University of Cambridge Faculty of Education

REAL Research for Equitable Access and Learning

laterite DATA | RESEARCH | ADVISORY

Using teacher assessments to understand teacher pedagogical knowledge in Rwanda

Leaders in Teaching Research and Policy Paper Series

April 2021

mastercard foundation Leaders in Teaching

Authors:

This report was written by Gabrielle Arenge and Dr Emma Carter of the REAL Centre, University of Cambridge, under the direction of Professor Pauline Rose from the REAL Centre who was involved in the framing and editing of the paper. Beatrice Ani-Asamoah from Laterite provided substantive support and feedback in the drafting of the paper.

Acknowledgements:

This work was carried out with funding from the Mastercard Foundation as part of the Leaders in Teaching initiative. Leaders in Teaching responds to the opportunities that a quality secondary education represents for the African continent. It supports teachers throughout their careers and prepares them to deliver high-quality, relevant education.

The REAL Centre and Laterite are learning partners for the Leaders in Teaching initiative, responsible for generating evidence on improved teacher performance and student learning.

The researchers would like to thank all teachers and students who agreed to take part in this study. We are also grateful to Kristin Colenbrander, Dimitri Stoelinga and Phil Leonard from Laterite for their support and feedback in the drafting of the paper.

About the REAL Centre and Laterite:

The REAL Centre at the University of Cambridge pioneers research into overcoming barriers to education, such as poverty, gender, ethnicity, language and disability, and promotes education as an engine for inclusive growth and sustainable development.

Laterite is a data, research and advisory firm dedicated to bringing high-quality research services to the most underserved markets. Based in East Africa, the firm strives to carry out impactful research that helps decision-makers find solutions to complex development problems.

Suggested citation

Ani-Asamoah, B., Arenge, G., Carter, E., and Rose, P. (2021). Using teacher assessments to understand teacher pedagogical knowledge in Rwanda. Leaders in Teaching Research and Policy Series, April 2021. Laterite, Rwanda and REAL Centre, University of Cambridge.

Introduction

Teacher knowledge of the subject(s) they teach is an important predictor of student learning outcomes (Bold et al., 2017; Baumert et al., 2010; Harbinson and Hanushek, 1992; Taylor and Taylor, 2012). The literature in this area distinguishes between two types of teacher knowledge: content knowledge and pedagogical knowledge of the subject (s) they teach (Shulman, 1987).

Content knowledge refers to a teacher's knowledge of the subject matter, such as mathematics. Pedagogical knowledge of the subject(s) taught, on the other hand, refers to teachers' knowledge of how to make the content of specific subject(s), such as mathematics, accessible to students. It is distinct, therefore, from pedagogical knowledge more broadly, which refers to general knowledge of teaching, which can be applied across subject areas. Both content and pedagogical knowledge of subject(s) taught can be supported through pre-service teacher training programmes and continuous professional development.

While there is a wide range of literature on the importance of teachers' content knowledge (e.g. Bold et al., 2017; Harbinson and Hanushek, 1992; Taylor and Taylor, 2012), the literature on pedagogical knowledge of subject(s) taught is limited, particularly in low and lower-middle-income country contexts. Standardised tools are unlikely to be appropriate, given any tool must include questions that link to topics being taught by teachers, which tend to differ across different countries, contexts as well as grade levels. However, there are limited examples of existing tools that have been used for measuring teacher pedagogical knowledge of subject(s) taught in different contexts from which lessons can be learnt.

In the context of Leaders in Teaching, a Mastercard Foundation initiative to improve the quality of teaching and learning in Rwanda, researchers at the Research for Equitable Access and Learning (REAL) Centre at the University of Cambridge developed a tool to assess teachers' pedagogical knowledge of mathematics in over 100 Rwandan secondary schools. The tool is aligned with the mathematics curriculum in Rwandan secondary education, and reflects topic areas covered in 2018 Learning Achievements in Rwandan Schools assessment (LARS III) carried out by the Rwanda Education Board (e.g. from geometry; algebra; statistics and probability) (Rwandan Education Board, 2018). The tool addresses three domains of teacher pedagogical knowledge of mathematics grounded in previous research, namely including a task, student and instruction dimension. These teacher assessments form part of a suite of data collected from the same sample of teachers in early 2020 by Laterite and the REAL Centre, including classroom observations, student assessments, and assessments of teacher content knowledge.

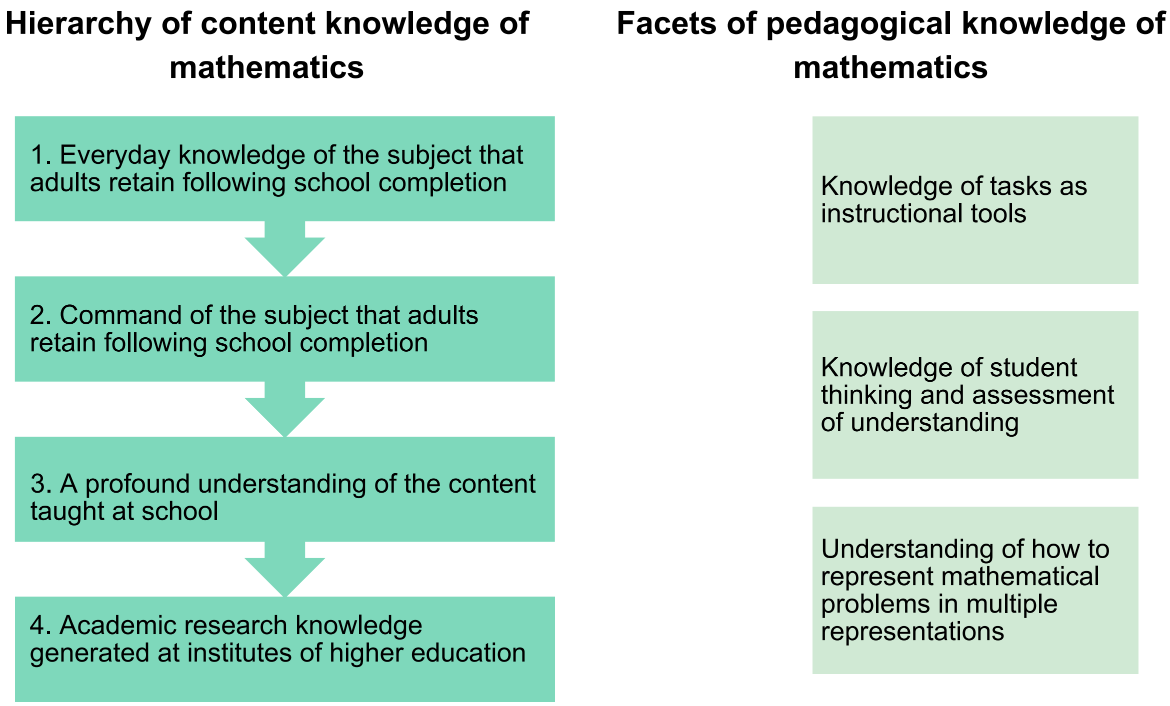
In this paper, we identify the ways in which our tool provides a contextualised and effective approach for understanding teacher challenges and strengths related to pedagogical knowledge of mathematics in the Rwandan context. We also show the challenges encountered. Addressing these will help improve the tool for future use in the LIT programme. Hopefully, it will also provide lessons for others intending to use such a tool in similar contexts.

This paper begins by describing the theoretical and empirical underpinnings of the tool that was developed to understand pedagogical knowledge of mathematics in the context of the Leaders in Teaching intervention in Rwanda. It then outlines the process of design of the tool, its implementation as well as development of the coding framework that was used to assess teachers' responses to questions on the instrument. Following this, issues experienced with implementation of the tool and coding are discussed. The paper concludes with recommendations for improvement.

Content knowledge vs. pedagogical knowledge of subject(s) taught

A combination of content knowledge and pedagogical knowledge of subject(s) taught is likely to be essential for quality teaching (Baumert et al., 2008; Callingham et al, 2016; Ozden, 2008; Shulman, 1987). However, the two concepts are not the same. As shown in Figure 1, in the context of mathematics, content knowledge has been classified hierarchically in four levels, with each level building on the next (see Baumert et al, 2010). Pedagogical knowledge of subject(s) taught constitutes a distinct body of instruction- and student-related mathematical knowledge and skills that makes the content *accessible* to students (Baumert et al., 2008; Callingham et al, 2016; Ozden, 2008; Shulman, 1987). Empirical evidence also identifies that content knowledge and pedagogical knowledge of subject(s) taught are separable aspects of teacher professional knowledge. This evidence has also shown that content knowledge is inert, unless complemented by a rich repertoire of knowledge and skills lined directly to the subject's instruction and student learning (e.g. Krauss, Baumert and Blum, 2008). Figure 1 shows the different facets of the two categories of knowledge in the context of mathematics.

Figure 1 / Facets of content knowledge and pedagogical knowledge of mathematics



Source: Adapted from Krauss, Baumert and Blume, 2008, cited in Baumert et al., 2008, p. 142.

Empirical studies which have primarily been undertaken in the Global North suggests that pedagogical knowledge of subject(s) taught makes a greater contribution to student progress than content knowledge (Baumert et al. 2008). Baumert et al.'s (2008) Germany-based study of data from a nationally representative sample of Grade 9 mathematics classrooms involving 181 teachers and 4,353 students found that pedagogical knowledge of mathematics may have greater impact on learning for low-achieving students from low socioeconomic backgrounds compared with high-achieving students from high socioeconomic backgrounds. In addition, their study highlighted the importance of content knowledge in enabling the development of pedagogical knowledge of subject(s) taught, a finding that has also been reinforced within qualitative research involving 23 primary mathematics teachers from the United States and 72 from China (e.g. Ma, 1999). This makes pedagogical knowledge of mathematics a particularly interesting aspect of teacher quality to explore in a Rwandan context given that, similar to many low-income contexts, inequality in learning outcomes is high and many students have faced barriers to their learning progress by the time they reach secondary school (Mastercard Foundation, 2020). It is further of interest as it will enable us to determine if previously found interconnections between content knowledge and pedagogical knowledge of subject(s) taught also exist within the Rwandan context.

Baumert et al. (2008) further note that teachers cannot develop this knowledge incidentally, but must learn it in structured learning environments in pre- and in-service training. This is important in the context of Leaders in Teaching, where implementing partners are working on a range of programmes that aim to improve teaching quality, including teacher content and pedagogical knowledge. For example, the African Institute of Mathematical Sciences' (AIMS) Teacher Training Program (TTP) in Rwanda aims to train over 4,500 in-service teachers from 760 secondary schools and over 2,100 pre-service teachers at the University of Rwanda College of Education (AIMS, 2020). The training covers both teacher content knowledge in Science, Technology, Engineering and Mathematics (STEM) subjects as well as innovative classroom pedagogical practices and integration of ICT in teaching. Understanding whether and how pedagogical knowledge STEM subjects, including mathematics, affects teaching and learning could be of relevance to implementing partners who are directly involved with teacher training.

Designing the tool

Our purpose in designing a tool assessing pedagogical knowledge of mathematics teaching was to gain insight into what teachers are currently doing in their instruction to make particular content in their lessons accessible and understandable to students. The intention is to analyse this information to identify the extent to which teacher pedagogical knowledge affects student's learning, and whether there is any change in this relationship once the Leaders in Teaching reforms have been embedded. It will further be analysed to determine the relationship between pedagogical knowledge of subject(s) taught and content knowledge and how this influences learning. The purpose is not to identify whether or not individual teachers have such knowledge or, more generally, to suggest that teachers in Rwanda are lacking in such skills. Rather, the aim is to identify whether and where teachers require additional support in order to enable them to promote their student's learning effectively. All participant and school data have been anonymised to ensure this.

In order to develop a tool to assess teacher pedagogical knowledge of mathematics in the Rwandan secondary education context, we began by reviewing previous literature to identify existing approaches (e.g. Ball et al., 2001; Baumert et al., 2008; Cueto et al, 2016; Krauss et al., 2008; Shulman, 1987). Baumert et al. (2008) categorise pedagogical knowledge of mathematics into three dimensions informed by earlier research (e.g. Krauss et al., 2008; Shulman, 1986, Ball et al., 2001, see Baumert et al., 2008, for a review). These three dimensions are identified as critical for providing insightful learning processes in mathematics:

- A **task dimension** assessing teachers' ability to identify multiple solution paths
- A **student dimension** assessing teachers' ability to recognise students' misconceptions, difficulties and solution strategies
- An **instruction dimension** assessing teachers' knowledge of different representations and explanations of standard mathematics problems.

Developing the questions

Our assessment similarly drew upon the three areas of task, student and instruction dimensions. They were included in an abridged format due to our time limitations with teachers who were undertaking multiple tasks for Leaders in Teaching at the same time (namely a teacher content knowledge assessment; teacher survey aimed at capturing information, such as on background characteristics, perceptions of teaching quality, attitudes towards diversity, job satisfaction and motivation for teaching; as well as a classroom observation of their teaching practices).

After determining the overall framework for the tool, the next step was to develop questions to ask teachers to test their pedagogical knowledge of mathematics across the three constructs. Questions were developed with reference to topics addressed in the Learning Achievements in Rwandan Schools (LARS III) numeracy assessment, as well as an examination of literature exploring typical misconceptions of secondary students in mathematics relating to these topics (e.g. Dogo and Nguuma, 2018 in Nigeria; Steinle and Stacey, 1998 in Australia; Zuya, 2014 in Nigeria). An example of this included the '"longer is larger" decimal misconception', whereby students believe a longer decimal number is larger number than a shorter decimal number.

Box: The Teacher Pedagogical Knowledge of Mathematics Assessment tool

Rather than focusing on what teachers know about their subject area, this tool (REAL Centre, 2021) focuses on how teachers make this knowledge accessible to students. The tool consists of 12 questions addressing three main areas of teacher pedagogical research drawn from Baumert et al. (2008, p. 149):

1. identifying student misunderstandings;
2. use of tasks to help facilitate student understanding of mathematical concepts/problems;
3. use of multiple forms of explanation and representation to help facilitate student understanding of mathematical concepts/problems.

Each question asks the teacher to consider a student's answer to a mathematical question, and identify whether the question was answered correctly. If not, the teacher is asked to correct the students' response and is then required to answer a series of questions about what the student misunderstood about the underlying concept, and how they would support the student to understand the concept. An example question is included below.

1. A student answers the following question.

Write a number that is greater than 3.11
3.101

a) Is this student correct? (If yes, skip to next question)

b) If incorrect, what is the correct answer?

c) If incorrect, what is their main misunderstanding of the concept?

d) What mathematical task would you give this student to help them better understand this concept?

e) Please outline 2 different ways of explaining this concept to your student.

Implementing the teacher pedagogical knowledge of mathematics tool

The tool was implemented in February/March 2020 with one mathematics teacher per school at over 100 secondary schools in Rwanda. This was the same sample used for other baseline research activities carried out by Laterite and the REAL Centre for the Leaders in Teaching initiative in early 2020. The instrument was implemented in English, due to this being the main instructional language at the secondary level in Rwanda. Given this, it was not anticipated that teachers would have difficulty understanding or responding to questions.

Overall, administering the assessment tool went smoothly. Teachers, on the whole, related to the topics addressed in the assessment. Teachers completed the assessments on paper copies, following the instructions of the researchers. The information was then transferred to an excel spreadsheet which facilitated processing and analysis of the data.

The assessments typically took place after teachers had been observed in their classrooms. Teachers were handed the assessment with general instructions on completing two sections (the first focused on content knowledge and the second, pedagogical knowledge of mathematics) and how much time they had available for the assessment (45 minutes). There were no specific verbal instructions provided around how each task was to be completed, given these were already provided on the assessment sheets. As the two assessments were provided within the same booklet (i.e. with content knowledge first), it is presumed that most teachers would have started with the content knowledge component. This, therefore, may have impacted the length of time spent on the component on pedagogical knowledge of mathematics. Where they had limited time available for the last part, this may have had implications on the outcomes of the assessment. Each teacher was allowed privacy during the assessment and was permitted to take the test at any quiet preferred location on the school grounds. Enumerators retrieved the assessment at the end of the time allocated. In most cases, teachers completed the assessments during class time in the office of the Director of Studies while other teachers were busy with their classes. There was therefore no indication at any point that teachers were referring to other teachers for support. The instruments combined (including teacher survey, classroom observations and assessments) took more than 2.5 hours in total. Enumerators reported that many teachers were tired by the time they started on this assessment. We return to points raised in this section in our discussion of issues below.

Developing the coding framework

We were careful to keep the question of ethics in mind in the design and use of the tool. As noted, the intent of the assessment is to understand where teachers need support, not to criticise teachers if they did not score as well on these assessments. It was vital that teachers and schools were all anonymous in the coding so the results could not be traced back to individuals. In addition, the coding framework was important in ensuring fair and contextualised assessments of teacher pedagogical knowledge.

We developed a coding framework for questions addressing the three constructs of pedagogical knowledge (see questions c, d and e in the instrument, (REAL Centre 2021)) using an exploratory approach grounded in the data. We first examined teacher responses across all questions to identify nuances and trends in the data instead of using a pre-existing coding framework. We then developed a series of codes to systematically capture the varying levels of accuracy, specificity and depth in teacher responses. These codes were piloted in a sub-set of responses by two researchers. Minor discrepancies were discussed and resolved and the codes were subsequently refined and finalised for scoring.

We used this grounded and iterative approach due to the limited number of existing assessments of teacher pedagogical knowledge of mathematics (or other subjects), and the lack of detail on how teacher responses are marked in research presenting results from these assessments. Additionally, we were committed to designing the framework in a way that was responsive to the data in order to fairly and non-judgmentally identify and reflect the wide variation in teacher responses. Table 1 shows an example of the variation in teacher responses.

Table 1 / Sample assessment coding and range of teacher responses

Question:			
1. Write a number that is greater than 3.11. Student response: 3.101 c) If incorrect, what is their main misunderstanding of the concept?			
Teacher Responses:			
0 points - Provides no response or an incorrect response.	**1 point -** Identifies a relevant general mathematical concept but not a specific area of student misunderstanding.	**2 points -** Identifies correct general area of student misunderstanding but lacks specificity.	**3 points -** Identifies correct and specific student misunderstanding.
"Rounding off the numbers" *"Inequality"*	*"Misunderstanding of the decimal number"* *"Doesn't understand the decimal number"*	*"Ordering decimal numbers"* *"Comparing decimal numbers"*	*"Place value of decimal numbers"* *"Not being aware how to use decimals, to know the place of tens, hundredth and thousandth"*

Issues with implementation and coding of the tool

During implementation and coding of the tool, we encountered two main issues:

Misunderstanding of key terms: The assessment asked teachers to provide 'tasks' and 'explanations' of mathematical concepts that could help students correct their misunderstandings. Preliminary analyses of teacher responses indicate that teachers may have confused the terms: at times teachers provided an explanation when asked to provide a task and vice versa. This issue appeared among more than 15% of respondents in one portion of the assessment—and was noted in the overall scoring. This confusion may be related to challenges in translation; teachers' relative lack of experience in undertaking these types of assessments; and teachers' limited repertoire in explaining different strategies and concepts they may use when teaching. It may also relate to teachers' English language proficiency.

Low levels of elaboration and specificity: Teacher responses also featured low levels of elaboration and specificity and at times were simplistic. For example, when asked to offer an explanation to correct students' misunderstanding of place value with decimal points, teachers with low levels of elaboration wrote answers such as "look at the number after the point" and "use place value of decimal numbers". Responses with more elaboration tended to offer greater specificity about what a teacher might do or say to support struggling students (e.g. "If you compare the decimal numbers, you should compare each digit to digit"). Although elaboration alone is not sufficient evidence of pedagogical knowledge, higher scoring responses often featured more detail. This finding might be related to the limited range of pedagogic strategies teachers have to draw on, which could be connected in part to the extent to which this has been supported in any pre-service teacher training or continuous professional development that they have received. It could also reflect the wording used in the assessment (e.g. the word 'outline' may be interpreted as a quick summary rather than a detailed response). Further, teachers' varying levels of English language proficiency may have contributed to their shorter responses in some cases. Importantly also, as noted above, teachers were given these assessments after they had already completed a range of other survey instruments, which took time. For this reason, enumerators reported that sometimes follow-up questions on this assessment might have been rushed. In addition, 10% were only partially completed, which may be because teachers ran out of time given the other tasks they were asked to complete.

Recommendations for improvement

Given this is the first time to our knowledge that pedagogical knowledge of mathematics has been assessed in the Rwandan context, we believe that the overall approach worked well, and provides a useful basis for analysis to identify the extent to which teacher knowledge contributes to student learning outcomes currently, the effects it has on narrowing learning inequalities, and where support to teachers could be beneficial in the future. These findings will be presented in a follow up paper.

At the same time, there are important lessons to learn for the future, both for its use in the Leaders in Teaching initiative, as well as for others engaged in improving teaching quality in Rwanda and other related contexts:

Clarifying key terms: Teachers' understanding and interpretation of the tool may be enhanced by including examples of key terms such as a 'task' and 'explanation' in future versions of the assessment. Ensuring key terms are also translated into the local language, and teachers have the option to respond in Kinyarwanda as well as in English, may also aid this process, given lack of familiarity with this type of assessment. Concrete examples may help mitigate any confusion between the two terms. It is important, however, to be mindful of the potential influence this might have on assessment responses and to ensure that examples are sufficiently distinct from questions included in the assessment itself.

Capturing challenges during implementation: We further recommend that the reasons why teachers experience challenges with the assessment tool are recorded. It is important to determine whether the majority of partially filled assessments were a result of not knowing the answers, misunderstanding of English terms and/or challenges expressing answers in English or written form. Having a question on the form asking to teachers to self-assess how they found the assessment and asking them to note any issues they had during the assessment (e.g. not having enough time to complete) could help provide insights into challenges experienced.

Providing more time and space for thinking: Finally, the limited time frame for completing the assessment combined with the physical design of the instrument may have impacted teachers' ability to articulate or diagram their responses. In the future, we recommend providing more time to complete the assessment. The tool would also benefit from more 'white space' on the paper where teachers can write, diagram, and/or draw their responses.

Conclusion

We know from the literature that the way in which information is transmitted to students is key for learning. It is therefore important that this pedagogical knowledge of subject(s) taught is assessed so that teacher training programmes can target gaps in teacher pedagogical knowledge with the goal of ultimately improving student learning. This is important in the context of programs such as Leaders in Teaching because it provides an area of focus for teacher education, training and continuous professional development programmes.

Going forward, we will continue our analysis of the teacher assessment data together with other datasets on the same sample, including classroom observations and student assessments, to better understand the relationship between teacher content knowledge and pedagogical knowledge of mathematics, as well as the relationship of these with student learning. We will also continue to reflect on and share lessons learned in the implementation of these assessments in future research phases of the Leaders in Teaching initiative, with the hope that this learning will be of benefit to others considering the use of such tools in other related contexts.

References

African Institute for Mathematical Sciences. (2020). Teacher Training Program. https://aims.ac.rw/public-engagement/teacher-training-program/

Ani-Asamoah, B., Carter, E., Colenbrander, K., Leonard, P. and Rose, P. (2020a) Video recordings of classroom observations: Using the Teach tool in Rwandan secondary schools. *Research and Policy Paper No. 20/9.* REAL Centre: University of Cambridge.

Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss (Dubberke), T., Jordan, A., Klusmann, U., Krauss, S., Neubrand, M., and Tsai, Y.-M. (2010). Teachers' Mathematical Knowledge, Cognitive Activation in the Classroom, and Student Progress. *American Educational Research Journal. 47, 133-180.* https://doi.org/10.3102/0002831209345157

Bold, T., Filmer, D., Martin, G., Molina, E., Stacy, B., Rockmore, C., Svensson, J., and Wane, W. (2017). Enrollment without Learning: Teacher Effort, Knowledge, and Skill in Primary Schools in Africa. *Journal of Economic Perspectives*, *31*(4), 185–204. https://doi.org/10.1257/jep.31.4.185

Callingham, R., Carmichael, C. and Watson, J. M. (2016). Explaining student achievement: The influence of teachers' pedagogical content knowledge in statistics. *International Journal of Science and Mathematics Education*, *14*, 1339–1357. https://doi.org/10.1007/s10763-015-9653-2

Cueto, S., León, J., Sorto, M. A., and Miranda, A. (2017). Teachers' pedagogical content knowledge and mathematics achievement of students in Peru. *Educational Studies in Mathematics*, *94*(3), 329–345. https://doi.org/10.1007/s10649-016-9735-2

Dogo, A. and Ngumma, J. (2018). Identification and remediation of students' misconpcetions in biology and mathematics using conceptual change approach. *International Journal of Education Development,* *22*(2). https://benchmarkjournals.com/wp-content/uploads/2019/09/6-2.pdf

Harbison, R. W., and Hanushek, E. A. (1992). *Educational performance for the poor: Lessons from rural northeast Brazil.* Oxford, England: Oxford University Press.

Jacob, F., John, S., and Gwany, D. M. (2020). Teachers' pedagogical content knowledge and students' academic achievement: A theoretical overview. *Journal of Global Research in Education and Social Science*, *14*(2), 14-44. https://www.ikprress.org/index.php/JOGRESS/article/view/5405

Krauss, S., Baumert, J., and Blum, W. (2008). Secondary mathematics teachers' pedagogical content knowledge and content knowledge: Validation of the COACTIV constructs. *ZDM*, *40*(5), 873–892. https://doi.org/10.1007/s11858-008-0141-9

Ma, L. (1999). Knowing and teaching elementary mathematics: Teachers' understanding of fundamental mathematics in China and the United States. Hillsdale, NJ: Erlbaum.

Mastercard Foundation. (2020). Secondary education in Africa: Preparing youth for the future of work. https://www.issuelab.org/resources/35972/35972.pdf

Ozden M. (2008). The effect of content knowledge on pedagogical content knowledge: The case of teaching phases of matters. *Educational Sciences: Theory and Practice, 8*(2), 633- 645.

REAL Centre. (2021). Teacher pedagogical content knowledge test. https://www.educ.cam.ac.uk/centres/real/researchthemes/teachingandlearning/leaders/Teacher%20Pedagogical%20Content%20Knowledge%20Test.pdf.

Rwanda Education Board (REB). (2018). *Learning Achievement in Rwandan Schools LARS III Phase Two: Primary 6 (P6) and Secondary 3 (S3) Results Report.* Kigali, Rwanda.

Shulman, L. (1987). Knowledge and teaching: foundations of the new reform. *Harvard Educational Review*, *57*(1), 1-22.

Steinle, V. and Stacey, K. (2003). Grade-Related Trends in the Prevalence and Persistence of Decimal Misconceptions. International Group for the Psychology of Mathematics Education. https://www.researchgate.net/publication/234636405_Grade-Related_Trends_in_the_Prevalence_and_Persistence_of_Decimal_Misconceptions

Taylor, N. and Taylor, S. (2013). "Teacher Knowledge and Professional Habitus." In Creating Effective Schools, edited by N. Taylor, S. Van der Berg and T. Mabogoane, 202–32. Cape Town: Pearson.

Zuya, H. E. (2014). Mathematics teachers" responses to students' misconceptions in algebra *International Journal of Research in Education Methodology, 6*(2*),*830-836*.* https://dspa-ce.unijos.edu.ng/jspui/bitstream/123456789/2450 /1/3880-Article%20Text-4405-2-10-20180104.pdf.

Research for Equitable Access and Learning

UNIVERSITY OF CAMBRIDGE
Faculty of Education

REAL Centre
Faculty of Education
University of Cambridge
184 Hills Road, Cambridge,
CB2 8PQ, UK
@REAL_Centre
www.educ.cam.ac.uk/centres/real
Email: realcentre@educ.cam.ac.uk

laterite
DATA | RESEARCH | ADVISORY

Laterite
Amy's House, Plot 1563,
KG 12 Avenue,
Gaculiro, Kinyinya,
Kigali, Rwanda

@Laterite_Africa
www.laterite.com

All details correct at the time of going to print, April 2021.