

System (In)Coherence: Quantifying the Alignment of Primary Education Curriculum Standards, Examinations, and Instruction in Two East African Countries

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With the rapid increase in schooling attainment in recent decades, education systems in many developing countries are primarily coherent for schooling—getting more children in school for more years. As the learning crisis has gained prominence there is increasing recognition that this coherence for schooling is not sufficient, on its own, for achieving learning for all. Many children who are in school are learning very little. To ensure all children receive an adequate education, education systems need to become coherent for learning.¹

This presents a challenge: how to measure (in)coherence in a system and diagnose and improve areas not coherent for learning.

Improvements in instructional coherence have been shown to have large impacts on student learning.² Yet analysis of such coherence, especially at a systems level in developing countries, is rare.³ Schools and teachers are expected to complete many instructional tasks, including completing the prescribed curriculum within an allotted timeframe and preparing children for national exams, especially the high stakes primary leaving exams at the end of primary school in many African countries. These teacher responsibilities may or may not be coherent with each other, and may or may not be coherent for learning.

This study uses an established methodology, the Surveys of Enacted Curriculum (SEC),⁴ and applies it to a developing country context to systematically analyze and quantify the content and coherence of the primary curriculum standards, national examinations, and actual teaching delivered in the classroom in Uganda and Tanzania.

To analyze instructional coherence, using the SEC methodology, a team of experts first developed a taxonomy of topics and subtopics for each subject in each country. They then coded the competencies in

¹ Pritchett, 2015

² Crouch and DeStefano, 2017; Piper et al., 2018; Banerjee et al., 2016; Smithson and Collares, 2007; Gamoran et al., 1997; Porter, 2002

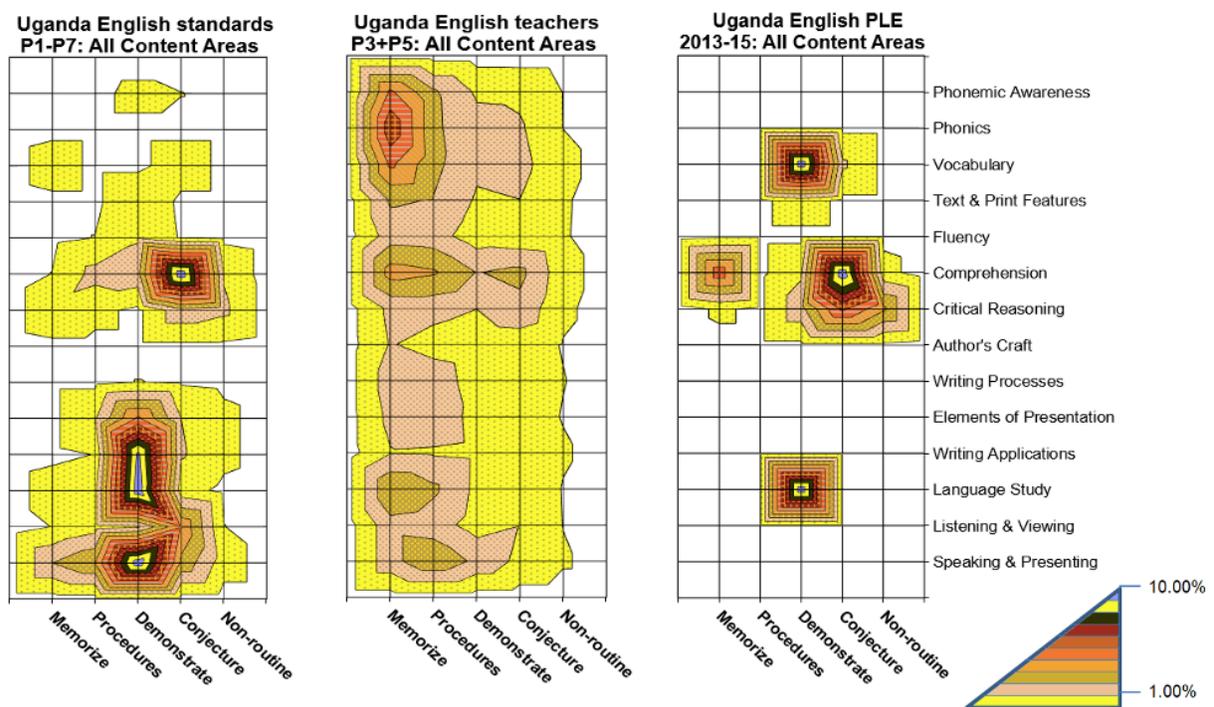
³ Twaweza, 2015 and Burdett, 2017

⁴ Blank, Porter and Smithson, 2001; Porter, 2002; Polikoff, Porter and Smithson, 2011

the curriculum standards and items in the national primary leaving exams against the lists of topics and subtopics and rated the level of cognitive demand for each. Further, teachers were trained and surveyed on their instructional content coverage using the same structure. The approach produces three-dimensional content maps displaying topic coverage, level of cognitive demand, and level of emphasis (see Figures 1 and 2) and produces quantified measures of alignment across components. The resulting rich dataset allows analysis of instructional (in)coherence.

The curriculum standards, national exams, and teacher instruction in Uganda and Tanzania vary widely in their focus and content coverage, from being narrowly focused on a few topics, as with the primary leaving exams, to broadly covering a full suite of topics, as with teachers' classroom instruction.

Figure 1. (In)coherence in Ugandan English instruction



Source: Atuhurra & Kaffenberger (2020)

In both countries, the English curriculum standards follow a non-systematic “drop and reinstate” content coverage pattern in which a topic is covered in one grade, not covered (“dropped”) in the next grade or two, and then reinstated sometimes at a (much) higher level of cognitive demand. This type of inconsistent progression not only limits content continuity from grade to grade, but can make it difficult for children to fully engage with the material in the higher grades as they have not had the opportunity to master the necessary intervening skill levels. Taken to the extreme, the Ugandan English standards do not cover the foundational topics of phonics or phonemic awareness in the early primary years, and only introduce phonemic awareness in Grade 6, expecting children to engage with it at a relatively high cognitive skill level.

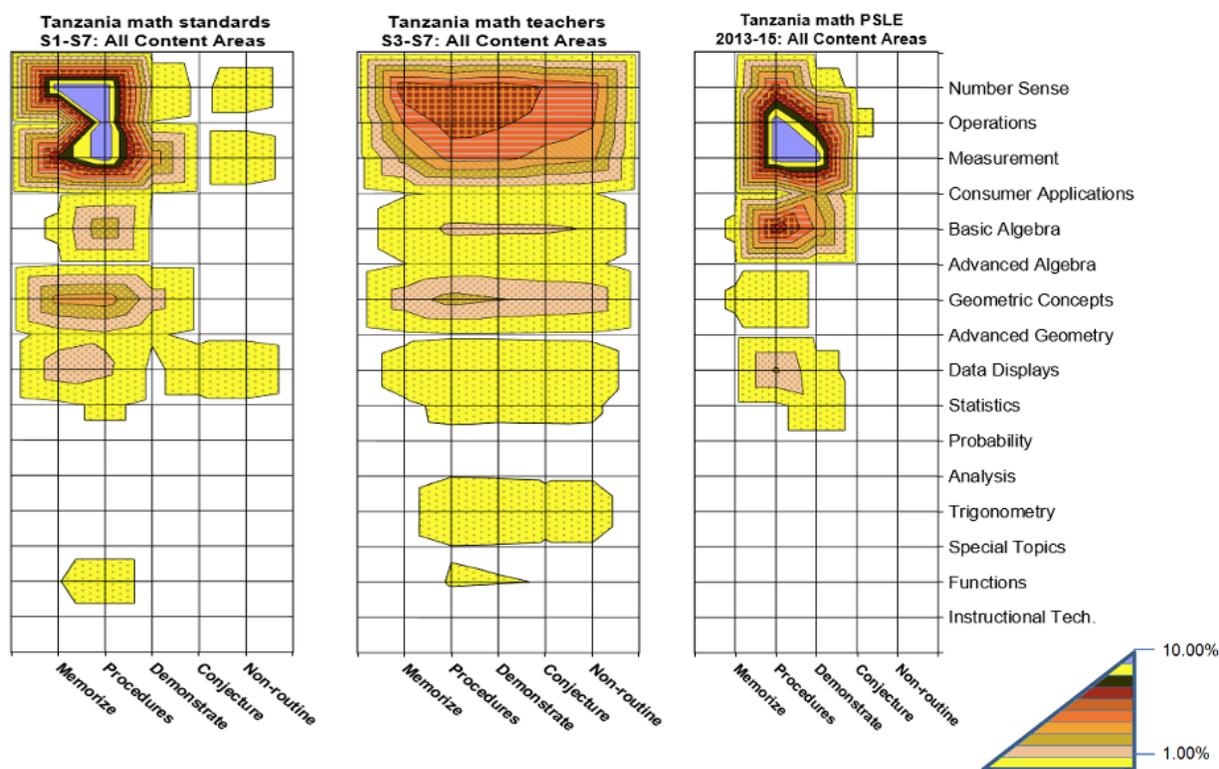
The national exams tend to prioritize the two lowest-order cognitive demand levels, curriculum standards prioritize lower order skills (Tanzania) or mid-level skills (Uganda), and teachers' instruction often covers all five levels of cognitive demand.

While the breadth of skill levels covered by teachers may be productive if it ensures children gain procedural and conceptual mastery of competencies, it could also indicate an overemphasis on breadth over depth of knowledge and abilities. In Uganda, rural teachers tend to prioritize lower-order skills of recall/memorization more than urban teachers.

The analysis reveals high levels of incoherence across instructional components.

National exams are, typically, poorly aligned with the curriculum standards, indicating that these education systems place competing responsibilities on teacher's limited instructional time. In Uganda, for example, only four of the 14 topics in the English curriculum standards appear on the primary leaving exam, and two of the highest-priority topics in the standards are completely omitted from the exams. In Tanzania, the alignment between the English exam and curriculum standards is 0.11 on a scale ranging from 0 to 1, with 0.50 considered reasonably well-aligned. For Tanzanian mathematics, the exams and curriculum have an alignment of 0.44. Ugandan mathematics is an exception with an alignment of 0.57 between curriculum standards and exams.

Figure 2. (In)coherence in Tanzanian mathematics instruction



Source: Atuhurra & Kaffenberger (2020)

Teacher instruction generally aligns poorly with the curriculum standards.

In both countries, teachers often cover broad swathes of content which is unrelated to the structure in the curriculum standards. In Tanzania, two mathematics topics constitute two-thirds of the curriculum

standards content but make up less than half of teachers' instructional focus. Conversely, teachers place 25 percent of their mathematical instructional focus on operations, which accounts for only 10 percent of the curriculum standard's content. While the curriculum standards, in both countries and for both subjects, tend to prioritize low- and mid-level cognitive skills, teachers' instruction covers a broad set of skill levels, often stretching from the lowest order (memorization) all the way to the highest order (application to non-routine problems). In Uganda, alignment between teachers' instruction and curriculum for English is only 0.15 on the 0 to 1 scale. In Tanzania teacher instruction is poorly aligned with exams, with alignment measures of 0.33 for mathematics and 0.11 for English.

Building on these findings, this study suggests multiple possible extensions:

- This methodology can be used in additional contexts to inform review and restructuring of curriculum standards to better align with children's levels and progression of learning. The same approach can also then assess support provided to teachers, such as textbooks, instructional materials, and training, and ensure they are coherent with the standards.
- The common language provided in the SEC approach for coding content can facilitate discussion across curriculum and examination bodies, and the content maps enable pinpointing of exam content that could be brought into better alignment with standards.
- Assessing children's learning levels against the same taxonomy would show how well aligned instructional components are with children's learning levels and needs. This could also identify patterns in teacher instruction, for example if instruction tends to favor some students (such as high or low performers) over others.

In addition to providing empirical results for Uganda and Tanzania, this study aims to provide a proof of concept for the SEC methodology, which can be used in other contexts to diagnose areas of instructional incoherence in education systems.

With its structured, systematic approach to quantifying content across multiple instructional components, and its adaptability to other uses such as informing teacher support materials and professional development, this type of analysis can provide valuable insight to education systems and guide reform efforts towards achieving coherence for learning.

The full paper, System (In)Coherence: Quantifying the Alignment of Primary Education Curriculum Standards, Examinations, and Instruction in Two East African Countries, including citations can be downloaded from the RISE website: <https://riseprogramme.org/publications/system-incoherence-quantifying-alignment-primary-education-curriculum-standards>

