—comparing performance across different points—to determine whether individuals are strong or weak responders to the intervention or targeted instruction (Kelly et al., 2018; Kelly & Goldstein, 2019). A newer approach is dynamic assessment, whereby either a teach-retest paradigm is used (assessment, brief teaching session, second assessment) or hierarchical prompting (providing children with prompts to determine their responsiveness by the level of prompts needed). Such dynamic tools are used to identify children with language disorders and have been shown to work well for *culturally and linguistically diverse* children.

Summative Assessments
These assessments evaluate student performance at the conclusion of a school year or an instructional period and are typically more extensive). Examples include end-of-unit tests within a reading programme or assessments conducted at the end of the programme (these assessments can also include diagnostic tests). Their primary purpose is to evaluate the performance and effectiveness of the instruction/programme.

Reading Assessments – Capturing Subdimensions of Reading and Development

Many tools exist for assessing various components of reading skills. However, no single assessment will provide detailed insights into all the reading-related skills. Many tools capture oral language, alphabet knowledge, phonological awareness, phonics, fluency, vocabulary, reading comprehension and writing. However, depending on the conceptual definition of reading skills used, these dimensions could be easily extended, for example with reading strategies or additional underlying skills.

The so-called Big 5 foundational skills of reading often cited encompass:

- ***Phonemic awareness*:** ability to focus and manipulate individual phonemes (the smallest unit of speed) in spoken words, for example, isolating phonemes (e.g., map has three sounds map), segment individual sounds and blend them together, isolate phonemes and change them to create different words. *Phonemic awareness* consists of phoneme isolation, blending, segmenting, addition, deletion, and substitution.
  → it is a subarea of the larger construct ***phonological awareness***, the awareness and ability to play with sound structures in oral language (words, syllables, onset-rimes, and sound levels). For example, knowing how many words are in a sentence, whether they rhyme, put together syllables to a word or identify the phonemes of a word heard orally
  → these skills are essential for recognising and decoding words, important for reading and for encoding, a prerequisite of writing (Fletcher et al., 2007; Seidenberg, 2017)

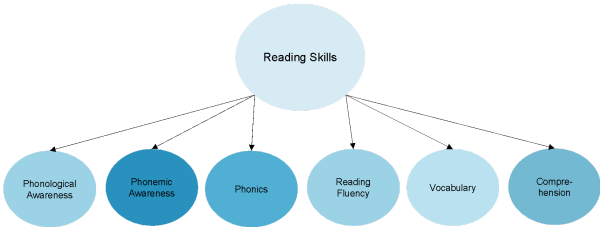
- ***Phonics:*** systematic relationship between heard sounds and graphemes (letters), for example understanding the alphabet, knowing about letter patterns; it is an important skill for decoding and reading (e.g. how do we read specific vocals in a word?); also helps to facilitate reading by sight (once word patterns are memorised)

- ***Reading fluency:*** reading with speed, accuracy and correct expression - it is related to phonemic awareness and phonics, as students who need more time to decode or make more mistakes are slower in reading and make more mistakes

- ***Vocabulary:*** All words to recognise and understand when reading, going from basic words used in everyday conversation to more complex contextual words (can be ambiguous), and domain-specific or low frequency words. This is the basis for reading comprehension and facilitates the reading process through automatisation (Marulis et al., 2010).

- ***Comprehension:*** Understanding and interpretation of the reading content (complex neuropsychological process), consisting of many different dimensions, such as lexical comprehension (key vocabulary), literal comprehension (who, what, where, when questions), interpretative comprehension (why/what if questions), applied comprehension (opinion based questions), and affective comprehension (perspective taking questions about the characters or the plot). According to reading scientists, comprehension is the gold standard of reading and if a child is only decoding, but not comprehend is not reading (see Castles et al., 2018 for a discussion).

A.



B.

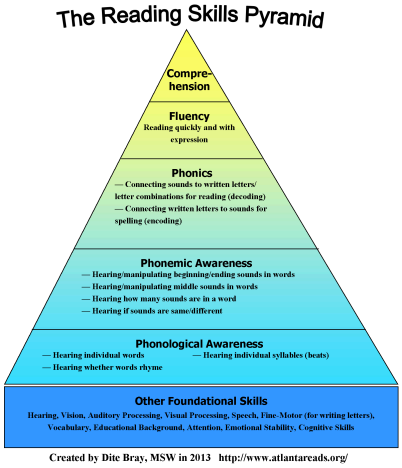


Figure 9. a) Big 5 of Reading - extended by phonological awareness and b) Reading skills pyramid

The role of different subdimensions of reading for reading development

It is important to consider that these subdimensions of reading are interrelated with each other throughout learning and development. For example, phonemic awareness and phonics are essential for reading fluently and decoding the words help to recognise them. Together with vocabulary, these processes together facilitate comprehension. When children start to learn how to read, phonological awareness and phonics are core processes. Researchers have created different models about the learning process, whereby decoding develops once children have acquired the principle on how the alphabet works (Castles et al., 2018). For such models see for example ***Ehri's phase theory*** (2017). During these early phases, teachers can specifically target their phonics instructions to children's needs (see Castles et al., 2018 for suggestions and myths proven wrong about phonics instruction).

More advanced readers still rely on decoding for more difficult or unfamiliar words, but there is a second mechanism becoming more and more important: gaining access to meaning directly from the spelling. This process is less demanding in terms of attention and enables faster reading and better comprehension (Castles et al., 2018). ***Computational models of reading*** that describe the cognitive operations in detail, for example the DRC Model (Coltheart et al., 2001), or the CDP+ Model (Perry et al., 2010).

It is important to understand that even after a reader can start to read a text more fluently, phonological awareness and phonemic are still core for reading (such as word identification and fluency and understanding; Blythe et al., 2015; Kirby et al., 2025; Rayner et al., 2014). *Hence, assessments and instruction should include these underlying components.*

During later phases, when readers can gain access to many words directly, morphological awareness and knowledge become more and more important as the child cannot

systematically map between spelling and meaning. Targeted instruction and enhancing students motivation to readcan support this phase (see Castles et al., 2018 for details).

Additional skills are also core to reading, such as executive functions, particularly working memory (keeping the content active for understanding), inhibition (keep distractors out, ignore contextually irrelevant information), and cognitive flexibility (switch between different perspectives; Castles et al., 2018). These additional skills are captured in more comprehensive models about reading, such as the ***Reading Systems Framework*** (Perfetti & Stafura, 2014) helps to better understand the processes involved in comprehension. Beyond linguistic and orthographic knowledge (including vocabulary), the processes of decoding, word identification, meaning retrieval, sentence parsing, inferring, and monitoring of comprehension are all working together to facilitate reading. They rely on additional cognitive resources, such as intelligence, memory and executive functions. In addition **metacognitive skills** are important for monitoring the reading process and facilitating comprehension (Castles et al., 2018; Forrest-Pressley & Waller, 2013; Pahrizal et al. 2025; Taouki et al., 2022).

Lastly, children also need to be **motivated** for reading, and it is important to be aware that difficulties to read can result in frustration and long-term social-emotional difficulties (Castles et al., 2018; Morgan et al., 2008).

The associations are complex, but determining in which aspects a child might need support could help to promote a targeted intervention.

Recommendations for the Oral Reading Fluency Tool

Ideas for Adapting and Further Developing the ORF Tool

1. **Consider a screening test or a more extensive diagnostic test in the beginning and dynamic assessment of specific subtests to determine response to intervention**
   This would help to identify the reading profiles of the students and suggest who may need a more targeted support and specifically target the instructions to their needs; the dynamic testing would help to identify how students respond to the intervention / instruction and would suggest who needs different approaches

2. **Monitor and demonstrate individual progress**
   The ORF tool aims to measure student progress and is a formative assessment tool. It could be extended by additional subtests to capture progress more broadly. Importantly, phonological skills and phonics are not only important for non-readers but also for readers; thus, progress in these areas should be tracked as well, along with vocabulary and nonsense words to reveal a more comprehensive picture of the big 5 reading skills

Student progress could be demonstrated for each student individually (as growth), given that it is a formative assessment tool. A second graphic could show the variance in growth and highlight students that are not improving or getting worse to the teachers.

3. **Identify different groups of students with different types of progress**
   If growth is shown, one could conduct growth analysis with the student data over time and inspect different growth trajectories (see for example, Cameron et al., 2024). If there are different groups of students, one could identify characteristics of students at risk and know about additional ways to target their support

4. **Participate approach to demonstrate the data according to teachers' needs**
   Research from Ghana shows that teachers are often unsure what a good reader is in (Opoku-Amanakwa et al., 2012). Therefore, focus groups with teachers could be conducted on what good readers are, how this can be measured and how to best represent the data for them to interpret and recommendations for targeted support. This participative approach would make it more likely that teachers know how to interpret the data.

5. **Target support according to students' needs**
   If a MTT approach is implemented, teachers can use the assessment to understand who needs more targeted support. Based on the students' reading profiles, the app could directly recommend specific activities for teachers or it could be used to discuss ideas to support students among experts.

6. **Assess students' reading motivation**
   The Inspiring Teachers team could consider assessing students' reading motivation as this is important for progress. The graphs about individual progress could be used to talk with the students about their progress or for them to plan their learning.

7. **Consider to collaborate with the ROAR team in order to adapt some of their subtests to the context Ghana - it is a silent reading test and easy to administer**
   The rapid online assessment of reading (ROAR, Yeatman et al., 2021) is a digital tool to assess reading fluency. The ROAR is well validated and widely used in the U.S., from kindergarten to 12th grade. It is a silent reading assessment - all students can take it simultaneously and no audio recordings are needed. No human scorers are needed for ROAR, hence it is an assessment that relies less on teachers and is easy to scale up.

   Compared to EGRA (see below), ROAR has a larger item pool available and automated scoring, leading to higher accuracy (Roncete et al., under review). Recently, two submodules of the test – single word recognition and sentence reading efficiency – have been adapted to a low resource context, Brazil, whereby these submodules have been tested for reliability and validity with a sample of 2651 students (Roncete et al., under

review). Similarly, subtests could be adapted for the context of Ghana (not only for the ORF tool but also for the planned RCT).

8. **Develop a Screening Tool for the Context of Ghana**
   Given the limited availability of Ghana-specific screeners, it may be beneficial for educational stakeholders in Ghana to adapt existing tools or develop new assessments that align with the linguistic and cultural nuances of the local context. Collaborations with organisations focused on literacy and education within Ghana can provide further guidance and resources in this endeavor.
   Here it is important to not only rely on oral reading fluency, since multiple components need to be assessed in order to identify students with dyslexia. In Years 1 and 2, widely recognised assessments often include measures of word reading accuracy, spelling, phonemic decoding efficiency, and sight word reading efficiency (see for example, Ives et al., 2018-2019). Such a test can still be easy to implement (see for example Zugarramundi et al., 2022).

Validation Strategy and Analyses

The validation of the ORF tool can be done when a more extensive test battery (summative assessment for construct validity) is used or standardised test scores (criterion validity) are assessed in the same sample where the ORF data is gathered. This data will potentially be available when the RCT post-test has been conducted.

Please see the example papers for how the validation of a reading test works in the measurement guide, and the analysis section in the measurement guide for details on the analyses.

Another example paper is the recent one of Roncete et al. (under review) for an example of how to adapt and validate tasks for a new context (e.g., by involving expert judges). They calculated the test-retest reliability, accuracy and used item response theory (IRT). For the validation of the subtests of the ROAR that they adapted to the Brazilian context, a standardised reading exam was used and the correlations were examined as well as the proficiency of readers in both tests.

With the Inspiring Teachers *ORF data collected until this moment*, it is possible to look at 1) correlations between oral reading fluency and comprehension at different time points (within-time correlations), 2) the distribution/variance at each time point of the measure, and 3) the stability of these measures (correlation of the same measures over time).

Moreover, it is possible to illustrate individual progress (and variance) of oral reading fluency and comprehension and whether they align. More complex analyses could be Cross-sectional-time-series-analyses looking at the overlap in growth (Cameron et al., 2024).

Measurement Recommendations for the RCT

For the planned RCT, we recommend to consider more extensive assessment batteries, such as ROAR (see information above on p. 28) or EGRA or additional subscales from diagnostic reading tools. We recommend to extend the measures by a subset of vocabulary (missing in EGRA) and to consider additional constructs that are core to comprehension, such as reading strategies (for an overview of studies and assessments, see for example, Lan et al., 2014). We recommend extensive piloting (not with the intervention sample) and checking for reliability in the pilot sample. If scales are adapted to the Ghanaian context, we recommend that expert groups are involved and that additional scales are measured alongside the new construct for the purpose of construct validation.

For additional concerns (types of hypotheses and designs, preregistration etc.), please have a look at the Measurement Guide. For making also null-findings informative and for determining who is benefiting most from the intervention, we recommend to include dynamic testing in the intervention group and assessing core variables that could moderate the effects of the literacy program.

Helpful Links to Resources:

Reading

EGRA: Early Grade Reading Assessment in Ghana

- https://www.earc-ghana.com/projects/details/early-grade-reading-assessment-and-early-grade-mathematics-assessment
- https://ierc-publicfiles.s3.amazonaws.com/public/resources/Ghana%202015%20EGRA-EGMA_22Nov2016_FINAL.pdf
- A critical review on EGRA: https://publicationsncte.org/content/journals/10.58680/rte201219761

Reading interventions and assessment in Africa

- Measuring reading comprehension - study from Kenya: https://onlinelibrary.wiley.com/doi/10.1111/1467-9817.12285
- Important considerations for teaching and assessing independent reading skills in multilingual African countries https://link.springer.com/chapter/10.1007/978-94-6209-218-1_14
- Review on the inclusion of children with learning difficulties in literacy and numeracy in Ghana: https://www.tandfonline.com/doi/full/10.1080/1034912X.2020.1792419
- Evaluation of the Quality Preschool for Ghana: https://psycnet.apa.org/doiLanding?doi=10.1037%2Fdev0000843

- Study on early grade reading in Kenya http://41.89.101.166:8080/handle/123456789/17298
- https://www.ghanabooktrust.org/monitoring-evaluation/
- Phone based literacy assessment in Cote d' Ivoire: https://ila.onlinelibrary.wiley.com/doi/10.1002/rrq.511
- Ghanaian teachers observing reading skills: https://www.researchgate.net/publication/364055279_Aspects_of_kindergartners'_reading_and_writing_skills_assessed_by_kindergarten_teachers_in_the_Atwima_Kwanwoma_District_Ghana
- Academic performance of lower primary school children in Ghana: https://journals.sagepub.com/doi/10.1177/2158244018797019

Reading interventions and early literacy assessment in other contexts

- Growth trajectories of early readers in New Zealand https://psycnet.apa.org/doiLanding?doi=10.1037%2Fspq0000563
- Reading comprehension: Full article on "The Impact of Item Dependency on the Efficiency of Testing and Reliability of Student Scores From a Computer Adaptive Assessment of Reading Comprehension"

Informative online module on reading assessments:

- Assessment: Introduction | Reading Rockets

Rapid Online Assessment of Reading, ROAR:

- Rapid Online Assessment of Reading
- The appendix provides an overview of reading assessments that were used to validate ROAR in Brazil, see p. 40 (the assessments are for Brazil, but may give ideas for Ghana). https://www.researchsquare.com/article/rs-5516837/v1

TPRI Assessment and Toolbox with Open Access Resources:

- TPRI Early Reading Assessment – Children's Learning Institute Main Site

Multi-Tier Intervention and Response to Intervention:

- Challenges, gaps, applications and solutions of using MTIs: https://www.sciencedirect.com/science/article/pii/S0885200621000405
- Checklist for Using RTI to promote reading: https://www.readingrockets.org/topics/rti-and-mtss/articles/checklist-using-rti-promote-reading-achievement

- Example video for the Response to Intervention Approach (RTI): https://www.youtube.com/watch?v=2IoLM6FrYzs
- Evaluation example of an RTI Intervention in elementary school reading (including scientists from the University of Washington): https://ies.ed.gov/use-work/resource-library/report/evaluation-report/evaluation-response-intervention-practices-elementary-school-reading

Metacognition and reading

- Reading strategies and reading comprehension: https://www.jstor.org/stable/jeductechsoci.17.4.186?seq=1
- Metacognition and reading comprehension: https://www.jstor.org/stable/23421392?seq=1
- Metacognition, executive functions, and reading - an intervention study: https://www.jstor.org/stable/41827183?seq=1
- Inhibitory control and reading comprehension: https://www.jstor.org/stable/43497159?seq=1

Important additional topics

The role of the family environment for reading in Ghana (the study also used EGRA to measure literacy):

- The role of home environments in children's literacy skills in Ghana: Parents, siblings, and books - ScienceDirect
- Executive function, reading, and social adjustment problems: https://www.jstor.org/stable/10.5406/amerjpsyc.134.1.0061

Mathematics / Numeracy

Additional articles an the role of metacognition:

- Metacognition as a mediator of the relation between family SES and language and mathematical abilities in preschoolers | Scientific Reports

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Deliverable 3 - Analysis of User Feedback

Deliverable 3 presents the results of data collected from school leaders and teachers regarding their experiences with the SmartCoach Application, the Inspiring Reading programme and the Literacy Training programme. The results are organised into three sections based on these programmes. For each programme, detailed information on the areas assessed, key findings, and further recommendations have been provided.

SmartCoach Application

Feedback on user experience with the SmartCoach App were collected across six thematic areas, including respondent backgrounds, ease of use and design, and the app's effectiveness in teaching and learning. Additional feedback focused on the app's features and functionality, overall user satisfaction, and suggestions for future improvements. The analysis further includes input on support, training, and potential feature enhancements.

1. Background Data of Participants

A total of 37 participants took part in the study, with 14 (37.8%) being school leaders and 23 (62.2%) being teachers. Of these respondents, 19 (51.4%) reported previous use of the SmartCoach App, while 16 (43.2%) were first-time users. Thus, the participant group includes both experienced users and first-time users, with more than half having prior experience with the SmartCoach App. This balance allows for valuable feedback on the app's usability and effectiveness, from both familiar users and those new to the platform. The mix of school leaders and teachers also provides insights from both strategic and operational perspectives (see Figure 10).

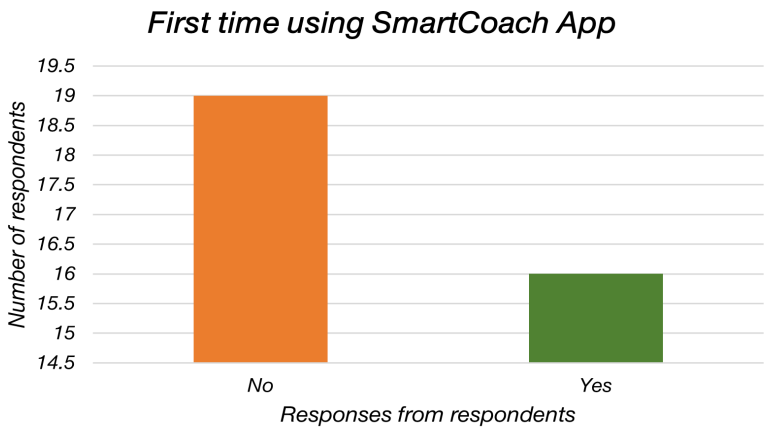


Figure 10. Distribution of responses by participants on being new to the SmartCoach App.

2. Ease of Use and Design

Information on 'Ease of Use and Design' was gathered to evaluate the overall user experience, focusing on how simple and intuitive the app is to navigate, as well as identifying any technical difficulties users may have faced. Key questions focused on users' ratings of the app's ease of use, the intuitiveness of its design and navigation, and whether they experienced any technical issues such as bugs or crashes. The findings are summarised in Table 2.

Table 2: Ease of Design and Navigation

Items	Ratings		Frequency	Percent
How would you rate the ease of use of SmartCoach?	Valid	1	2	5.4
		2	2	5.4
		3	5	13.5
		4	15	40.5
		5	12	32.4
		Total	36	97.3
	Missing	System	1	2.7
How intuitive is the app's design and navigation?	Valid	1	2	5.4
		2	1	2.7
		3	5	13.5
		4	16	43.2
		5	10	27.0
		Total	34	91.9
	Missing	System	3	8.1
Have you experienced any technical issues (e.g., bugs, crashes) while using SmartCoach?	Valid		1	2.7
		No	25	67.6
		Yes	11	29.7
		Total	37	100.0

Most respondents found SmartCoach easy to use, with 40.5% rating it 4/5 and 32.4% giving it a 5/5. This indicates that the overall interface is effective and user-friendly for the majority. However, a few participants (24.3%) gave it a lower rating of 3 or below, suggesting that some users may have faced minor difficulties in navigating the app. This points to an opportunity to enhance the user experience further, perhaps through more guided tutorials or in-app support features.

Feedback on the app's design and navigation were seen as intuitive by most users, with 43.2% rating it 4/5 and 27.0% rating it 5/5. These responses suggest that users generally find the

layout logical and easy to follow. However, some respondents rated it lower (13.5% gave it a 3 or below), and 8.1% did not respond, which may indicate that certain design elements are not immediately clear to everyone. Minor improvements to visual structure or user guidance could help increase confidence and ease of use across the board.

Regarding technical performance, 67.6% of respondents reported no issues, which is encouraging. However, nearly 30% indicated they had experienced technical problems such as bugs or crashes. This highlights an important area for improvement. Ensuring greater app stability through debugging and regular maintenance would likely enhance user satisfaction and prevent disruptions during use.

3. Effectiveness In Teaching and Learning

Additional data was gathered to evaluate the impact of the SmartCoach App on student engagement, learning, and teaching practices. Sixteen participants gave the app a perfect 5/5 rating for how well it met their needs for teacher coaching and support, while 27.0% rated it 4/5. Although 3 participants did not provide feedback on the app's effectiveness in improving teaching outcomes, 20 participants (54.1%) rated it 5/5 for its impact on teaching outcomes. A similar percentage, 54.1%, rated the app as effective in helping them set goals and improve their teaching methods. Regarding student engagement and learning, 18 participants gave the app a 5/5 rating, and 27.0% rated it 4/5. While 5 respondents did not report any improvements in their teaching practices, 83.8% (31 participants) indicated they had seen improvements since using the SmartCoach (see Table 3).

Table 3: Effectiveness in Teaching and Learning

Item	Rating	Frequency	Percent
How well does SmartCoach meet your needs for teacher coaching and support?	1	3	8.1
	2	3	8.1
	3	4	10.8
	4	10	27.0
	5	16	43.2
	Total	36	97.3
	Missing	1	2.7
How effective has SmartCoach been in improving your teaching outcomes?	Total	37	100.0
	1	1	2.7
	3	4	10.8
	4	9	24.3
	5	20	54.1
	Total	34	91.9
	Missing	3	8.1
	Total	37	100.0

How effective is SmartCoach in helping you set goals and improve your teaching methods?	2	3	8.1
	3	4	10.8
	4	8	21.6
	5	20	54.1
	Total	35	94.6
	Missing	2	5.4
	Total	37	100.0
How has SmartCoach impacted student engagement and learning in your classroom?	1	1	2.7
	3	3	8.1
	4	10	27.0
	5	18	48.6
	Total	32	86.5
	Missing	5	13.5
	Total	37	100.0
Have you seen improvements in your teaching practice since using SmartCoach?	No	1	2.7
	Yes	31	83.8
	Total	32	86.5
	Missing	5	13.5
	Total	37	100.0

These results imply that the SmartCoach App is a valuable tool for teachers seeking support and guidance in enhancing their instructional strategies, ultimately leading to improved learning experiences for students. However, the feedback also highlights areas that may require additional attention or refinement, such as addressing the concerns of the few participants who did not report improvements in their teaching practices or engagement levels. Overall, the results demonstrate the app's potential to contribute significantly to both teacher development and student success.

4. Features and Functionality

Data was collected on the app's 'Features and Functionality' to evaluate the various features and their impact on enhancing teaching practices. The data focused on areas such as: the most frequently used SmartCoach features, the effectiveness of the coaching system in improving teaching, the ease of using the Observation Tools to track teaching progress, the usefulness of the Progress Tracking feature in monitoring performance, and the frequency with which SmartCoach is used for planning and tracking teaching goals. The results are presented below:

4.1. Which SmartCoach features do you use most frequently?

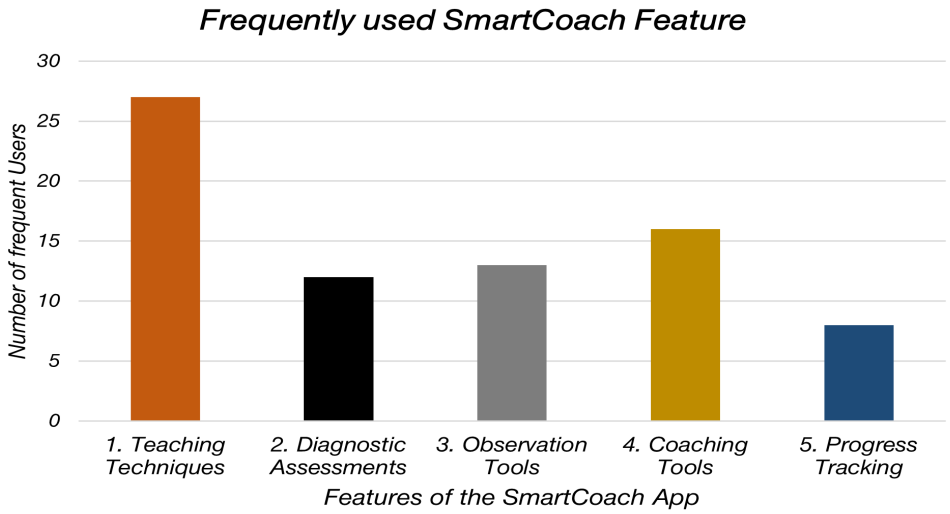


Fig 11. Distribution of the frequently used feature of the SmartCoach App

The results in Figure 11 show that the most used feature is Teaching Techniques, with 27 teachers using it regularly. Coaching Tools are also popular, used often by 16 teachers. This suggests that these two features are especially helpful to teachers. Diagnostic Materials are used by 12 teachers. Observation Tools are used by 13 teachers, while only 8 use the Progress Tracking feature. This means some tools are used a lot, while others are less utilised by the teachers. Overall, the results suggest that while many teachers find the app useful for improving their teaching, there is a chance to encourage more use of the diagnostic and progress-tracking tools.

4.2. Features and Functionality of the SmartCoach App

This theme focuses on how teachers experience and evaluate specific features of the SmartCoach App. It looks at three main areas: the usefulness of the coaching system for improving teaching, the ease of using the observation tools to track progress, and the helpfulness of the progress tracking feature for monitoring performance. (see Table 4 for results)

Table 4: Features and Functionality of the SmartCoach App

			Frequency	Percent
How useful do you find the coaching system for improving your teaching?	Valid	1	4	10.8
		3	4	10.8
		4	5	13.5
		5	22	59.5
		Total	35	94.6
	Missing	System	2	5.4

Total			37	100.0
How easy is it to use the Observation Tools to track teaching progress?	Valid	1	2	5.4
		2	2	5.4
		3	4	10.8
		4	16	43.2
		5	5	13.5
		Total	29	78.4
	Missing	System	8	21.6
Total			37	100.0
How helpful is the Progress Tracking feature for monitoring your performance?		1	2	5.4
		2	4	10.8
		3	5	13.5
		4	11	29.7
		5	10	27.0
	Valid	Total	32	86.5
	Missing	System	5	13.5
Total			37	100.0

The results indicate that the coaching system of the SmartCoach App is generally perceived as highly effective. A majority of respondents (59.5%) rated the system as "5 – Very Useful," with an additional 13.5% rating it as "4 – Useful." Only 21.6% of respondents provided lower ratings, suggesting that the system is widely regarded as a valuable tool for improving teaching effectiveness. The strong positive feedback supports the continued use and potential expansion of this feature, as it appears to play a key role in enhancing teaching practices.

In contrast, the observation tools designed to track teaching progress received more varied feedback. While 43.2% of respondents rated these tools as "4 – Helpful" and 13.5% as "5 – Very Helpful," a notable proportion (21.6%) rated them below a 4, indicating that a significant number of users experienced challenges with the tools' ease of use. Additionally, the high rate of missing responses (21.6%) suggests that some users either struggled to engage with the feature or encountered technical difficulties. These findings imply that further improvements may be needed to enhance the usability of the observation tools, such as clearer guidance or interface adjustments.

The progress tracking feature was also generally rated positively, with 27% of respondents rating it as "5 – Very Helpful" and 29.7% rating it as "4 – Helpful." However, 13.5% of respondents provided lower ratings, indicating that the feature may not fully meet the needs of all users. Despite this, the overall positive responses suggest that the progress tracking

functionality is an important aspect of the app that warrants continued attention, with potential adjustments aimed at addressing the concerns of the smaller group of dissatisfied users.

4.3. How often do you use SmartCoach for planning and tracking teaching goals?

Twelve participants use the SmartCoach app weekly, while 8 use it daily. Four use it less than once a week, and 11 use it several times a week. These results show that most users engage with the app regularly, but some may not fully integrate it into their routines, possibly due to time constraints or limited engagement with the app's features.

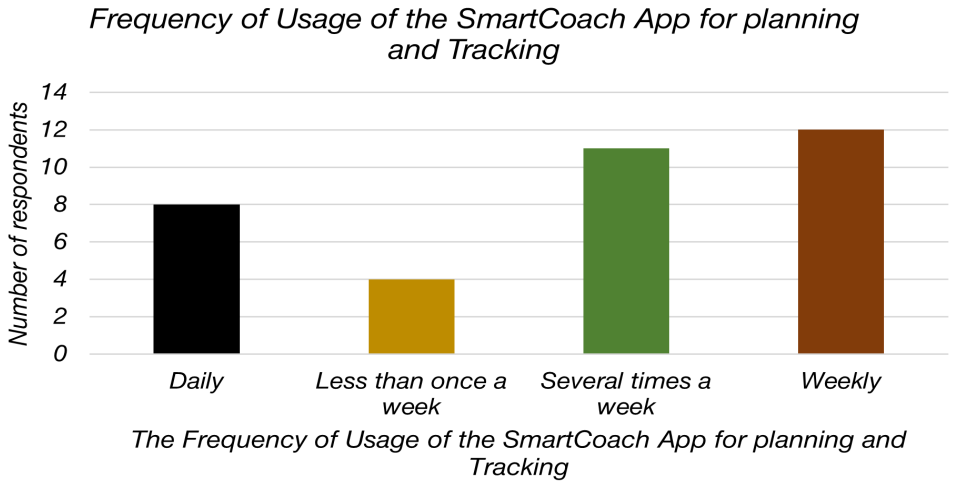


Figure 12. Distribution of the frequency of usage of the SmartCoach App for planning and tracking teaching goals

5. Support, Training, and Feature Suggestions

To evaluate user support, training, feature engagement, and areas for improvement, three key questions were asked. These questions explore users' experiences with the training they received on using SmartCoach, the accessibility and effectiveness of available support and resources, and the quality of their interactions with the support team. Together, they provide insight into the overall user experience and highlight opportunities for enhancement.

5.1. Helpfulness of the training received on using SmartCoach

The helpfulness of the training provided on using the SmartCoach app was highly rated by the participants. Out of 35 respondents, 23 participants (65.7%) rated the training as "5 – Very Helpful," while 9 participants (25.7%) rated it as "4 – Helpful." Only 3 participants (8.6%) rated it lower, indicating that a small minority did not find the training as beneficial. The predominance of high ratings (91.4% of respondents rated it 4 or higher) strongly suggests that the training effectively met the needs of the majority of users. This suggests that the training not only

helped users become familiar with the app but also provided sufficient support to enhance their teaching practices (see Figure 13).

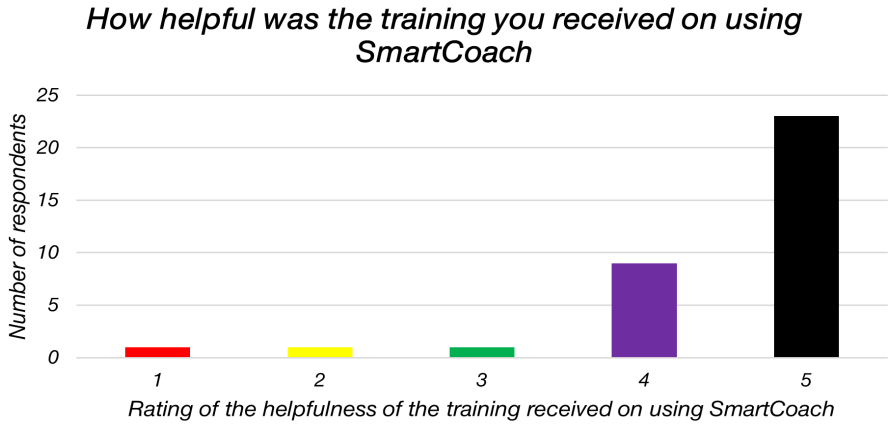


Figure 13. Distribution of the rating of the helpfulness of the training received on using SmartCoach

5. 2. Accessibility of Support and Resources in Case of Issues

A total of 15 participants (40.5%) rated accessibility as "5 – Very Easy," indicating that they find it highly convenient to access support or resources through the SmartCoach platform. An additional 12 participants (32.4%) rated it as "4 – Easy," suggesting that they also encountered minimal difficulty in accessing assistance. Four participants (10.8%) rated accessibility as "3 – Neutral," reflecting a moderate or mixed experience. These results suggest that the majority of users perceive the platform as accessible, although a small proportion may benefit from enhancements to ensure consistent ease of access for all users.

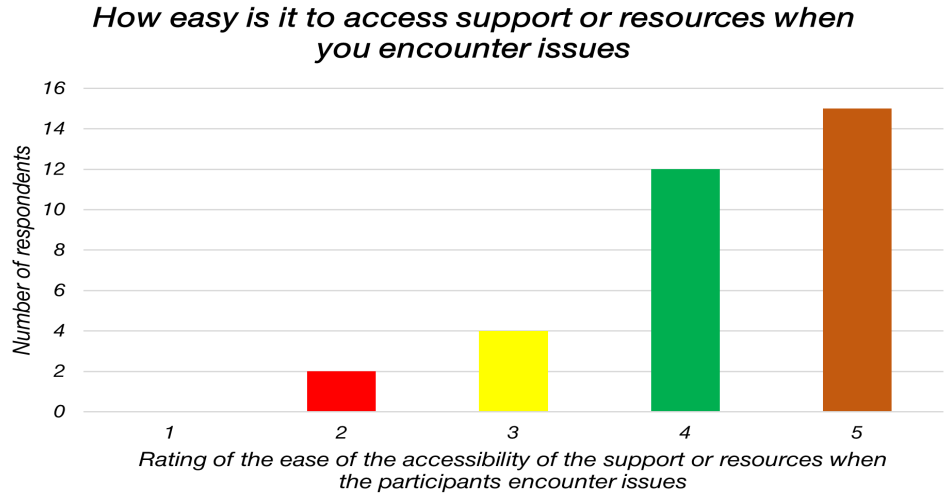


Figure 14. Distribution of the rating of the ease of the accessibility of the support or resources when the participants encounter issues.

5.3 Interaction with Support Team

The interaction with the support team appears to be mostly positive. 15 participants (40.5%) rated their experience with the support team as 5/5, implying they had a very positive experience and were highly satisfied with the assistance provided. Another 10 participants (27.0%) rated it 4/5, suggesting they were generally satisfied but may have encountered some minor issues or feel there is room for improvement. Additionally, 4 participants (10.8%) rated it 3/5, implying a more neutral experience, where the support provided may have met basic expectations but did not exceed them. Overall, the feedback indicates that the support team is generally well-received, though there's potential to further enhance the experience for a small group of users.

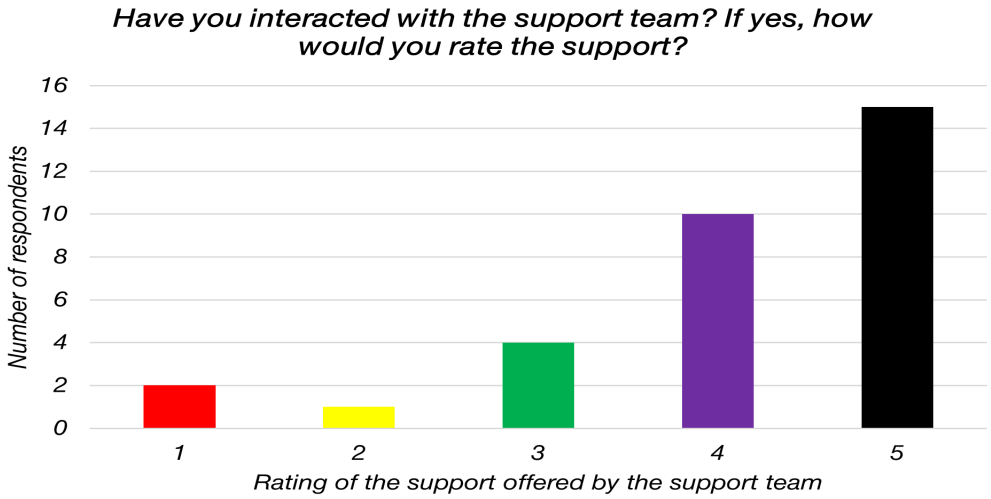


Figure 15. Distribution of the rating of the participants' interaction with the support team support

6. Overall Satisfaction and Future Improvements

To capture overall user sentiment, questions were designed to assess satisfaction, ease of use, and likelihood of recommending the platform. These questions help identify strengths and guide future improvements.

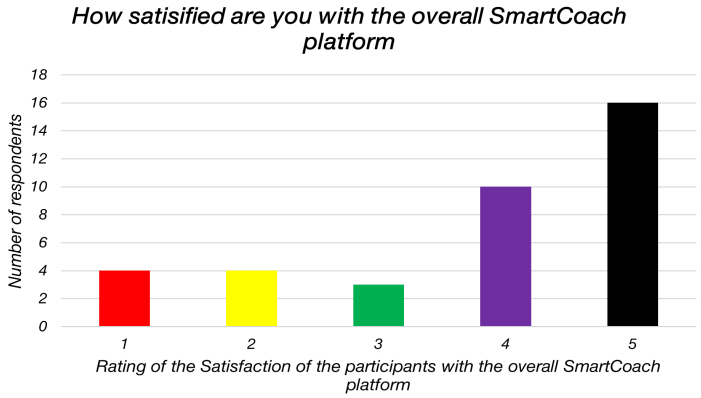


Figure 16. Distribution of the rating of the satisfaction of the participants with the overall SmartCoach platform.

6.1. Satisfaction with SmartCoach

Sixteen (16) participants representing the majority (43.2%) rated their satisfaction with the SmartCoach app as 5/5, indicating a high level of satisfaction, while 10 participants (27.0%) rated it 4/5, showing they were also pleased.

However, four users rated the app 2/5, and another four rated it 1/5, indicating a clear level of dissatisfaction (see Figure 16). These contrasting responses suggest that while most users view the app favorably, a minority may have experienced issues related to functionality, usability, or relevance, warranting further investigation to address their concerns and improve overall user satisfaction.

6.2. Likelihood to recommend SmartCoach

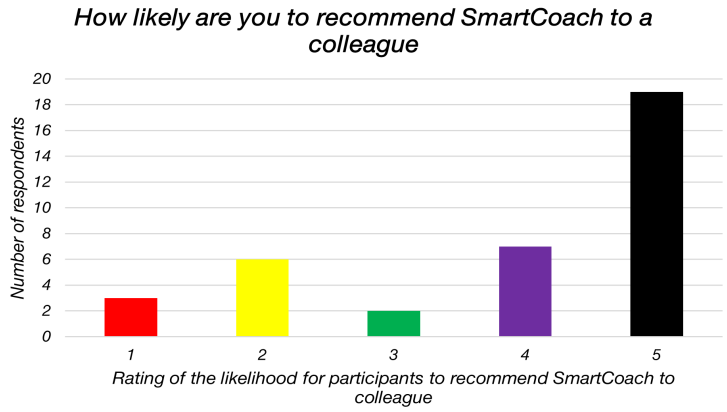


Figure 17. Distribution of the rating of the likelihood for participants to recommend SmartCoach to colleague

The results from Figure 17 indicate participants' likelihood of recommending the SmartCoach app to a colleague. A majority of respondents—19 participants (51.4%)—rated their likelihood as "5 – Extremely Likely," suggesting strong endorsement of the app among over half of the users. An additional 7 participants (18.9%) selected a rating of 4, indicating that they are also inclined to recommend the app, albeit with slightly less conviction. Combined, nearly 70% of participants provided a positive response (ratings of 4 or 5), reflecting a generally favorable perception of the app's value and utility.

In contrast, 6 participants (16.2%) rated their likelihood of recommending the app as 2, and 3 participants (8.1%) gave the lowest possible rating of 1, signifying reluctance or unwillingness to recommend the app. A smaller group (5.4%) provided a neutral rating of 3, neither endorsing

nor rejecting the app. These findings suggest that while the majority of users are highly satisfied and likely to advocate for SmartCoach, a minority remain unconvinced of its benefits, which may point to individual differences in experience, expectations, or context of use. Addressing the concerns of this minority could further strengthen the app's overall reception and broaden its impact through peer recommendation.

6.3. Satisfaction with the offline functionality of SmartCoach

While a majority of users (around 51.3%) rated their satisfaction as 4 or 5, indicating a generally positive experience with the offline functionality, there is still a notable portion (about 18.9%) who are dissatisfied (rating it 1 or 2). This suggests that although the offline feature is working well for many, there may be issues that need addressing for a smaller group of users.

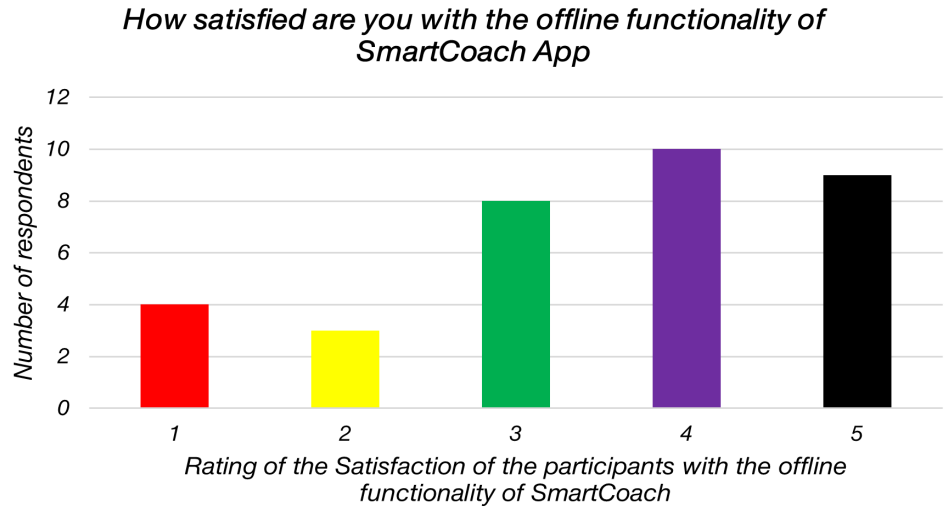


Figure 18. Distribution of the ratings of the satisfaction of the participants with the offline functionality of SmartCoach

6.4 What additional features or improvements would you like to see in the SmartCoach?

The participants recommended the need for offline access and downloadable content due to difficulties using the app during meetings or training sessions. They also suggested less frequent updates, ideally every three months, and reported stability issues during meetings and training sessions. Again, they emphasised the need for tutorial videos to help them navigate the app more easily. Some participants also requested better explanations to improve their understanding of certain features. Additionally, they requested additional resources like lesson plans, numeracy materials, letter pronunciation guides, songs, and downloadable teaching content, including videos. Lastly, they valued the app's features for teaching and learning, with some finding it perfect and others suggesting minor improvements for better usability.

Summary of Key Findings and Recommendations

Feedback from school leaders and teachers indicates that the SmartCoach App is generally well-received, with many users finding it user-friendly, intuitive, and effective in supporting teaching and learning. The app has been instrumental in helping educators improve their teaching practices and increase student engagement. The most commonly used features include the Teaching Techniques and Coaching Tools. Other features like the observation tools and progress tracking are used less frequently, possibly due to limited awareness, technical challenges, or inconsistent access to training. While some users reported regular engagement with the app, others noted that they use it only occasionally, suggesting that there may be barriers—such as time constraints or unfamiliarity with certain features—that prevent full integration into their teaching routines. Training on how to use the app was generally viewed as helpful, and many participants expressed satisfaction with the accessibility and quality of support available to them. These positive experiences point to a solid foundation in user support, which should be maintained and enhanced.

However, one major concern that stood out was dissatisfaction with the app's offline functionality. Although a number of users were content with the current offline features of the app, a significant portion clearly indicated frustration. In Ghana, where internet access is often limited or unreliable (Selby, 2024; Kpessa-Whyte & Dzisah, 2022), this poses a serious barrier. Some users noted that they were unable to effectively use the app during meetings or training sessions due to poor connectivity. This makes it essential for the offline capabilities of SmartCoach to be strengthened so that educators in all regions, regardless of connectivity, can benefit from the platform's resources without interruption.

Based on the findings, it is recommended that:

- The app's offline functionality is enhanced, to enable users access essential teaching materials (such as coaching content, lesson plans, diagnostic tools, and progress trackers) without requiring an internet connection.
- Downloadable resources, including literacy and numeracy materials, letter sound guides, songs, and instructional videos, are provided to ensure educators can teach effectively even in offline settings.
- The app's stability is improved to prevent lagging or crashes, to create a smoother user experience.
- Tutorial videos and in-app guidance are integrated to assist users in navigating and utilising the app's features more effectively, especially for first-time users or those less confident with technology.
- The frequency of updates is reduced to avoid disruptions. Updates could be scheduled quarterly and accompanied by clear instructions.

- More consistent use of underutilised features, such as observation tools and goal tracking, is encouraged through targeted training or reminders to highlight their benefits.
- Ongoing feedback collection from users is prioritised to ensure SmartCoach continues to meet their evolving needs and remains a reliable tool for improving educational outcomes across Ghana.

Inspiring Reading programme

In addition to feedback on the Smartcoach App, data was also collected to evaluate participants' experiences with the Inspiring Reading Programme (IRP). The evaluation focused on key areas such as teacher competence, material usability, lesson delivery, learner progress, and overall programme effectiveness. The areas assessed offer a comprehensive understanding of the impact of the programme, highlighting both its strengths and areas for improvement. The results and findings are outlined in detail below.

1. Teacher Competence and Confidence

This theme sought to evaluate teachers' self-assessed skill levels and their confidence following engagement with the IRP. Data was gathered on a range of instructional capabilities, including confidence in teaching vocabulary, guiding learners in extracting information from texts, supporting phonemic awareness through segmenting and blending letter sounds, and presenting written content clearly on the board. In addition, the survey examined teachers' self-efficacy in helping students construct meaningful, grammatically correct sentences and their perceived preparedness to implement the programme independently in the future. Other areas assessed were interpreting results to inform instructional adjustments, and administering 1–1 Oral Reading Fluency assessments. The results are summarised in Table 5.

Table 5: Items grouped under theme, “Teacher Competence and Confidence”

	The programme has helped me to feel more confident to teach vocabulary.	The programme has helped me to feel more confident to help learners get answers from the text.	The programme has helped me to feel more confident to help learners segment/blend the letter sounds of a word.	The programme has helped me to feel more confident to write well on the board.	The programme has helped me to teach the learners how to compose meaningful and grammatically correct simple sentences.	I would feel confident following the programme next term if I was given the teacher guides without support	I feel confident completing the weekly class assessments and understand how to use this information to help my teaching.	I feel confident running 1-1 Oral Reading Fluency assessments	Total
Strongly Agree	30 (57.70%)	24 (46.20%)	34 (65.40%)	26 (50.00%)	17 (32.70%)	11 (21.20%)	23 (44.20%)	12 (23.10%)	150 (36.06%)
Agree	20 (38.50%)	25 (48.10%)	17 (32.70%)	25 (48.10%)	31 (59.60%)	37 (71.20%)	25 (48.10%)	36 (69.20%)	216 (51.92%)
Neutral	1 (1.90)	1 (1.90%)	0 (0.00%)	0 (0.00%)	3 (5.80%)	0 (0.00%)	1 (1.90%)	1 (1.90%)	7 (1.68%)
Disagree	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	2 (3.80%)	1 (1.90%)	1 (1.90%)	4 (0.96%)
Strongly Disagree	1 (1.90%)	1 (1.90%)	1 (1.90%)	1 (1.90%)	1 (1.90%)	2 (3.80%)	1 (1.90%)	1 (1.90%)	8 (1.92%)
Missing	0 (0.00%)	1 (1.90%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (1.90%)	1 (1.90%)	3 (0.72%)
Total	52 (100.0%)	52 (100.0%)	52 (100.00%)	52 (100.00%)	52 (100.0%)	52 (100.0%)	52 (100.0%)	52 (100.0%)	416 (100.0%)

The data presented in Table 5 highlights a highly favourable perception of the programme's impact on various teaching aspects, with over 88% of responses falling within the "Strongly Agree" or "Agree" categories. Teachers expressed the highest confidence in "helping learners segment/blend the letter sounds of a word," with 65.4% strongly agreeing and an additional 32.7% agreeing. This indicates the programme's effectiveness in enhancing phonemic instruction, which is critical for early literacy development. Similarly, there was a high level of confidence in vocabulary instruction, with 57.7% strongly agreeing and 38.5% agreeing. This shows that the majority of teachers felt better prepared to expand their students' word knowledge. Positive responses were also noted regarding text comprehension skills, with 46.2% strongly agreeing and 48.1% agreeing. Thus, participants expressed more confidence in helping learners extract answers from text, an essential component of reading comprehension. Confidence in presenting content legibly on the board was also notable, with 50.0% strongly agreeing and 48.1% agreeing. To summarise, the programme did not only strengthen pedagogical techniques but also improved practical classroom routines.

It is worth noting that although a majority of the respondents expressed confidence in the literacy programme, slightly fewer felt completely confident in independent or assessment-related tasks. For instance, only 21.2% strongly agreed that they would feel confident implementing the programme without support, although 71.2% agreed. Similarly, only 23.1% strongly agreed with their ability to administer 1–1 Oral Reading Fluency assessments, but 69.2% agreed. Again, 1.68% of responses were neutral, 0.96% disagreed, and 1.92% strongly disagreed. This pattern of results indicate that although the programme is generally effective, there is still a small group of participants that may be facing challenges with it possibly due to contextual factors, varying prior experience, or individual learning needs.

2. Programme Materials and Usability

Data was also collected to measure the usefulness and impact of the programme materials on teaching and learning. Other questions were asked to assess parts of the programme that teachers find most helpful, as well as any additional support they would like to enhance their experience. Teachers were also asked about the ease of use of the teacher guides and how they might be improved to make them more accessible. The cultural appropriateness of the stories and programme materials was assessed and teachers provided feedback on how the programme could be made more relevant to the cultural context of the learners. Further, teachers were asked how the Learner Workbook could be improved, what changes could be made to the assessments, and how the programme materials compare to those used in their previous teaching. The findings are presented below:

2.1. Which part of the programme have you found the most helpful so far?

The results in Table 6 show that half of the participants (50%) found all components of the programme—including coaching, learner workbooks, teacher guides, and training sessions

equally helpful. Among specific components, the teacher guides were identified as the most helpful by 23.1% of respondents, followed by the training sessions (21.2%). These results highlight the value teachers place on structured instructional support and professional development. Only a small percentage selected coaching through in-school visits (3.8%) and the learners' workbook (1.9%) as the most helpful aspects, which may suggest these components are either less impactful on their own or less consistently experienced.

Table 6: Which part of the programme have you found the most helpful so far?

	N	%
All of the above	26	50.0%
Coaching (in-school visits)	2	3.8%
Learners' workbook	1	1.9%
Teacher Guides	12	23.1%
Training sessions	11	21.2%

2.2. What Additional Support would you like from us?

When asked what additional support participants would like, they provided several insightful suggestions:

i. The need for more training sessions and workshops.
ii. Organising the programme more regularly, ideally once a month, to maintain momentum and consistent engagement.
iii. Frequent visits to schools were mentioned as a way to provide hands-on support and encouragement.
iv. Access to teaching and learning materials to enhance classroom instruction.
v. Including familiar songs in the programme to make learning more engaging and relatable for students.
vi. A dedicated component of the programme focused on classroom management was recommended, possibly due to the challenges teachers face in maintaining a productive learning environment.

2.3 The teacher guides are easy to use.

In response to the question of whether the teacher guides are easy to use, 51 teachers (98.1%) agreed that they are (see Table 7).

Table 7: The teacher guides are easy to use.

	N	%
Strongly agree	22	42.3%
Agree	29	55.8%
Strongly disagree	1	1.9%

A follow-up question explored ways to make the guides even more user-friendly. While some teachers felt the guides were fine as they are, others recommended improvements such as 'Provision of more workshops and coaching', 'Use of Phonics', 'Provision of guide in a hardcopy form', 'Provision of more explanations and demonstrations', 'Provision of more time and 'Good content structuring'. These suggestions reflect a desire for continued support and refinement, even for a tool already regarded as user-friendly.

2.4 The stories and programme materials are culturally appropriate.
Participants were asked to share their views on the cultural relevance of the stories and programme materials (see Table 8) and to provide suggestions on how to further increase the cultural relevance of the programme materials.

Table 8: The stories and programme materials are culturally appropriate.

	N	%
Strongly agree	12	23.1%
Agree	37	71.2%
Neutral	1	1.9%
Disagree	1	1.9%
Strongly disagree	1	1.9%

The results indicate that most of the participants [49 (94.3%)] find the content of the materials as culturally appropriate. As a follow-up, some participants suggested that organising more workshops, increasing the time for lesson delivery, relating lessons to the local setting of the students, incorporating of moral values, cultural stories and local characters in the various stories and using more local songs, reading and writing, will further strengthen the cultural relevance of the programme.

They also suggested the learner's workbook could be improved by:

i. Providing more activities for learners
ii. Incorporating learner guides
iii. Including more visuals
iv. Increasing activities on reading, writing, and comprehension
v. Reducing the length of text.

If these suggestions are considered, the workbook will meet the diverse learning needs of students, making it more engaging, accessible, and effective in supporting the development of core literacy skills.

The respondents further suggested that the assessments could be improved by:

i. Adding more writing
ii. Blending of letters to form words
iii. Drawing, using visuals

iv. Increasing the number and the time for exercises and
v. Decreasing the difficulty level of the assessments

2.5. Compared to how you used to teach English, I feel these materials for the learners are….''.

This question sought to understand how teachers perceive the learner materials in relation to what they have experienced previously (see Table 9).

Table 9: Compared to how you used to teach English, I feel these materials for the learners are:

	N	%
About the same	2	3.8%
Better	50	96.2%

From Table 9 96.2% of the teachers feel the Inspiring Teachers materials for the learners are better than the materials they used to teach English previously. Thus, the current materials were deemed more effective and better support English language instruction, improving both teaching and learning experiences.

The teachers found the programme materials very helpful, especially the teacher guide. The majority agreed the programme was culturally appropriate. To further enhance the cultural appropriateness of the programme, the participants made the following suggestions:

- More training and workshops
- Incorporation of visuals in learners' workbook and assessment
- Increase in the number of exercises on reading, writing and phonics
- Improve the usability of the learners' workbook and the assessments.

3. Lesson Delivery and Time Management

Three key questions were used to measure the elements that are challenging for lesson delivery and the estimated time used to deliver a lesson. The results are presented below.

3.1 What element do you find the most challenging when teaching the lessons?

The participants were asked to identify the elements they find most challenging in teaching. The results are presented in Table 10.

Table 10: What element do you find the most challenging when teaching the lessons?

	N	%
Comprehension	5	9.6%
It about the language structure	2	3.8%
It delays us when the learners don't understand	2	3.8%
None	7	13.5%
Oral language and Phonics	5	9.6%
Reading	19	36.5%

Sight words	1	1.9%
Spelling	1	1.9%
The songs	3	5.8%
The vocabulary	2	3.8%
Writing	3	5.8%

While 7 teachers reported that they did not find any specific element particularly challenging when teaching the lessons, a larger group of 19 teachers, representing 36.5%, identified the reading aspect as the most difficult part of teaching. This suggests that a significant number of teachers faced challenges in effectively teaching reading skills. Additionally, 5 teachers highlighted challenges in teaching the comprehension, while another 5 pointed challenges in the oral language and phonics. This could indicate that teachers struggled with helping students understand and apply phonics rules or foster comprehension skills. These findings emphasise the need for targeted support or professional development in the areas of reading instruction and phonics, as these were perceived as the most challenging elements by a notable portion of teachers.

3.2. I find the time taken to teach each lesson is mostly…

Participants were also asked to report the average time they typically spend on a lesson. The results are shown in Table 11.

Table 11: I find the time taken to teach each lesson is mostly:

	N	%
Accurate - It takes around 1 hour	18	34.6%
More than 1 hour	34	65.4%

Table 11 shows that 34 (65.4%) of teachers reported that it takes them more than 1 hour to teach each lesson, while 18 (34.6%) indicated that they typically finish the lesson in around 1 hour. The fact that a majority of teachers feel the lessons take longer than one hour suggests that the content may be more complex or requires more time for students to fully engage with the material. It could also indicate that the pacing of the lessons is slower than expected, possibly due to the need for more time on certain activities or concepts. On the other hand, the smaller group of teachers who feel that 1 hour is sufficient might be able to efficiently manage the lesson flow or have fewer challenges in delivering the content. This disparity in responses could point to a need for reviewing lesson durations and ensuring that the lesson plans are appropriately paced for different teaching environments.

3.3. If your lessons normally take more or less than one hour, can you tell us around how long each lesson normally takes you to teach?

To further validate the responses in section 3.2, participants were also asked about the typical length of their lessons. The results are presented in Table 12 below.

Table 12: Normal duration for each lesson:

	N	%
Less than 30 minutes	7	13.5%
Between 30 minutes and 1 hour	1	1.9%
From 1 hour to 1 hour 30 minutes	35	67.3%
Between 1 hour 30 minutes and 2 hours	1	1.9%
2 hours and above	5	9.6%

Based on the responses from 49 teachers, the time spent teaching each lesson varied. Seven teachers reported that their lessons take 30 minutes or less, while one teacher said it takes between 30 minutes and 1 hour. The majority, 35 teachers, indicated that lessons typically take between 1 hour and 1 hour 30 minutes. One teacher reported 1 hour 30 minutes to 2 hours, and five teachers stated their lessons take 2 hours or more. The minimum time reported was 30 minutes, and the maximum was 2 hours, reflecting a wide range of lesson durations. These variations suggest that teachers' pacing and instructional needs may differ, possibly depending on experience, class dynamics, lesson complexity, or available time.

4. Learner Progress and Challenges

Questions were formulated to gather insights into how teachers perceive their students' progress and the challenges they encounter. These questions focused on reflecting on the overall progress of learners, asking teachers to identify changes since the start of the programme and to highlight any barriers that might be hindering progress. Teachers were also asked to highlight areas that their learners may need improvement.

4.1 What does your learners' progress look like since starting the programme?

This question sought to gather teachers' perceptions and observations regarding how their students have improved in their learning since they began participating in the programme. The results are presented in Table 13.

Table 13: What does your learners' progress look like since starting the programme?

	N	%
All of my learners have made progress	5	9.6%
Most of my learners have made progress	27	51.9%
Some of my learners have made progress	20	38.5%

Table 4.1 shows teachers' assessments of their learners' progress since the programme began. While 9.6% of teachers indicated that all of their learners had made progress, the majority (51.9%) noted that most of their learners had shown improvement. A further 38.5% of teachers reported progress in only some of their learners, suggesting a varied impact across students. These findings reflect overall positive progress but also draws attention to the fact that certain learners may not have benefited as much.

4.2. What is the reason your learners are not making progress?

The respondents highlighted several challenges to learner progress through feedback regarding the factors hindering students' ability to make progress and the support needed to address these issues. The challenges were:

- Frequent absenteeism was identified as a factor hindering learner progress for some students.
- Some students required more time and individualised attention to make progress.
- New learners to the programme had trouble in keeping up initially.

The teachers also expressed optimism believing that slower learners would eventually catch up with additional support and time.

4.3. Since starting the programme, my learners have improved:

The teachers' observations regarding learner improvement since the start of the programme are presented in Table 14.

Table 14: *Since starting the programme, my learners have improved:*

	N	%
Less than I expected	5	9.6%
More than I expected	44	84.6%
The same as I expected	3	5.8%

From Table 15, the majority of the respondents 44 (84.6%) indicated that their learners have improved more than they had expected, highlighting the effectiveness of the programme in fostering progress. A small proportion, 9.6%, felt that the improvement was less than anticipated. Thus, for a few, the expected outcomes may not have been fully realised. Only 5.8% of respondents reported that their learners had improved exactly as they expected, indicating a generally positive trend across the participants. These findings reflect overall satisfaction with the programme's impact on student progress, although there are a few cases where expectations were not met.

4.3 I think my learners have made the most progress in:

Teachers' perspectives were gathered on the specific areas in which their learners have made the most progress since the implementation of the programme. It captures teachers' reflections on noticeable improvements in key literacy areas including oral language, phonics, reading and writing (see Table 15).

Table 15: I think my learners have made the most progress in:

	N	%
Oral Language	3	5.8%
Phonics	35	67.3%
Reading	9	17.3%
Writing	5	9.6%

Thirty-five (35) of the respondents (67.3%) indicated that their learners have made the most progress in phonics, making it the area with the highest reported improvement. This suggests that the programme has been particularly effective in helping students improve their understanding of letter-sound relationships, a crucial skill in early literacy development. A smaller group of respondents, 9 (17.3%) indicated that their learners made the most progress in reading, while 5 (9.6%) pointed to writing, and 3 (5.8%) identified oral language as the area of greatest progress. These findings suggest that while phonics was the most common area of improvement, the programme also had positive effects on other language skills.

4.4 I think my learners struggle the most with

Respondents also provided feedback on areas where learners continue to face difficulties. The results are presented in Table 16.

Table 16: I think my learners struggle the most with:

	N	%
	1	1.9%
Oral Language	3	5.8%
Phonics	8	15.4%
Reading	37	71.2%
Writing	3	5.8%

A majority of respondents (71.2%) indicated that reading is the area their learners struggle with the most, highlighting it as a key concern in literacy development. Additionally, 15.4% of teachers reported that phonics posed the greatest difficulty for their students. Smaller proportions of respondents identified oral language (5.8%) and writing (5.8%) as the most challenging areas. These findings suggest that while multiple components of literacy present

challenges, reading remains the most significant barrier to learner progress for the majority of teachers.

5. Programme Evaluation and Recommendations

This theme presents teachers' reflections on the overall value of the Inspiring Reading Programme. It includes their willingness to recommend the programme, preferences for continued use, highlights of their experience, and suggestions for improvement. Results of the items used to gather these insights are presented below:

5.1. I would recommend this programme to other schools.

This item sought to examine the extent to which participants found the Inspiring Reading Programme valuable and effective enough to suggest it to other schools. See results in Table 17.

Table 17: I would recommend this programme to other schools.

	N	%
Strongly agree	36	69.2%
Agree	14	26.9%
Neutral	0	0.00%
Disagree	0	0.00%
Strongly disagree	2	3.8%

50 teachers, representing 96.1% of respondents, indicated that they would recommend the programme to other schools. Their reasons highlighted the programme's overall usefulness, noting that it is beneficial for both teachers and learners, easy to understand, and well-aligned with the GES-based curriculum. Teachers also emphasised that the programme enhances learners' speaking and writing skills in English, while simultaneously strengthening their own instructional techniques.

5.2 Compared to how you taught English Language before this programme, given the choice, would you continue to use the Inspiring Reading programme, or the way you used to teach?

This question was used to evaluate teachers' preferences regarding their teaching approach before and after the implementation of the Inspiring Reading programme. See table 18 for results.

Table 18: Compared to how you taught English before this programme, given the choice, would you continue to use the Inspiring Reading programme, or the way you used to teach?

	N	%
I would continue with the Inspiring Reading programme.	49	94.2%
I would rather teach English as I used to before I started this programme.	3	5.8%

Forty-nine (49) ‘’respondents’’ (94.2%) chose the Inspiring Reading Programme as the programme they will want to use in teaching English, because the programme is accessible, helps phonics and writing and also makes teaching and learning English easier. It is also fun, and interesting. This overwhelmingly positive response suggests that the teachers found the programme effective and beneficial in improving their teaching practices. They also indicated that their teaching skills and confidence, the literacy, and oral language of students have improved through the Inspiring Reading programme. However, a few respondents (3, 5.8%) expressed a preference for their previous teaching approach, which may indicate that, for a small number of teachers, the programme did not meet their needs or expectations.

5.3. Teachers' Reflections and Suggestions for Programme Enhancement

Teachers' reflections on their favourite aspects of the programme, areas for improvement, and any additional feedback or recommendations for enhancing the programme's effectiveness were also gathered. See results in Figure 19

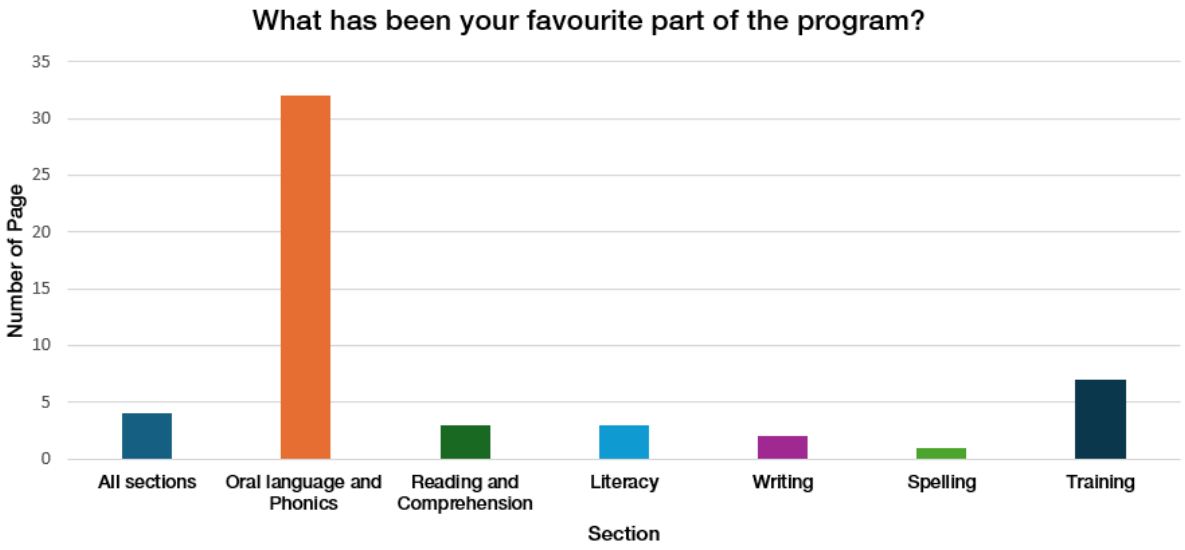


Figure 19: Distribution of the participants’ favourite part of the programme

From Figure 19, 32 teachers, representing 60%, favoured oral language and phonics over the other aspects of the programme. 13% of the respondents also preferred the training session. Whereas 8%, 4%, 2% and another 8% preferred all sections, reading and comprehension, spelling, literacy sessions respectively. The teachers suggested the programme can be improved by extending it to other schools, using different activities and strategies such as design patterns, and increasing the number of activities on phonics. They also suggested that reducing the difficulty level of the content and taking feedback from more workshops and training could improve the programme. Finally, they suggested that the book be made into a mobile application. And again, more training and supervision be provided in the schools.

Key Findings and Recommendations

Participant feedback on the Inspiring Reading programme reflects a generally positive reception, particularly in relation to teacher competence and confidence, the quality and usability of programme materials, lesson delivery, learner progress, and overall programme effectiveness. Teachers reported notable gains in instructional confidence, especially in areas such as vocabulary development, phonics, reading, and writing. Many attributed these improvements directly to their engagement with the programme, indicating that it has contributed meaningfully to the development of their pedagogical skills.

Despite the overall positive feedback, a few teachers indicated challenges with independently navigating the teacher guides, suggesting a need for additional support and scaffolding. While the programme materials, particularly the teacher guides and learner workbooks were broadly regarded as culturally appropriate and relevant, participants recommended enhancements such as the inclusion of more visuals and interactive activities, particularly in the domains of phonics, reading, and writing.

In terms of learner outcomes, participants reported general progress among students, with the most notable improvements occurring in phonics. However, reading fluency and comprehension were consistently identified as areas where learners continue to struggle. This suggests that while foundational literacy skills are being strengthened, further emphasis on developing reading proficiency is needed.

Based on the findings, several recommendations emerge for enhancing the programme's impact:

- Increase training and professional development opportunities: Expand the frequency and depth of training sessions and workshops to provide ongoing support and address areas where teachers feel less confident, particularly in using instructional materials independently.
- Enrich programme content: Incorporate more visuals (see, Kesherim, 2024; Probine 2020) localised examples (see, Okudo & Omotuyole, 2013; InTeGrate Project, 2017) and learner-centered activities (see, Patel-Junankar, 2017; Daniels & Perry, 2003) especially in the reading and writing components, to improve engagement and comprehension.
- Improve instructional time management: Explore strategies such as revising lesson pacing or streamlining content to ensure lessons can be delivered effectively within the allocated time.
- Enhance learner workbooks: Include a broader range of activities and adjust the difficulty level to better align with learners' abilities, thereby fostering greater comprehension and sustained interest.

- Expand programme reach and support: Consider extending the programme to more schools and increasing the frequency of supervisory support through regular in-school visits to strengthen implementation and provide continuous guidance.

Literacy Training

Lastly, participants' feedback was gathered on their evaluation of the literacy training they received. The goal was to assess how effective the training has been. Six key questions were asked, including how confident teachers feel in teaching oral language, phonics, reading, and writing following their participation in the literacy training. Participants also shared what they learned most from the training, and gave suggestions on how the training could be improved. The responses highlight strengths of the programme and point to areas that need improvement. The results for each of the six questions are presented below.

How confident do you now feel about teaching oral language?

Figure 20: Distribution of the Level of Confidence to teach oral language after the literacy training

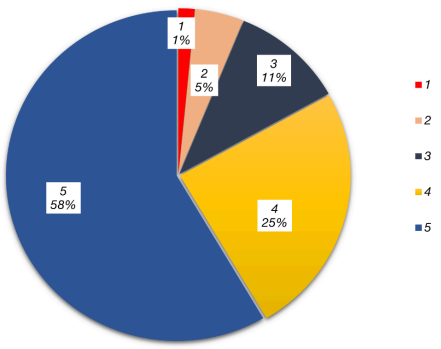
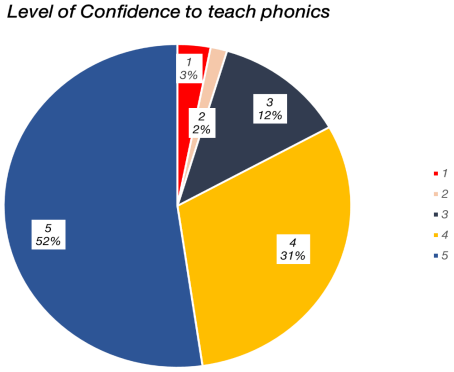


Figure 20 provides results of the distribution of teachers' confidence levels in teaching oral language after participating in the literacy training. The confidence levels are rated on a scale from 1 to 5, with 1 indicating the lowest level of confidence and 5 indicating the highest.

The data in Figure 20 shows that the majority of teachers reported high levels of confidence in teaching oral language following the literacy training. Specifically, 57.6% of respondents rated their confidence at level 5/5, while an additional 24.2% rated their confidence at level 4/5. Combined, this indicates that over 80% of teachers felt well-prepared to teach oral language as a result of the training. A smaller proportion of teachers reported moderate to low confidence levels. About 10.6% selected level 3, 4.5% chose level 2, and only 1.5% rated their confidence at level 1. These responses suggest that while the training was generally effective, a few participants may still require additional support or follow-up to build their confidence in this area.

How confident do you now feel to teach phonics?

Figure 21: Distribution of the Level of Confidence to teach phonics after the literacy training



This question aimed to assess the impact of the literacy training on teachers' confidence in teaching phonics. The results are presented in Figure 21.

The results in Figure 21 indicate a generally positive outcome in terms of teachers' confidence to teach phonics following the literacy training. A majority of teachers, 51.5%, rated their confidence at 5/5, suggesting that they feel very confident in teaching phonics.

Additionally, 30.3% of the respondents reported a confidence level of 4/5, indicating a solid level of preparedness.

However, there were still some teachers who reported lower levels of confidence. 12.1% rated their confidence at level 3, 1.5%, rated it at level 2, and 3% rated it at the lowest level (1). This shows that while the majority of teachers feel confident, there is still a small group who may require further support or follow-up training.

How confident do you now feel to teach reading?

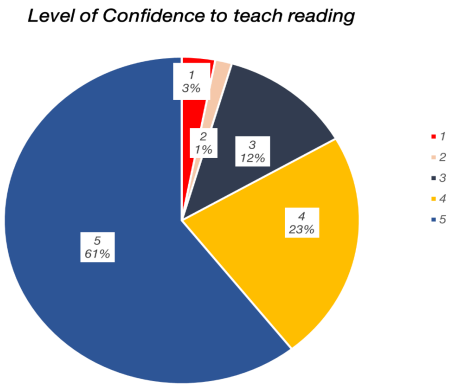


Figure 22: Distribution of the Level of Confidence to teach reading after the literacy training

The data in Figure 22 shows a strong increase in teachers' confidence to teach reading after the literacy training. A significant 60.6% and 22.7% rated their confidence levels at 5/5 and 4/5 respectively, indicating that the majority feel well-prepared to teach reading after the training. However, there are still some teachers who reported lower levels of confidence. 12.1% rated their confidence at level 3, 1.5%, rated it at level 2.

Only 3% of teachers rated their confidence at level 1, indicating that still a few teachers do not feel confident to teach reading after experiencing the literacy training. However, the general results suggest that the literacy training had a substantial impact on building teachers' confidence to teach reading, with the majority feeling highly confident.

How confident do you now feel to teach writing?

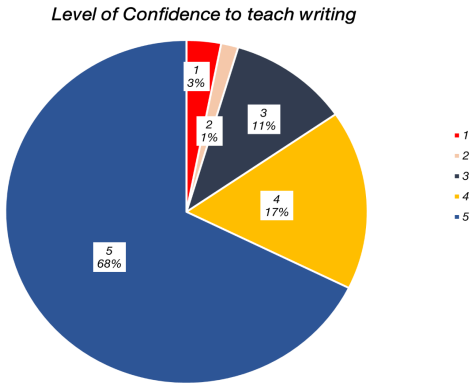


Figure 23: Distribution of the Level of Confidence to teach writing after the literacy training

The results in Figure 23 show that the literacy training had a positive impact on teachers' confidence in teaching writing. Most teachers (66.7%) reported feeling very confident (5/5) in teaching writing, while another 16.7% rated their confidence at level 4. However, 10.6% rated their confidence at level 3, and 1.5% rated it at level 2, indicating that there are still some teachers who feel uncertain about teaching writing. Only 3% of teachers felt completely unprepared (level 1).

What have you learnt most from the training?

The participants shared varied lessons and experiences that they learnt from the training:

- Learned to start and teach literacy as a subject
- Learned the 'ins' and 'outs' in teaching phonics
- Learned the skill to create an inclusive atmosphere for teaching and learning
- Learned to efficiently use the vocabulary words
- How to teach writing: warming up and holding a pencil rightly
- Various ethics in teaching: be comfortable teaching, children need much patience from the teacher and that will help them succeed, teacher positioning during instructional session
- The 'ins' and 'outs' in teaching oral language and reading.
- How to have passion and timing when teaching.
- Skill to supervise teachers in teaching literacy effectively

What could we do better next time at training?

Participants were asked to provide recommendations for improving future training sessions. The main suggestions that emerged include:

- Use of videos on the teaching as a reminder
- Addition of monitoring and supervision to improve teaching
- More skills, readings and teachings on phonics (letter sound and songs), oral language, writing and reading
- More time to practice
- How to manage classroom behaviour
- Provision of teaching and learning materials

- Provision of the soft copies which were projected in class
- Provision of whole handbook
- Teach us the letter sound and songs
- Engaging more teachers

Key Findings and Recommendations

The feedback collected from participants indicates that the literacy training had a largely positive impact on teachers' confidence in teaching key literacy areas such as oral language, phonics, reading, and writing. A majority of teachers expressed high confidence in teaching these subjects after the training, highlighting the effectiveness of the programme in preparing them to implement the skills learned. However, while many teachers felt well-prepared, there were still some who reported lower levels of confidence, particularly in areas such as reading and writing. This suggests that while the training was effective for the majority, a small group of teachers still faces challenges in fully applying what was taught at the literacy training.

In terms of what teachers learned, several key takeaways were highlighted. Participants noted that they gained valuable insights into teaching phonics, creating an inclusive learning environment, and effectively managing the classroom. Teachers also acknowledged learning how to teach writing techniques.

Several areas for improvement also emerged from the feedback. Teachers expressed the need for more practical demonstrations, particularly in the areas of phonics, reading, and writing. They also emphasised the importance of additional time to practice these skills during the training sessions. Furthermore, many teachers recommended that future training incorporate more materials, such as handbooks and digital resources, to provide ongoing support in the classroom.

The following recommendations are provided, based on the findings:

- Provide More Practical Time for Practice: Additional opportunities to practice the techniques learned during training, especially in teaching phonics, reading, and writing will be helpful. Incorporating more hands-on activities and demonstrations could help strengthen their skills and confidence in these areas.
- Offer Ongoing Support and Supervision: To further reinforce the training’s impact, regular classroom visits, coaching, and follow-up support should be provided. This would address the remaining gaps in teacher confidence and allow for continuous development in their literacy teaching practices.
- Enhance Focus on Phonics and Writing: Future training should dedicate more time and resources to phonics instruction (e.g., letter sounds, songs) and writing techniques. This would help improve teacher confidence and competency in these areas, which were identified as areas of need.

- Increase Availability of Teaching Materials: Providing teachers with more accessible teaching materials, both in physical and digital formats, would support them in effectively implementing what they learned in the training. Offering handbooks, lesson guides, and other resources can serve as useful references in their teaching practices.
- Incorporate Classroom Management Training: Including more classroom management strategies in future training would help teachers maintain a positive and effective learning environment.
- Encourage Collaborative Learning: Creating opportunities for teachers to engage with one another during training—such as through peer discussions, group activities, and shared learning experiences—can foster a sense of community and support, allowing teachers to learn from each other's experiences and improve together.

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Deliverable 4 - Competitive Analysis

This deliverable aims to provide a clearer understanding of the competitive landscape in which Inspiring Teachers operates in the literacy space, helping the organisation more effectively differentiate its literacy programme.

The Context in Ghana

The Ghana Ministry of Education (MoE) prioritises teacher training. Despite the country's infrastructural challenges, the MoE has invested in government-led, tech-enabled teacher training programmes.

The National Teaching Council (NTC), through its Continuous Professional Development (CPD) platform and programmes like the Ghana Accountability for Learning Outcomes Project (GALOP), backed by significant donor funding, has reached thousands of teachers through structured, tech-enabled training (Bjerde, 2023). These programmes play a crucial role in the competitive landscape for Inspiring Teachers and its solutions.

This competitive analysis provides insights into Ghana's current environment for tech-enabled teacher training initiatives. Examining existing government-led programmes, regulatory frameworks, infrastructure constraints, and best practices will support the strategic decisions of Inspiring Teachers to enhance programme alignment and identify actionable opportunities for improving foundational literacy and numeracy in Ghana.

Government-led Initiatives

The MoE, the Ghana Education Service (GES), and NTC continuously implement teacher training programmes that leverage technology. Under GALOP, the MoE trained more than 72,000 teachers in innovative methods, including structured lessons and ongoing coaching (Bjerde, 2023). Teachers receive scripted lesson guides, learning materials, and continuous coaching through GALOP, significantly improving learning outcomes. Early results indicate that the number of schools meeting teaching standards moved from 3.3% to 65% after GALOP interventions (Bjerde, 2023).

Through its Teacher Portal (TPG) and e-learning platforms, NTC hosts accredited courses for teachers to earn continuous professional development (CPD) points required for licensing. The NTC partnered with organisations like Instill Education and TECHAiDE to provide Ghanaian teachers with training opportunities.

Donor-backed Initiatives

Donor-led interventions play a significant role in improving foundational literacy and numeracy outcomes in Ghana. The MoE, in collaboration with partners such as the World Bank and Innovation for Poverty Action (IPA), have employed Structured Pedagogy and Teaching at the Right Level to boost teaching and learning outcomes at the pre-tertiary level significantly (Abdul Latif Jameel Poverty Action Lab (J-PAL), 2018; Banerjee et al., 2023; Piper & Dubeck, 2024).

Barriers to Entry for External Providers

Establishing a working relationship with external organisations that have yet to work with the MoE presents significant challenges. Teacher training programmes must comply with the NTC's requirements to count towards CPD points. Without the NTC's approval, the motivation to adopt high-quality training may be negatively impacted. Training content and pedagogy must be mapped to the standards of the MoE to gain support. This often comes with bureaucratic processes (navigating between the GES and NTC) for approval of instructional materials within public schools.

There is a high risk of competing with ongoing government-led or donor-backed initiatives. Because the GES and NTC continuously provide training through these initiatives, solutions from external providers may be viewed as duplicative or unwelcome, especially initiatives that create additional administrative tasks and reduce teachers' time on task.

External partners must invest in building trust across all sectors of the education system by working closely with decision-makers at the national, regional, district and school level. These collaborations can range from co-design implementation plans on delivering evidence-based teacher training at the national level to supporting district-level officers to test and validate effective teacher training models.

Building consensus within the MoE and across the regional, district, and school levels is critical to implementing and scaling solutions. Implementation may face challenges without relevant support from stakeholders, especially teachers, head teachers, and district supervisors.

Infrastructure and Scaling Challenges

Although Ghana's technology infrastructure has improved over the last ten years, significant challenges hinder the scalability of EdTech interventions. One issue is low digital literacy, especially in rural and marginalised communities. Many teachers also lack access to reliable internet and devices.

Recent studies found that 92% of Ghanaian teachers reported poor internet connectivity as a significant challenge to online training, while 98% cited the high cost of data as a barrier.

Concerning digital literacy, 97% of teachers were uncomfortable with digital tools (Addai-Poku et al., 2024).

Regional Comparison on Teacher Training

Similar initiatives beyond Ghana provide relevant lessons for implementing tech-enabled teacher training and support in Ghana. Tusome's success in Kenya is widely associated with the strong government ownership and training model, which provided ongoing coaching to nearly 80,000 teachers directly through the Ministry's infrastructure (Myers et al., 2021).

In Nigeria, the EKOEXCEL initiative in Lagos State, launched in 2019, retrained 14,000 public primary school teachers, emphasising in-class coaching and real-time monitoring. After 80 weeks of instruction, children improved their literacy and numeracy foundations three times faster than their peers in traditional schools (Ojugbana, 2024).

Strategic Recommendations for Inspiring Teachers

Inspiring Teachers offers a structured, tech-enabled approach to supporting teachers in improving the foundational literacy skills of Ghanaian learners. Navigating the government, donor, and general EdTech landscape is essential to positioning Inspiring Teachers as a complementary solution contributing to effective teaching and learning.

Policy Alignment

Inspiring Teachers can position itself as a valuable partner to the MoE rather than as parallel efforts. One consideration is to work with the MoE and GES to align their implementation model with existing channels like the Professional Learning Circles (PLCs) established through GALOP, utilising Inspiring Teachers' tools and resources to facilitate training, continuous coaching, and engagement (Soares & Galisson, 2021).

Cost-effectiveness and Scalability

Adopting a cost-effective model is critical for Inspiring Teacher's as it pursues a working relationship with the MoE and its donor partners, especially in low-resource settings. Adopting an "offline-first" strategy provides Inspiring Teachers the opportunity to address key pedagogical challenges in rural and marginalised communities and provides a cost-effective approach to scaling improved teacher training and foundational literacy skill development nationally (Ndaruhutse, 2022).

Competitive Positioning

Inspiring Teachers operates in a landscape with strong tech-enabled teacher training providers in Ghana (refer to a detailed competitive landscape below). Highlighting the Inspiring Teacher's

evidence-based design and the integration of structured pedagogy is a core advantage. With many MoE and donor-led initiatives providing one-off training without consistent follow-ups, inspiring teachers' continuous coaching and feedback for teachers' functionality fills a significant gap, which most existing solutions implemented by the MoE lack (Jacobs Foundation, 2020).

Adopting a building blocks approach presents an opportunity for Inspiring Teachers to modularise its tools and services, focusing on the critical needs and priorities of the MoE (Adam et al., 2021). For example, the remote coaching component of the Inspiring Teachers tool can serve as a stand-alone tool that integrates with existing MoE teacher training tools, providing continuous coaching to teachers following in-person or remote training delivered by the MoE.

Competitive Landscape

The following analysis (Table 19) reviews organisations working in this space, specifically those focusing either on literacy skills development or teacher training. This review aims to position the Inspiring Teachers Literacy programme clearly in relation to existing solutions.

It is recommended that the Inspiring Teachers team explore each of the organisations mentioned below to identify those with the strongest potential for partnership, based on shared values and complementary strengths.

Table 19: Competitive Landscape

Organisation Name	Size/ Reach	Initiative Name	Focus of Initiative	Funding Model	Impact	Additional Notes
Inspiring Teachers	Ghana, Tanzania, Uganda, Zambia	Peer Coaching programme, Fellowships, Smart Coach App	Empowers teachers through peer coaching, professional development, and digital coaching tools	Non-profit	6,244+ teachers	Recognised by the World Bank as a top 10 innovation in teacher development (2021)
Building Tomorrow	Uganda	Fellows programme	Develops local education leaders to connect learners with transformational education programmes.	Non-profit	14,966 community education volunteers trained	Focuses on literacy and numeracy at-home and community-based programmes, selected for the HundrED Global Collection 2025

PEAS (Promoting Equality in African Schools)	Uganda, Zambia	Secondary School Network	Expanding access to secondary education through sustainable schools	Non-profit	Data not specified	Focuses on running schools rather than teacher coaching, the largest secondary school network in Sub-Saharan Africa
STiR Education	India, Uganda, Tanzania	Teacher Motivation programme	Supports teacher networks and professional development	Non-profit	558,827 teachers reached	Works with governments to embed long-term coaching within education systems
Dignitas	Kenya	Leadership Development for Schools	Empowers educators and strengthens school leadership through various iniatives/programmes	Non-profit	Data not specified	Focuses on school leadership development
Tusome (Kenyan Ministry of Education programme)	Kenya	Tusome Early Literacy programme	Structured pedagogical programme for early grade reading	Government	101,000 teachers	Strong government-backed programme improving early literacy

Teaching at the Right Level (TaRL Africa)	Multiple African countries	TaRL programme	Grouping children by ability to improve foundational literacy	Non-profit	5 mil+ children	Strong evidence base for impact in foundational literacy, working with governments & organisations
Shikshalokam	India	School Leadership Development	Supporting headteachers and educators with professional development	Non-profit	570,000 education leaders	Uses digital tools for capacity-building in schools
Ark Education Partnerships Group (EPG)	Global	Education System Strengthening	Consulting with governments on education policy	Non-profit	Data not specified	Worked on education system reform rather than direct teacher training, spun individual programmes out so organisation does not exist anymore
Mantra4Change	India	School Improvement programme	Supports school transformation through coaching	Non-profit	309,111 school leaders	Focuses on school-wide improvements using structured coaching

Teach For All	Global	Teacher Training programme	Recruiting and training teachers for underprivileged schools	Non-profit	14,600 teachers	Global teacher training programme deploying teachers into disadvantaged schools
World Literacy Foundation	Global presence	Sun Books	Technology-driven literacy support with solar-powered tablets	Non-profit	11,171+ children and families	Focuses on tech-enabled education in low-resource environments, have programmes in other countries
Room to Read	20+ countries	Literacy programme; Girls' Education programme	Literacy improvement and gender equality in education	Non-profit	50 mil+ children	Works with local communities and governments
Worldreader	100+ countries	BookSmart	Digital reading resources for literacy improvement	Non-profit	22 mil cumulative readers	Provides digital libraries with thousands of multilingual books
International Literacy Association	75+ countries	Various literacy initiatives	Global literacy advocacy and professional development	Non-profit	Data not specified	Engages educators and literacy professionals worldwide

ProLiteracy	Global reach	Adult Literacy programmes	Literacy development for adults	Non-profit	1.1 mil adult learners	Focuses on adult literacy advocacy and curriculum development
Teacher Education in Sub-Saharan Africa (TESSA)	10 African countries	TESSA programme	Open educational resources for teacher professional development	Non-profit	Data not specified	Offers materials in multiple languages for widespread accessibility
Luminos Fund	Ethiopia, Ghana, Liberia, Gambia	Second Chance programme	Accelerated learning for out-of-school children	Non-profit	377,407 children	Strong focus on marginalised communities, provide catch-up programmes for out of school children
African Storybook	Sub-Saharan Africa	African Storybook Project	Free, local-language digital storybooks	Non-profit	Data not specified	Provides customisable reading materials to improve early literacy
Ubongo Learning	9 African countries	Ubongo Kids; Akili and Me	Educational media to enhance literacy and numeracy	Social enterprise	42 mil households	Produces TV shows and digital content to support education

OER4Schools	Zambia	OER4Schools programme	ICT-driven interactive teacher training	Collaborative initiative	Data not specified	Helps teachers integrate technology into their teaching, school-based teacher training
African Library Project	4,000+ libraries in sub-Saharan Africa	Library Development	Establishing libraries for better literacy access	Non-profit	Data not specified	Focuses on book collection and community library creation
Bookbot	Global presence	Bookbot Literacy App	AI-powered reading assistant that enhances literacy fluency	Social enterprise	Data not specified	Uses speech recognition to provide instant feedback on pronunciation and fluency

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Deliverable 5 - Future-focused Roadmap

Inspiring Teachers already has a track record of delivering impact through its programmes. To further strengthen its evidence base, this deliverable includes future recommendations aimed at helping Inspiring Teachers scale its efforts. We have grouped the recommendations by topic. These topics are:

- Research Agenda
- Partnerships
- Parental Engagement in Learning
- Communication

Research Agenda

As part of shaping the organisation's long-term direction, this future roadmap includes recommendations for developing a focused research agenda. The aim is to establish a clear framework for conducting systematic research that supports Inspiring Teachers in understanding and strengthening the efficacy, scalability, and sustainability of its programmes. By embedding research into future planning, Inspiring Teachers can generate robust evidence to guide implementation, inform strategic decisions, and deepen its impact in low-resource education contexts.

Research Objectives

The core objectives can be summarised under the following topics:

- **Professional Teacher Development:** Identify sustainable and locally relevant models for teacher professional development. Successful implementations of identified models in contexts similar to Ghana will support this process.
- **Effectiveness of instruction:** It is critical to assess the effectiveness of instruction on student literacy outcomes.
- **Digital Technologies:** Examine the role of digital tools, including AI-generated materials and mobile applications, in enhancing teacher effectiveness and reducing time spent on planning.
- **Teacher-led formative and summative assessments:** Assess the impact of teacher-led formative and summative assessment practices on targeted instructions and literacy acquisition, and instructional decision-making.
- **Parental Participation:** Examine the strategies that facilitate meaningful parental participation, focusing on how parental engagement influences the development of

foundational literacy and overall academic performance, especially in rural and marginalised communities.

Proposed Research Questions

Below are some proposed research questions:

Teacher-led Assessment.

- How can teacher professional development interventions enhance the objectivity and reliability of classroom-based formative assessments? Can teachers collect objective and reliable data on students' reading? What kind of training do they need to generate reliable assessments?
  → *We recommend conducting inter-rater reliability; this means different teachers assess the same students, and we look at their agreement (see the Measurement Guide for details)*

- How do Ghanaian teachers operationalise assessment data to facilitate differentiated instruction and targeted remediation? What kind of information do they find helpful? How does this information need to be displayed to be informative? How do teachers adapt their instruction based on the assessment data?
  → *We recommend focus groups with teachers and ongoing feedback to the development team (see the User Study Section)*

- What are the causal pathways through which teacher-led formative assessment influences student literacy outcomes in Ghana?
  → *We recommend collecting longitudinal data on potential core mechanisms (e.g., observations on teachers' instructional approaches, data on student engagement and learning approaches)*

Foundational Literacy.

- What instructional design principles underpin the efficacy of foundational literacy in literacy instruction? What is the larger theoretical framework underlying the literacy programme?
  → *We recommend embedding the literacy programme into a larger theoretical framework that can be extended and modified based on recent advancements in the literature and based on the data collected within the evaluative framework of Inspiring Teachers*

- How do scripted lesson plans, teacher guides, and adaptive instructional scaffolding contribute to measurable improvements in reading outcomes?

→ We recommend an observational approach and longitudinal data from teachers and their students on the core instructional and personal mechanisms (based on the theoretical framework)

- What contextual adaptations (e.g., linguistic differentiation, multi-grade teaching) optimise foundational literacy in diverse educational settings?
  → We recommend exploring and tailoring a multi-linguistic approach

Tech-enabled Instructional Coaching.

- What user-centred design techniques effectively inform digital coaching approaches in enhancing learner engagement and pedagogical outcomes?
  → We recommend exploring how different approaches longitudinally relate to different pedagogical outcomes (based on the larger theoretical framework)

- How does digital coaching compare with in-person instructional coaching regarding pedagogical improvement and sustainability?
  → We recommend a analysis of in-person continuous coaching mechanisms compared to tech-enabled coaching, its cost-effectiveness and impact on improving teaching. As part of this comparative analysis a quantitative measure of student foundational literacy outcomes.

- What limitations do mobile applications, AI-driven feedback mechanisms, and virtual professional learning communities present in enhancing teacher professional development across different educational levels?
  → We recommend 1) ongoing user studies on the challenges teachers face; 2) a comparative approach on the role of digital and in-person trainings and assessments; 3) being up-to data on the rapidly emerging literature within this field and implement it in the larger theoretical framework

- How do mobile-based professional development interventions impact teacher instructional efficacy and implementation fidelity?
  → We recommend to explore longitudinal study to identify the determining factors necessary for sustained impact of mobile-based teacher continuous professional development mechanism on teaching quality and adherence to instructional protocols.

Scaling Teacher Professional Development Programmes.

- What structural and systemic constraints hinder the large-scale implementation of teacher professional development models in Ghana?
  → We recommend performing a policy and systems analysis to identify the barriers (funding, infrastructure, policy misalignment, implementation and support) hindering scaling tech-enabled teacher professional development programs, with an emphasis on

foundational learning, in Ghana. This study should include strategic recommendations to addressing identified challenges both at the systems level and classroom level.

- What are the key organisational and policy mechanisms that enable successful institutionalisation of foundational literacy frameworks in the Ghanaian education systems?
  → *We recommend to 1) conduct an "As-Is" analysis to understand the existing structures, leadership practices and policy implementation mechanisms. 2) Review of best practices that contribute effectively institutionalising foundational literacy frameworks in the Ghana education system that allow for a successful implementation.*

- How do data-driven decision-making approaches differ in improving foundational literacy outcomes across school, district, regional, and national levels in Ghana?
  → *We recommend conducting a case study examining how data is utilised at various administrative levels within the Ghana education system. The goal of this study is to understand how foundational literacy implementation and outcomes data informs decision making processes as it relates to best practices, resource allocation and areas of improvement.*

Parental Engagement in Learning.

- What mechanisms for parental involvement most significantly improve children's reading comprehension and vocabulary development?
  → *We recommend to conduct an implementation research study evaluating the active involvement of parents in literacy activities, such as reading at home or school-based literacy activities. As part of the measures in this study, we recommend measuring the impact of these programs on student literacy outcomes.*

- How does parental engagement influence student achievement in early-grade literacy in Ghana?
  → *We recommend to explore a quantitative analysis looking at the correlation of parental involvement with student literacy outcomes.*

- What cultural and socioeconomic barriers hinder parental participation in literacy outcomes among low-income urban families with school-aged children?
  → *We recommend a qualitative analysis exploring cultural perspectives, economic challenges and other factors that hinder parental involvement in the literacy development of students, especially in rural and marginalised communities.*

- What models of parent-teacher collaboration best support sustained improvements in literacy outcomes for primary school students in Ghana?
  → *We recommend to 1) add literature on parental involvement to the theoretical framework of the Inspiring Teachers programmes; 2) collect data from parents on their*

possibilities for involvement within a focus group; 3) collect longitudinal data of parents who can be involved and the effect on student learning

Methodological Approach

The research methodology aligns with the research questions, ensuring rigor in generating actionable insights. In addition to the specific recommendations to address the above research questions, the following methodological approaches have been selected based on their empirical validity and relevance to the Ghanaian context.

Design-based Implementation Research (DBIRs).

Design-based implementation research generates research findings that inform practice and policy through iterative design, testing and refinement cycles in real-world conditions. With the practical or hands-on nature of the Inspiring Teachers model, DBIR will allow for adaptive learning and improvement of the Inspiring Teachers tools and solutions.

Longitudinal Mixed-methods Inquiry.

This method captures both measurable outcomes and insights over time. It helps identify how foundational literacy, digital coaching, teacher-led assessments, and parent engagement evolve in practice and over time. The literacy assessments, mobile-based teacher engagement tracking, and structured classroom observations provide evidence of intervention effectiveness, while teacher interviews, focus groups with teachers and parents, and case study reviews will provide insights into implementation challenges, adaptation strategies, scalability, and sustainability of the Inspiring Teachers framework.

This agenda adopts a stakeholder co-design and participatory research approach. It engages the MoE, teachers, school heads, district and regional officers, and policymakers, ensuring that the design and research findings meet the MoE's needs and requirements.

Experimental and Quasi-experimental Design.

Randomised control trials (RCTs) will be beneficial in drawing causal relationships between foundational literacy interventions and student learning outcomes. This approach is recommended when there is enough knowledge on the potential core mechanisms within the theoretical framework.

Morevover, due to ethical, logistical, and practical constraints, RCTs may not always be feasible. Quasi-experimental designs such as difference-in-differences (DiDs) and propensity score matching (PSM) will allow Inspiring Teachers to infer causality while working within the limitations of the Ghana education system.

Resources on experimental and quasi-experimental research design

- Instructions on choosing methods, analysing results and using tools like R or Stata. | DIME Wiki and World Bank
- Research Resources | The Abdul Latif Jameel Poverty Action Lab
- Tools, Resources and Courses to Advance EdTech | EdTech Hub
- Explore different methods including Difference-in-differences and PSM | Sage Research Methods

Expected Outcomes

The research will contribute to the evidence base supporting policymakers, teacher training institutions, and practitioners in refining their instructional strategies. Research will contribute to scaling effective pedagogical models that use technology, especially in low-resource settings.

Optimise Assessment Strategies.

The research will provide frameworks for teacher-led formative and summative assessments that enhance literacy outcomes (see Assessment Strategy for specific recommendations). By establishing best practices for embedding assessment-driven instructions into foundational literacy, decision-makers can support teachers with practical strategies in real time and support data-informed decisions at the school and classroom level. Research outputs will support mobile-based assessment tools, effectively guide and track individual student progress, and use assessment insights to adapt teaching methodologies. Findings from teacher-led assessments will support the transformation of the national teacher training curricula, ensuring long-term sustainability and adoption nationally.

Best Practice for Foundational Literacy.

Findings will identify evidence-based strategies for implementing foundational literacy in diverse settings, especially low-resource ones. By evaluating the effectiveness of scripted lesson planning and structured teacher guides, Inspiring Teachers will inform the guidelines for improving instructional quality using technology. Additionally, findings will contribute to developing targeted teacher training materials that focus on integration into daily teaching practices at the classroom level.

Guidelines for Digital Coaching.

Recommendations from the research studies on using technology to facilitate continuous coaching to build teacher capacity will impact the adoption of evidence-based approaches on instructional effectiveness and teacher engagement. Findings from Inspiring Teachers' use of AI-powered coaching tools will provide valuable insights on scalability and cost-effectiveness of digital coaching in low-resource settings, ensuring tech-enabled continuous professional

development remains accessible and sustainable in Ghana. Findings will contribute to developing hybrid coaching models that blend remote digital support with in-person mentoring, maximising engagement and instructional coherence.

Policy Recommendations on Instructional Leadership and Teacher Development.

Findings from the research studies will generate policy recommendations that will strengthen instructional leadership, professional learning structures and teacher development structures. These findings can support the development of national teacher training strategies, ensuring alignment with foundational learning priorities, especially with Ghana's Global Partnership for Education Compact which focuses on improving structured pedagogy and literacy. Additionally, comparative analyses of large-scale teacher training interventions in Ghana will provide insights that will support policy design, institutional capacity building and sustainable financing models for teacher professional development in Ghana.

Data-driven Instructional Insights.

Study findings will identify frameworks for embedding assessment-driven instruction into classroom practice, ensuring teachers use actionable insights to improve literacy outcomes in Ghana's rural and marginalised communities. Research publications will recommend using real-time analytics in national teacher professional development programmes, enabling data-driven decision-making at the classroom, school, and national levels.

Dissemination and Engagement

Dissemination of findings is a critical component of the research agenda. The dissemination strategy ensures that research findings are translated into actionable insights for decision-makers, teacher training institutions, and implementers in Ghana. Using multiple knowledge-sharing channels, the findings will contribute to academic discourse and practical implementation. Through these dissemination strategies, findings will support the scaling of tech-enabled, evidence-based teachers' training in Ghana.

Academic Dissemination.

The findings will be published in peer-reviewed journals under an open license. This approach will ensure that the findings contribute to broader academic discourse on foundational literacy, teacher-led assessments, and digital coaching without financial barriers.

Presentations at Conferences.

Working with partners and stakeholders, findings will be presented at regional and international conferences and education research forums. These forums will allow engaging with global and regional researchers and experts, facilitating learning and comparative analyses.

Policy Engagement and Government Collaboration.

The findings will contribute to developing targeted policy briefs outlining the key findings, recommendations, and implementation strategies for foundational literacy and digital coaching. These briefs will contribute to conversations with policymakers and district officers, ensuring evidence-driven insights and strategies are included in Ghana's policy design and implementation processes. Additionally, the emphasis on digital coaching and AI-powered teacher support will contribute to improving and implementing Ghana's ICT in Education Policy.

Partnerships

As Inspiring Teachers continues to strengthen and expand its literacy programme, there is significant potential to harness the power of strategic partnerships. Collaborations with aligned organisations—whether in content development, teacher training, technology integration, or research—can enhance credibility, extend reach, and improve overall impact. Building on existing relationships and insights from the competitive landscape analysis, Inspiring Teachers is well-positioned to embed itself within a broader ecosystem of educational transformation.

Broaden the Scope to Include Numeracy

To support holistic foundational learning, Inspiring Teachers could either develop internal expertise or partner with organisations specialising in early numeracy. This would allow the organisation to build an integrated approach to literacy and numeracy, reflecting international best practice and addressing feedback from partners and funders who increasingly seek dual-focus interventions.

Strengthen Local Implementation Partnerships

As the programme expands from private to public schools in Ghana, there is an opportunity to deepen engagement with the Ghanaian Ministry of Education. Formalising this collaboration can support system-level adoption and pave the way for national scale-up. Similar to the Techniques for Effective Teaching (TFET) in Ghana program developed by Sesame Workshop and IDP Foundation, building public-private partnership implementation models can be is critical in making tech-enabled teacher training available and in a cost-effective manner in Ghana and across Africa (LaRocque & Latham, 2003).

Collaborate for Rigorous Research and Evaluation

The ongoing RCT with the University of Washington offers a strong foundation for further research partnerships. Inspiring Teachers should continue to collaborate with academic institutions and research organisations (e.g. J-PAL, IPA, local universities) to strengthen its evidence base and support continuous improvement. These collaborations can also contribute to the emerging research agenda focused on efficacy, scalability, and sustainability.

Partner for Content Development and Teacher Support

Working with organisations that bring complementary expertise—such as Room to Read for literacy materials, Pratham for community-based learning approaches, or Teach For All partners for teacher coaching—can enhance programme quality and contextual relevance. These partnerships may also help adapt resources across languages and geographies.

Leverage Technology through EdTech Collaborations

Explore partnerships with educational technology platforms that support mobile-based teacher coaching, real-time data collection, or digital learning tools. This could strengthen delivery in remote areas and improve monitoring and feedback loops.

Build Multi-Stakeholder Coalitions and Access to Funding

Collaborating with funders and other NGOs with shared goals—particularly those focused on foundational learning, equity, and systemic reform—can unlock co-investment and amplify advocacy efforts. Joint proposals for pooled funding mechanisms (e.g. via GPE or FCDO) could further support expansion.

Building on Parental Resources for Student Literacy

A key step in refining and scaling the Inspiring Teachers literacy programme is to re-evaluate and strengthen the parental engagement component. While involving parents is crucial for reinforcing learning at home, it's essential to do so in a way that is inclusive, context-sensitive, and grounded in community realities.

To avoid unintentionally amplifying existing social inequalities—where only parents from more advantaged backgrounds can engage—a recommended first step is to conduct a series of focus groups or interviews with parents from diverse socioeconomic backgrounds. This will help identify realistic, culturally appropriate, and accessible ways for caregivers to support their children's literacy development. Additional recommendations include:

- **Use focus groups to co-design engagement strategies**, ensuring they are relevant to parents' lived experiences and responsibilities.
- **Explore the role of community-based support**, such as involving social workers, community leaders, or early childhood facilitators who may already have trusted relationships with families.
- **Pilot structured parental meetings in schools** or community hubs that include both literacy training and wellbeing check-ins, making use of existing school infrastructure or partner NGOs.

- **Adapt delivery methods** (e.g. group sessions, SMS reminders, take-home activities, or audio content) to suit the needs of families with low literacy levels or limited time.
- **Integrate parental engagement with other support systems**, such as school social workers or school-community liaisons, who can help bridge the gap between home and school.

Comparable initiatives and models for learning include:

- **Kenya Connect's Literacy programmes**: Kenya Connect implements programmes such as school libraries, literacy clubs for children, and a livelihood programme for mothers. These initiatives integrate digital and physical literacy resources, provide training for mothers, and emphasise the joy of reading, thereby making a lasting impact on children's reading habits and social-emotional wellbeing.
- **Edusphere Education Consultancy's Parent Training in Uganda**: Edusphere focuses on training parents and caregivers in early childhood development and education. Their objectives include implementing programmes to promote quality education and equipping parents with the necessary skills to support their children's learning.
- **GLOT Inc's LiteracyKit + programme in Colombia**: GLOT Inc developed the Kit Literacy+, an accelerated learning programme aimed at assessing and improving foundational skills in children by using learning-through-play methodologies. This programme involves engaging parents in the learning process to reinforce educational outcomes at home.
- **Education for Sharing (Mexico and beyond)**: Education for Sharing uses play-based learning to foster civic values, empathy, and collaboration among children while actively engaging parents and communities. Through structured games and reflection activities, the programme strengthens the home-school connection and encourages families to participate in children's learning journeys. Their approach offers a replicable model for integrating family engagement into education programmes across diverse contexts.

These examples illustrate how Inspiring Teachers can develop an inclusive, family-centred approach that recognises both opportunities and barriers.

Ultimately, the aim is to support all parents to play a meaningful role in their children's learning, while also recognising that support structures beyond the nuclear family (e.g., social workers, extended family, or community mentors) may be just as critical in low-resource contexts.

Strengthening Communication to Amplify Reach and Impact

The Inspiring Teachers team identified a critical need to improve how the organisation communicates its mission, activities, and measurable impact, particularly to funders, government stakeholders, and potential partners. Effective communication is not just a visibility

tool; it is a strategic lever for influence, credibility, and sustainable growth. To strengthen Inspiring Teachers' communication, we recommend:

1. **Develop a Clear and Targeted Communication Strategy**

    - Define core audiences (e.g., funders, education ministries, practitioners, researchers) and tailor messaging accordingly.
    - Clarify the organisation's unique value proposition—what sets Inspiring Teachers apart—and align messaging with its vision and theory of change.
    - Outline communication goals across timeframes (e.g. raising awareness, attracting funding, influencing policy) and assign internal roles for implementation.

2. **Conduct a Website and Messaging Audit**

    - Review the current website, public materials, and digital presence to assess clarity, consistency, and resonance with key audiences.
    - Ensure that impact stories, metrics, and outcomes are clearly communicated, ideally with accessible data visualisations and human-centred narratives.
    - Consider working with an external communications or UX specialist to enhance structure, design, and content strategy if resources allow.

3. **Prioritise Impact Communication**

    - Create or refine an 'Our Impact' section on the website, using plain language to highlight how the programme changes teacher practice and student outcomes.
    - Include data-backed summaries, case studies, and short videos or quotes from teachers, learners, and education leaders.
    - Consider periodic impact briefs or 'learning snapshots' to share progress and lessons with stakeholders.

4. **Apply Evidence-Informed Dissemination Practices**

    J-PAL and other research organisations recommend the following for effective evidence communication:

    - **Tailored briefs:** Produce short, audience-specific research summaries (e.g., for policymakers, school leaders, or donors).
    - **Visual storytelling**: Use infographics, videos, and animations to make key findings more accessible.
    - **Leverage existing platforms**: Disseminate through education networks, policy roundtables, newsletters, and events where stakeholders are already active.

- **Two-way channels**: Foster dialogue, not just broadcast—host webinars, Q&A sessions, or social media conversations with audiences to gather feedback and build relationships.

5. **Build Internal Capacity and Partnerships for Communications**

    - Consider designating a team member or hiring a consultant to lead communications, even on a part-time or project basis.
    - Partner with communications experts or organisations experienced in education and nonprofit storytelling to upskill the team and co-create assets.

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Appendix

Appendix A: Suggested instruments for user feedback data collection on the SmartCoach App.

The current data offers a reasonable understanding of user feedback on the SmartCoach App, the Inspiring Reading Programme, and the Literacy Training Program. However, to gain deeper and more comprehensive insights, several critical areas need to be addressed. Therefore, three interview schedules have been developed to collect more extensive feedback from users. These instruments are designed to elicit detailed responses and broaden the scope of understanding regarding the effectiveness, usability, and impact of each programme.

1. Interview Guide- Inspiring Reading Programme
2. Interview Guide- SmartCoach App
3. Interview Guide- Literacy Training Programme