

Learning to read and numerate in the developing world:

Cross-national commonalities and differences in primary school curricula and textbooks

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Preliminary Remarks

In contrast to many existing cross-national studies of curricula and textbooks, this study:

- Mainly addresses policy concerns/debates around ‘quality education’ and learning outcomes, and not a specific issue in the analysis of school curricula
- Focuses on international, rather than national, level policies
- Focuses on end of primary cycle (grades 4-6), not secondary education
- Analyzes ‘core’ subjects—reading and mathematics—and not subjects in the social sciences (history, geography, civics, environment)
- Focuses exclusively on countries in the developing world
- Depicts cross-national patterns in the current period and not changes over time
- Codes textbooks and curricula using native language speakers

Outline of Presentation

1. Background: Recent international policies/UNESCO initiatives to improve quality education in the developing world
2. Creating an international collection of official curricular documents in reading and mathematics-ICATA
3. Examining the diversity & representativeness of analyzed curricular materials
4. Three main research questions
5. Methods: Coding frameworks and coding process
6. Results, Summary and Caveats
7. Conclusion and Next Steps

International policy: EFA & Quality

- In 1990, Jomtien Thailand, the **Education for All** agenda emerged - an '**expanded vision of basic education**' – committing governments, international agencies, donors and NGOs to '**universal access to, and completion of, primary education by 2000**'
- In 2000, Dakar Senegal, the World Education Forum agreed that by 2015 '**all children...will have access to and complete free and compulsory primary education of good quality.**' More comprehensive set of six EFA goals was established
- EFA Goal 6: “**Improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills**”

UNESCO Initiatives on Quality

- Main interagency initiatives (2000-2010): ‘But Can They Read’, ‘From Access to Success’; **‘Learning Counts’**; **‘International Working Group on Assessing and Improving Quality Learning’** and Teacher Education in Sub-Saharan Africa (TISSA)
- UNESCO involved in regional learning assessments in Latin America and sub-Saharan Africa
- On-going shift in monitoring quality education: from a focus on **monitoring inputs and enabling conditions** (eg, pupil-teacher ratios, teacher qualifications, textbook availability, expenditures) **to learning outcomes**—especially in literacy, numeracy and ‘life skills’

Specific Background to this Study

- Linked to International **Education for All** Agenda: Emerging priority since 2000-- quality education & learning outcomes
- Captures policy shift: **from access to quality issues; from monitoring inputs to outcomes**; though learning process still ‘black box’
- **Initially part of UNESCO inter-agency initiative: ‘Learning Counts’ (2008-2010)**
- Present study was one of several commissioned by UIS as background for the ‘International Working Group on Assessing and Improving Quality Learning’



Main aims: Create int'l curriculum archive and explore commonalities

Aim: To obtain official curriculum documents in reading and mathematics for the upper grades of primary education in a diverse range of developing countries, and identify curricular commonalities/ differences

- Specific focus: The intended curriculum guidelines and Textbooks in reading and mathematics for grades 4-6
- Means: Official networks e.g. IBE, UNESCO, MoE web sites
- Non-official networks: int'l colleagues and scholars; UAlbany int'l students



Creation of International Curriculum and Textbook Archive: ICATA

- ICATA contains over 700 documents
- Includes different document types: official guidelines, policy statements, teacher guides, textbooks, exercise books and (a few) exams
- Documents come from over 60 countries
- Two main doc categories: 1) Official curriculum guidelines; 2) Textbooks
- About 60% of relevant documents coded
- (Additional documents compiled but not coded: out of date, other subjects/grades)

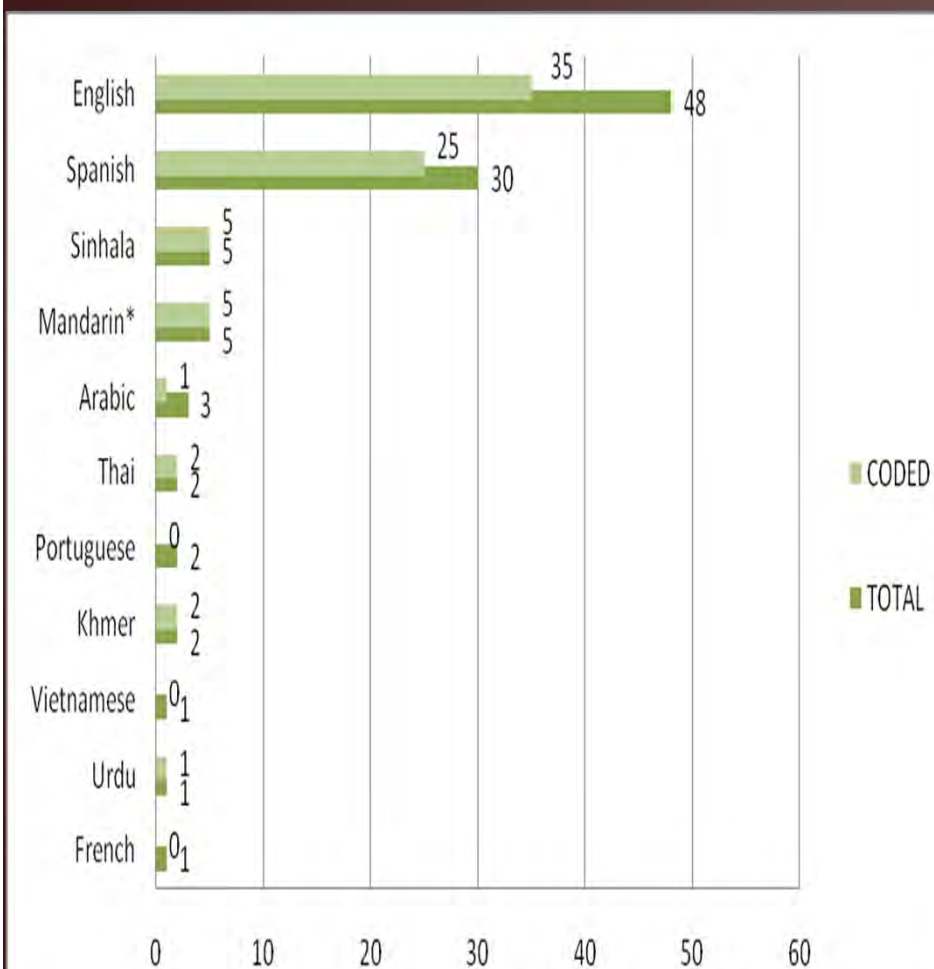


Countries Represented in Archive

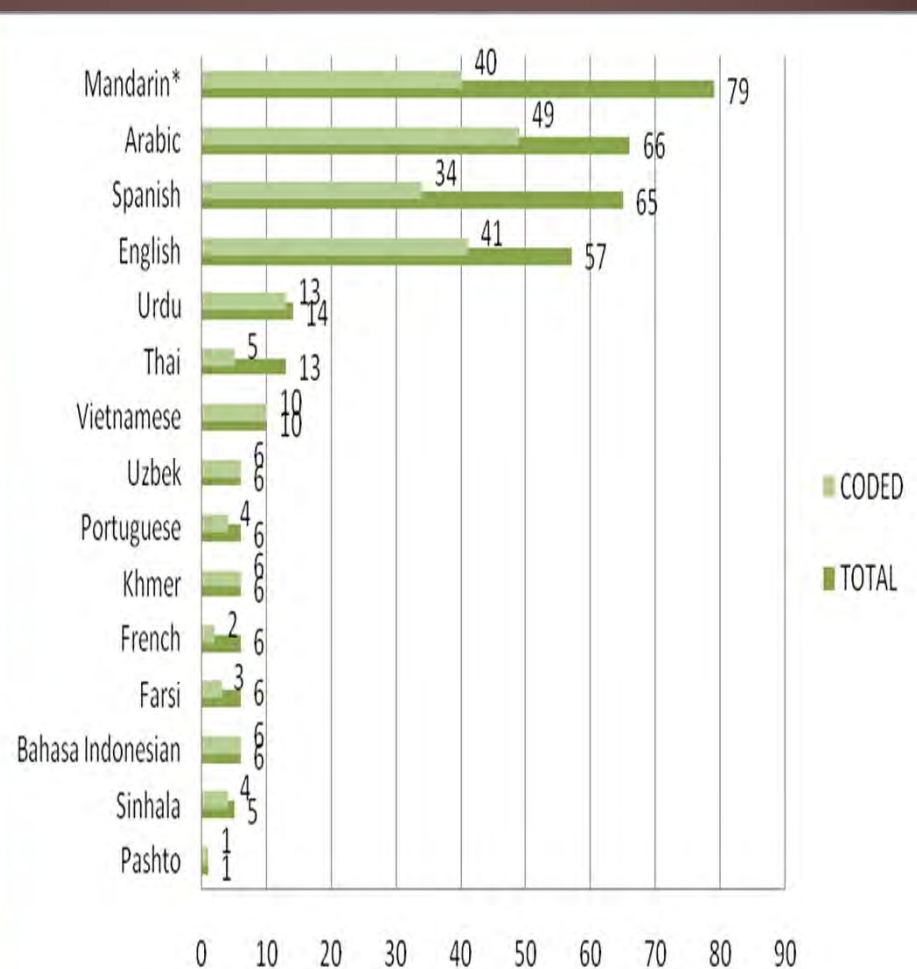
Egypt	Bahamas	Indonesia	Belize	Nicaragua	Iran	Namibia
Jordan	Bermuda	Papua New Guinea	Brazil	Panama	Pakistan	Senegal
Lebanon	Dominican Republic	Philippines	Chile	Paraguay	Sri Lanka	South Africa
Palestinian Autonomous Territories	Eastern Caribbean*	Singapore	Colombia	Peru	Angola	Uganda
Qatar	Jamaica	Taiwan	Costa Rica	Venezuela	Benin	Armenia
Syrian Arab Republic	Saint Lucia	Thailand	Ecuador	Trinidad & Tobago	Botswana	Kyrgyzstan
Tunisia	Cambodia	Vietnam	El Salvador	Afghanistan	Ghana	Uzbekistan
United Arab Emirates	China (+two major cities)	Sudan (south)	Guatemala	Bangladesh	Lesotho	
Libya	Hong Kong	Argentina	Mexico	India	Mauritius	Malta

Language Diversity: Documents coded in 15 different languages

Curricular Guidelines

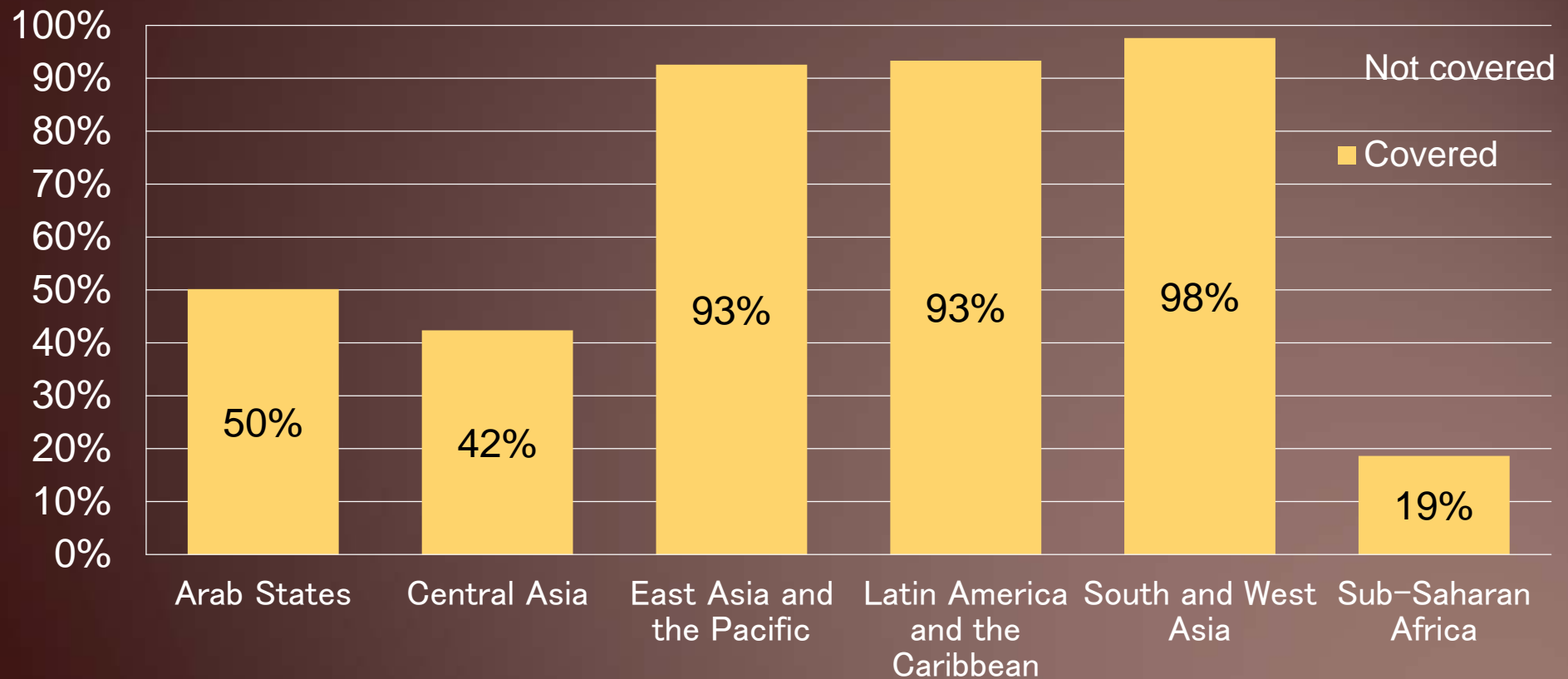


Textbooks



Enrollments of countries in analysis relative to enrollments in region

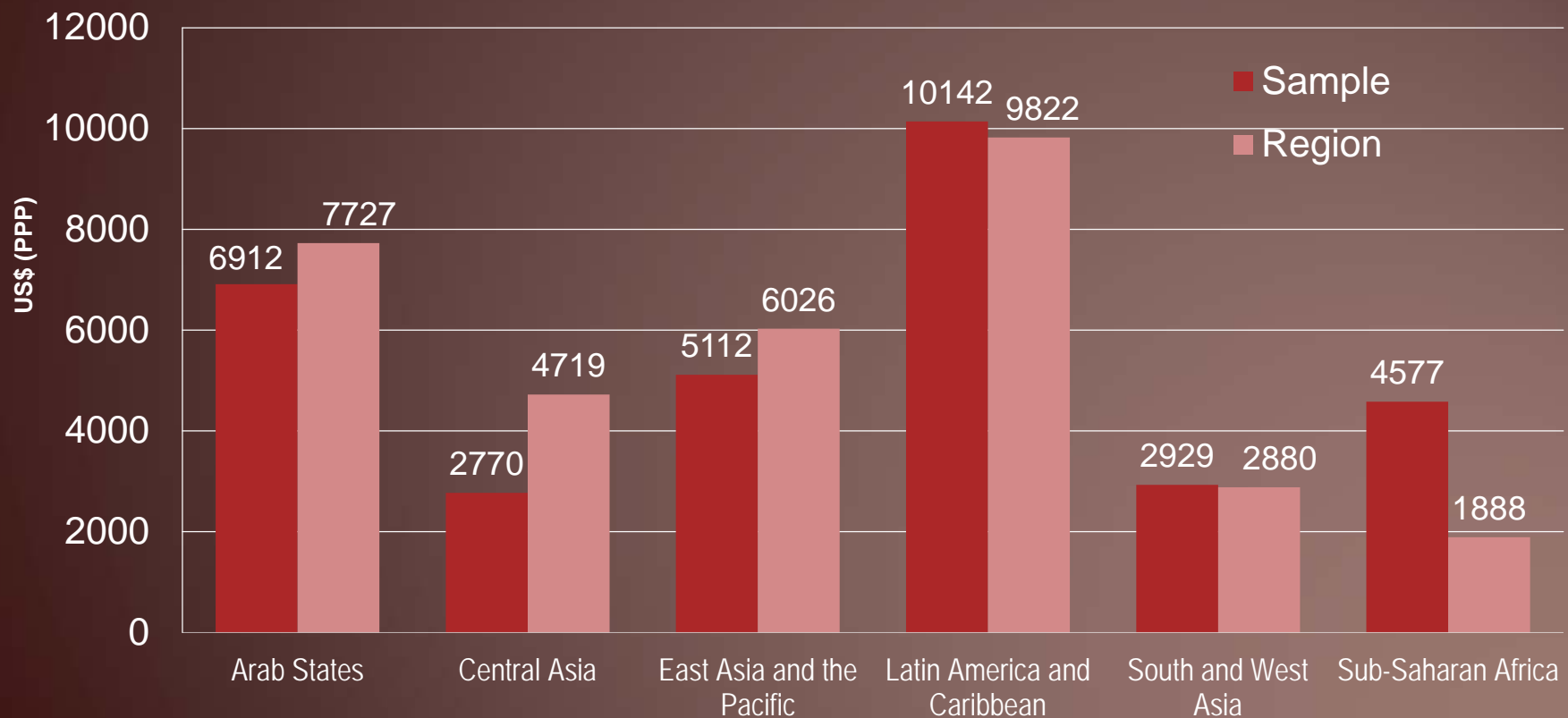
What percentage of primary school enrolments in each region is 'covered' by coded curriculum materials in this study?



Only enrolments in developing countries are included in regional calculations

Average income of countries in analysis relative to average income in region

How representative are countries in study to all developing countries in the region, by weighted regional averages* of GNP per capita?



Only developing countries are included in the calculation of regional averages

3 Key Research Questions

- To what extent do diverse developing countries in the world define similar contents and performance expectations in reading and mathematics in the upper grades of primary education? (*the commonalities issue- International policy*)
- To what extent do the content domains of official curriculum statements in reading and mathematics align with those found in relevant textbooks? (*the alignment issue- National policy*)
- In which countries are performance expectations in mathematics curricula more (or less) cognitively challenging? (*the challenging curriculum issue- Curriculum developers*)
[In the future performance expectations in reading will be explored.]

Challenge: How to characterize (and compare) the entire contents of a curricular guideline or textbook, not a specific topic within them

Coding Frameworks (from TIMSS & PIRLS)



Coding Process



Coding the intended contents of mathematics & reading

- Drew upon detailed coding frameworks from TIMSS and PIRLS to define two basic dimensions of the mathematics and reading curriculum: 1) **the intended topics, issues and contents taught in each subject**; and 2) **the standards that students are expected to achieve in each subject at a given grade level** (or cycle)
- The first dimension--**contents**--reflects the subject knowledge domains; the latter--**performance expectations**--refers to the skills and competences that students are expected to possess as a consequence of classroom instruction
- Detailed TIMSS and PIRLS coding schemes were simplified
- Also, coding frameworks cover a wider range of knowledge than one would expect to find primary-level textbooks in developing countries
- Note: the same subject coding framework was used for both curricular statements/ guidelines and textbooks

Coding framework in mathematics

- The mathematics framework is divided into 10 general content topics (2 digit) that are divided into detailed sub-categories (3 digit) and even sub-sub-categories (4 digit) .
- The topics range from simple mathematical concepts (e.g., whole numbers, fractions and decimals) and operations to more complex topics such as geometry, proportionality and data representation
- Performance expectations in mathematics are organized from simple to more complex.
- Five major performance expectations: knowing; using routine procedures; investigating and problem solving; mathematical reasoning; and communicating.
- Each performance standard is further subdivided into one or more specific competencies

Coding Framework In Math (Contents)

1.1	Numbers		
	1.1.1	Whole Numbers	
		1.1.1.1	Meaning
			The uses of numbers
			Place value & numeration
			Ordering & comparing numbers
		1.1.1.2	Operations
			Addition
			Subtraction
			Multiplication
			Division
			Mixed Operations
		1.1.1.3	Properties of Operations
			Associative properties
			Commutative properties
			Identity properties
			Distributive properties
			Other number properties
	1.1.2	Fractions & Decimals	
		1.1.2.1	Common Fractions
			Meaning & representation of common fractions
			Computations with common fractions & mixed numbers
		1.1.2.2	Decimal Fractions
			Meaning & representation of decimals
			Computations with decimals
		1.1.2.3	Relationships of Common & Decimal Fractions
			Conversion to equivalent forms
			Ordering of fractions & decimals
		1.1.2.4	Percentages

Math Coding Framework (Contents)

1.4	Geometry: Symmetry, Congruence & Similarity
1.4.1	Geometry: Transformations Patterns, tessellations, friezes, stencils, etc Symmetry Transformations
1.4.2	Congruence & Similarity Congruence Similarities (similar triangles and their properties; other similar figures and properties)
1.4.3	Constructions w/ Straightedge & Compass
1.5	Proportionality
1.5.1	Proportionality Concepts Meaning of ratio and proportion Direct and inverse proportion
1.5.2	Proportionality Problems Solving proportional equations Solving practical problems with proportionality Scales (maps and plans) Proportion based on similarity
1.5.3	Slope & Simple Trigonometry
1.5.3.1	Slope and gradient in straight line graphs Trigonometry of right triangles
1.5.4	Linear Interpolation & Extrapolation
1.6	Functions, Relations, & Equations
1.6.1	Patterns, Relations & Functions Number patterns Relations and their properties Functions and their properties Representation of relations and functions Families of functions (graphs and properties)

Math Coding Framework (Performance Expectations)

2	Performance Expectations		
	2.1	Knowing	
		2.1.1	Representing
			Select an appropriate representation Construct an appropriate informal representation for the subject (e.g., a sketch) Construct a formal representation governed by strict construction procedures
		2.1.2	Recognizing equivalents
			Indicate recognition of an equivalence by identification or selection Construct an object equivalent to a given object or two equivalent object of a certain category Select or construct an object and its equivalent decomposition or two equivalent decompositions
		2.1.3	Recalling mathematical objects and properties
			Recalling mathematical objects and properties Recognizing mathematical objects and properties
	2.2	Using routine procedures	
		2.2.1	Using equipment
		2.2.1.1	Using instruments, for example, measuring instruments
		2.2.1.2	Using computational devices
		2.2.2	Performing routine procedures
		2.2.2.1	Counting
		2.2.2.2	Computing
			Identify an appropriate single computational operation Identify an appropriate single computational method Predict the effect of a computation operation or method

Coding framework in reading

The reading framework consists of three dimensions

1. The **types of written texts** that students can expect to find in reading textbooks and guidelines
2. The **key elements of written texts** (e.g., types and structure of plots, purposes and functions of written texts)
3. Various **performance expectations** in reading which examine levels of reading comprehension.

Coding framework in reading

- The coding framework lists more than **60 types of written texts** that can be found in reading textbooks and official guidelines
- The **key elements of written texts** include, eg, types and structure of plots, purposes and functions of texts, which are further subdivided into more specific categories
- Performance expectations in reading are divided into four types of reading comprehension:
 1. **literal comprehension** (e.g., identifying parts of the text, remembering what is written)
 2. **inferential comprehension** (e.g., compare, deduce, generalize, apply)
 3. **value or evaluative comprehension** (judgments about text)
 4. **meta-comprehension** (e.g., formulating and proving hypotheses; continued reading, elaborate analogies)

Coding Framework In Reading (Types of texts)

60+ Types of written texts

Riddle	Essay	Monograph
Posters .Banner	Interview	Annotation
Ad	Epitaph	News item
Opinion Article	Tags, Labels	Novel
Notice	Fable	Play
Biography	Bill	Newspaper
Letter	Brochure	Poem
Signs	Form	Postcards
Catalog	Graphic, Graph	Weather forecast
Comment	Tourism guide	Proverb
Contract	Science fiction story	Recipe
Chronicle	Real life story	Receipt
Story / Tale	Mystery story	Saying
Curriculum Vitae	Comics	Historic account
Joke	Report	Article
National form of verse	Instruction (Procedure)	Review
Definition	Invitations	Magazine
Personal Diary	Sign	Labels, signs, heading
Dictionary	Law	Table
Housekeeping Journal	Legend, myth	Cards
Dissertation	School textbook	Religious text
Editorial	Manual	Song
Encyclopedia	Map	Others
	Menu	

Reading Coding Framework (elements)

- 1.1. Acts of Speech
- 1.2. Function
- 1.3. Types of Plot
 - 1.3.1. Narrative
 - 1.3.2. Descriptive
 - 1.3.3. Explanatory, expositive
 - 1.3.4. Argumentative
 - 1.3.5. Conversational
- 1.4. Structure of the Plot
 - 1.4.1. Exposition, thesis, introduction
 - 1.4.2. Conflict, argument, rising action
 - 1.4.3. Falling action, conclusion. resolution
- 1.5. Structural Elements of the Plot
 - 1.5.1. Categories and types of relations
 - 1.5.2. Narrative point of view
 - 1.5.3. Characters (degree of importance and motivation)
 - 1.5.4. Linguistic markers
- 1.6. Elements of textbooks
 - 1.6.1. Author
 - 1.6.1.1. Purpose
 - 1.6.1.2. Perspective
 - 1.6.1.3. Nationality
- 1.7. Formal structure of plays
- 1.8. Structure of the ideas
- 1.9. Moments
- 1.10. Purposes
 - 1.10.1. Information
 - 1.10.2. Recreation
 - 1.10.3. Interact socially
 - 1.10.4. Solve a practical problem
 - 1.10.5. Learn
 - 1.10.6. To create
- 1.11. Reading mode
 - Out loud
 - In silence
 - Scanning and Skimming

Reading Coding Framework

1. Performance expectations (*skills/competences to be acquired*)

1.1. Literal comprehension (elements **explicitly** found in the text)

1.1.1. Explicit information found in the text

- Identify
- Extract
- Find
- Remember

1.2. Inferential comprehension (use/handling of **implicit** elements in the text).

1.2.1. Types of inference, according to the operation

- Differentiate
- Compare
- Deduct
- Generalize
- Apply
- Interpret
- Reorganize
- Relate/Connect
- Summarize
- Paraphrase
- Include

1.3. Value or evaluative comprehension (judge reading elements against values, norms, and criteria)

1.3.1. Judgments about

- Precision-vagueness
- Coherence-incoherence
- Complexity-simplicity
- Validity and/or reliability
- Completeness of the information
- The probability or plausibility
- The contrast with values and/or personal experience
- The contrast with socio-cultural values or experiences

1.4. Metacomprehension

1.4.1. Strategies

- Formulate hypotheses
- Prove hypotheses
- Predict
 - The content
 - The ending
 - Information

1.4.2. Reread

1.4.3. Continue reading

1.4.4. Generate mental images

1.4.5. Elaborate analogies

1.4.6. Ask

Reading Coding Framework (Performance Expectations)

Performance expectations

Literal comprehension (elements **explicitly** found in the text)

Explicit information found in the text

Identify

Extract

Find

Remember

Inferential comprehension (use/handling of **implicit** elements in the text).

Types of inference, according to the operation

Differentiate

Compare

Deduct

Generalize

Apply

Interpret

Reorganize

Relate/Connect

Summarize

Value or evaluative comprehension

(judge reading elements against values, norms, criteria)

Judgments about

Precision-vagueness

Coherence-incoherence

Complexity-simplicity

Validity and/or reliability

Completeness of the information

The probability or plausibility

The contrast with values and/or personal experience

The contrast with socio-cultural values or experience

Metacomprehension

Strategies

Formulate hypotheses

Prove hypotheses

Predict

The content

The ending

Information

Training Coders and Coding Process

Applying complex coding frameworks to actual curricular materials in different languages

- **Pilot phase and training sessions:** Application and adjustments to frameworks; Week-long training at UAlbany with language proficient coders; Weekly team meetings to identify coding problems and solutions; Training of new coders and language specialists
- **Coding procedures:** Coder divides archived document into 'segments'; reviews each segment and lists a series of (3 or 4 digit) codes relevant to content and performance expectations found in segment.
- (Later completes supplemental questionnaire)

Examples of coded documents (3)

UNESCO-sponsored Cross-national project on the Intended Curriculum in Primary School Mathematics and Reading Document Analysis Form

Country name: Uganda
Document ID code: 19021002

Coder Name: Marcellus TAYLOR
Date of Coding: Jan / 30 / 2010

Document Type: Curriculum Exercise Textbook Test
 Guideline Mathematics Reading Multiple
Semester: Year First Semester Second Semester

Unit ID #	Unit Type	Page Range in Unit	Grades							Primary Content Codes						Primary Performance Code					
			0	1	2	3	4	5	6												
T1, U1	3	1-23							X	1.4.2							2.1.1.	2.1.3.	2.2.3.4		
T1, U2	3	24-46							X	1.1.1.1.	1.1.1.2	1.1.2.2	1.1.5.2				2.1.2.	2.1.3.	2.2.2.1.	2.2.2.2	2.2.3.1
T1, U3	3	47-76							X	1.1.1.1.	1.1.1.2	1.1.1.3.	1.1.4.1	1.7.1.		2.1.2.	2.1.3.	2.2.2.1	2.2.2.2.	2.3.3.	
T1, U4	3	77-94							X	1.1.1.1.	1.1.1.2.	1.1.1.3.	1.1.4.4.	1.1.5.2		2.1.1.	2.1.2.	2.1.3.	2.2.2.1	2.2.2.2	
T1, U5	3	95-114							X	1.1.5.3.	1.6.1.					2.3.3.					
T1, U6	3	115-150							X	1.1.1.1.	1.1.1.2.	1.1.3.1.				2.1.2.	2.1.3.	2.2.2.1	2.2.2.2		
T1, U7	3	151-174							X	1.1.1.2	1.1.2.1	1.1.2.5	1.1.4.4.	1.1.2.2		2.1.3.	2.2.2.1	2.2.2.2	2.3.3.		
T2, U7	3	151-174							X	1.1.1.2.	1.1.5.1	1.2.1.	1.2.2.		2.1.1.	2.1.3	2.2.2.2	2.2.2.5	2.4.3.1		
T2, U8	3	175-203							X	1.3.2	1.4.1.	1.1.1.2	1.4.3		2.2.1.1.						
T3, U9	3	204-213							X	1.1.1.2	1.1.1.1.	1.1.4.5				2.1.1.	2.2.1.1.	2.1.3.	2.2.1.1.	2.2.2.4	
T3, U10	3	214-232							X	1.1.1.2	1.1.1.1.	1.1.4.5				2.2.2.5	2.3.3.				
T3, U10	3	214-232							X	1.1.1.2.	1.7.1.					2.1.2.	2.1.3.	2.2.2.1	2.2.2.2		
T3, U11	3	233-266							X	1.1.1.2.	1.2.1.	1.2.2.	1.6.2	1.7.1		2.1.3.	2.2.2.2	2.2.3.2	2.3.3.		
T3, U12	3	267-289							X	1.1.1.2.	1.1.4.3					2.1.2.	2.1.3.	2.2.2.2	2.3.3.	2.4.2.	
									X							2.5.2.					

Codes organized for each country by subject, document type and grade level

Creation of 8 'Master' Tables:

1. **Mathematics Text Books 5th & 6th Grades**
2. Mathematics Text Books 6th Grade only
3. **Mathematics Curriculum Guidelines 5th & 6th Grades**
4. Mathematics Curriculum Guidelines 6th Grade only
5. **Reading Textbooks 5th & 6th Grades**
6. Reading Textbooks 6th Grade only
7. **Reading Curriculum Guidelines 5th & 6th Grades**
8. Reading Curriculum Guidelines 6th Grade only

Reported results based on master tables in yellow-- info for grades 5 & 6

Number of countries in Master Tables (benchmark of 70% to define commonalities)

Document type		Subject	
		Mathematics	Reading
Curriculum Guidelines	Grade 6 (only):	27	23
	Grades 5 & 6	30 (21)	25 (18)
Textbooks	Grade 6	33	32
	Grades 5 & 6	31 (22)	30 (21)

(Parenthesis: # of countries that must have same codes to reach 70% benchmark)

Results



Results: Commonalities in Mathematics

(Pooled info for grades 5 and 6)

- Much common ground (across at least 70% of examined developing countries) in knowledge domains and performance expectations of mathematics textbooks and curricular guidelines (pooled info from grades 5 and 6).
- Most textbooks and guidelines include instruction in: **whole numbers (their meaning, operations and properties), fractions and decimals; measurement issues; two- and three-dimensional geometry; and data representation and analysis.** Proportionality concepts and problems are common to textbooks but not guidelines.
- Examples of content domains **not** in common: Integer, rational and real numbers; Other number concepts; functions, relations and equations; as well as probability and statistics.

Results: Commonalities in Mathematics

(Pooled info for grades 5 and 6)

- Common performance expectations (in both textbooks and guidelines) include: **representing math expressions and recognizing equivalents; using measuring instruments (in textbooks); performing various kinds of counting, computing and measuring (but not graphing) procedures; investigating and problem solving.** Using more complex procedures was common in guidelines but not textbooks.
- Overall, commonalities in math standards mainly revolve around ***routine and basic skills in mathematical problem solving and reasoning***, and not in relation to the more cognitively demanding skills
- **Overall, fewer commonalities in the contents of official policy statements in mathematics when compared to textbooks**

Results: Commonalities in Reading

- Unlike mathematics, **countries hold more divergent views about the contents of the primary reading curriculum.** Countries vary significantly in the types and functions of the written texts used, the acts of speech learned, as well as the types and structures of plots found in the texts.
- Reading textbooks draw on a diverse array of text types in teaching students to read. From a list of over 60 types of written texts, only 6 show up in 70% or more of all grade 5 and 6 textbooks examined: **stories/tales, poems, plays, letters, historical accounts and biographies.**
- In official statements and guidelines there is only one **common type of written text: poems.**
- Thus, ministry officials and textbook writers hold divergent views as to the texts students should use to acquire reading proficiency

Results: Commonalities in Reading

- **Commonalities in reading textbooks:** 1) written texts are typically informative and express factual information; 2) they typically have plot types emphasizing narration, description and explanation; 3) they include 1st person, 2nd person and 3rd person accounts; 4) they typically include acts of speech focusing on dialogue; 5) the purpose of the texts is ‘to learn something’; and 6) they typically have instructions that ask students to read texts in different modes: read out loud, in silence & by scanning or skimming.
- **None of the above elements are commonly found in official guidelines.** Only **one** basic element of the reading curriculum is common to both textbooks and guidelines—namely, including **a written text whose function is to be informative.**
- **Commonalities in performance levels—in textbooks and guidelines.** Students should: 1) be able to identify, extract, find and remember **explicit** information in the written text; 2) develop various inference skills: to compare, deduce, generalize, apply, interpret, connect, include summarize and paraphrase **implicit** elements in the text; and 3) develop evaluative judgments about the written texts—e.g., the extent to which they are coherent (or not), precise/opaque, complex/simple, valid, reliable, complete or plausible. More cognitively challenging reading standards were much less common across countries.

Second Research Question

- To what extent do diverse developing countries in the world define similar contents and performance expectations in reading and mathematics in the upper grades of primary education? (the *commonalities* issue)
- To what extent do the content domains of official curriculum statements in reading and mathematics align with those found in relevant textbooks? (the *alignment* issue)
- In which countries are performance expectations in mathematics curricula more (or less) cognitively challenging? (the *challenging curriculum* issue)

Curricular Alignment: Comparing intentions with classroom implementation

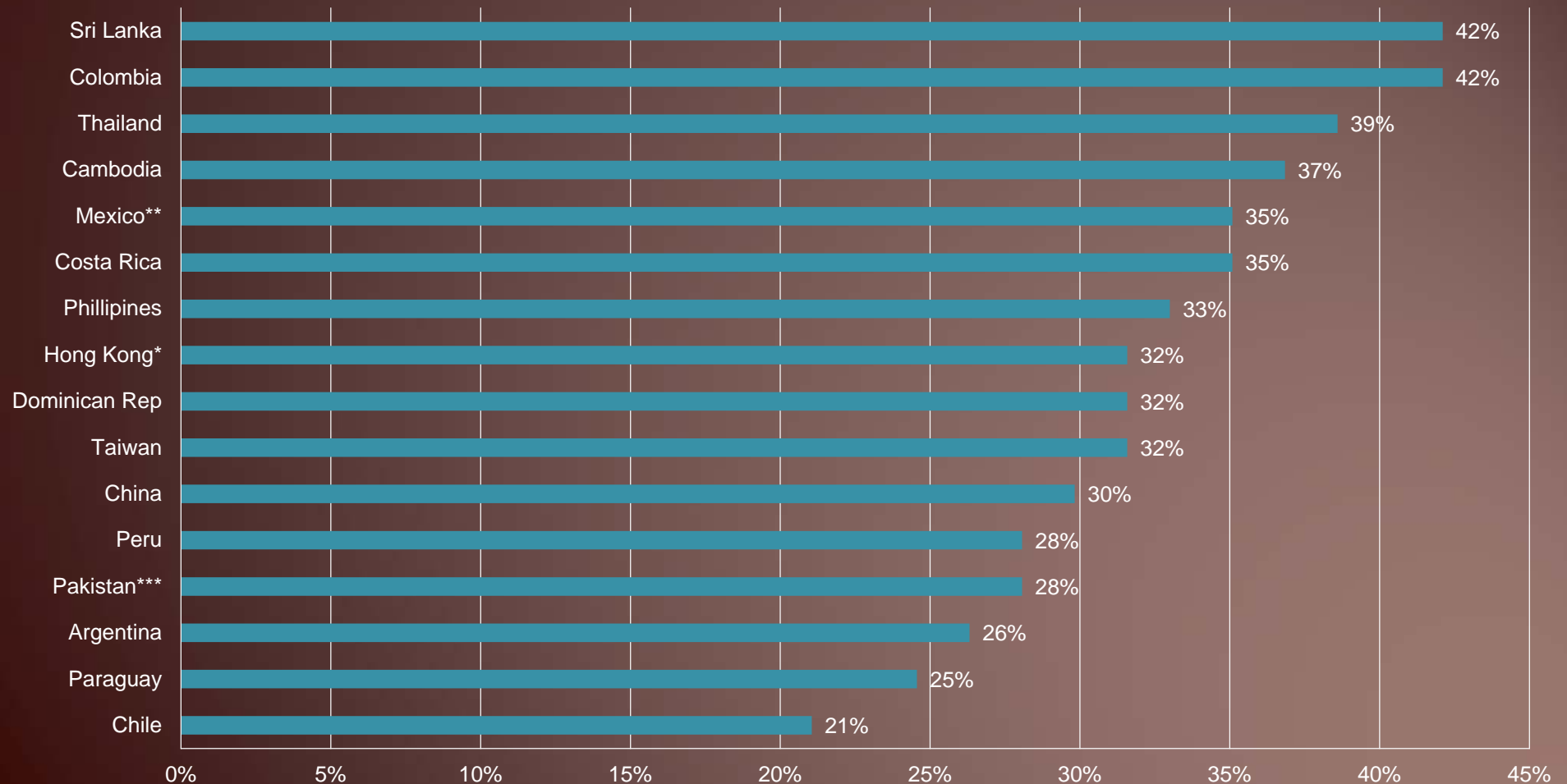
- Important distinction between **official, intended curriculum** and **actual, implemented curriculum** (and also received or achieved curriculum)
- Considerable cross-national information available about the intended curriculum and much less about the implemented curriculum; there are different ways to conceive and measure the latter
- **In current study, curricular guidelines represent reasonably well the official intended curriculum; textbooks lie in between the intended and the actual implemented curriculum**
- **Especially in classrooms where teaching is organized in close accordance with the textbook, then textbooks more accurately approximate the actual implemented curriculum.** Nevertheless, this tendency varies between classrooms, schools, and within and between countries
- Therefore, makes sense to refer to **textbooks as the ‘potentially implemented’ curriculum** (Valverde)

Measuring Curricular Alignment

- Determine and compare the content codes found in curricular guidelines and in textbooks for same grade level(s)
- The denominator refer to the total number of content codes that are found in either the guidelines or the textbooks in either grade 5 or grade 6
- The numerator refers to the number of content codes that are found in each subject in BOTH the intended curricular guidelines and the textbooks in either grades 5 and 6
- The constructed percentage refers to the percent of shared or aligned contents per subject area across document types

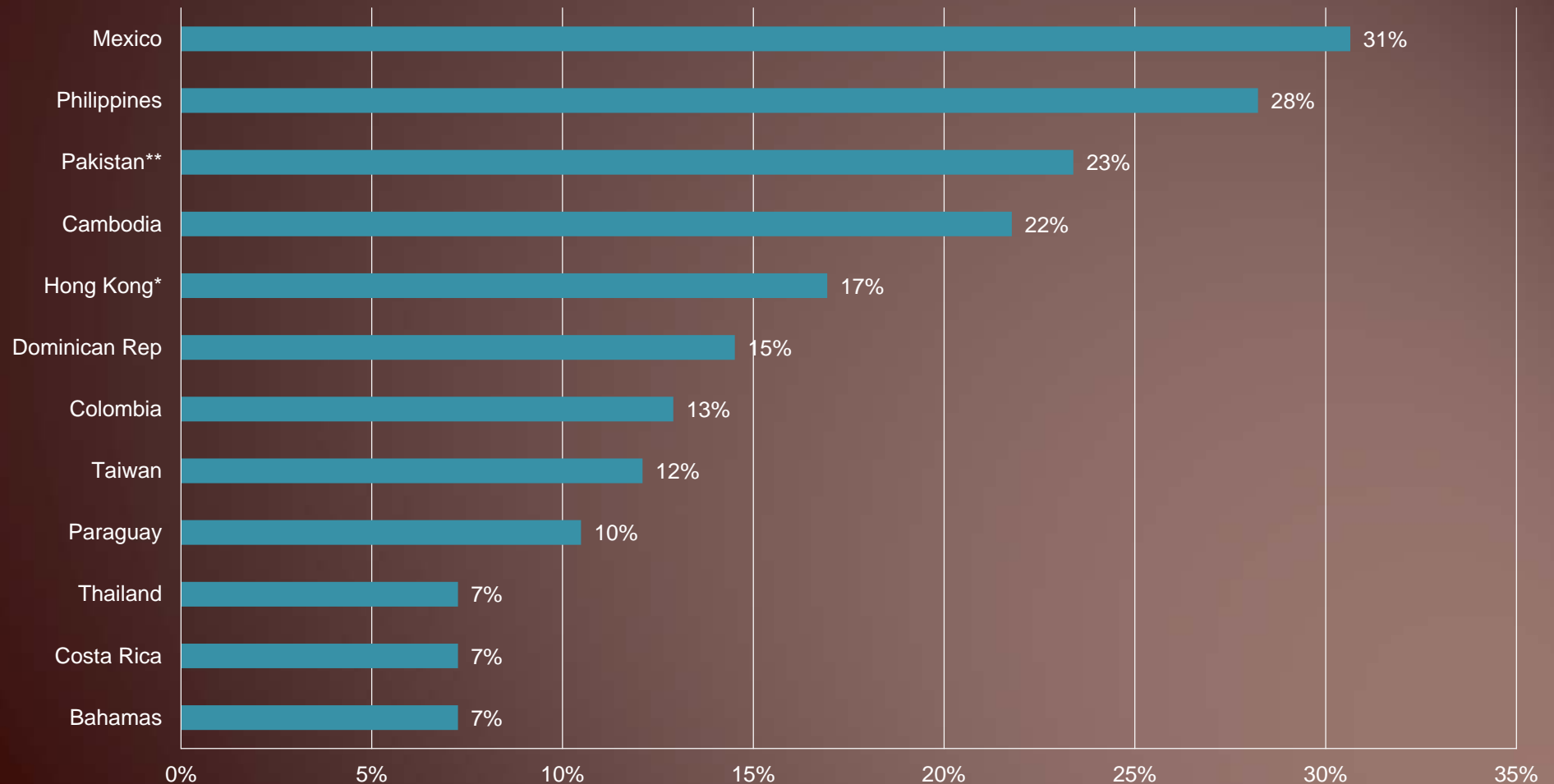
Results: Curricular Alignment in Mathematics

Percentage of aligned contents between official curriculum and textbooks in mathematics, in grades 5 & 6, by country



Results: Curricular Alignment in Reading

Percentage of aligned contents between official curriculum and Textbooks in Reading, grades 5 & 6, by country



Possible reasons for low alignment levels?

- the relatively insular world of subject textbook writers
- the lack of specificity in official guidelines and statements
- the different target audiences addressed by official statements/guidelines and textbook writers
- the high expense of revising/adjusting textbooks in the wake of reforms to official curricular policies
- editors, authors and even curriculum designers rely more on past practices and existing materials, even when strongly urged to operationalize “new” ideas in the next generation of materials
- Other reasons?

Third Research Question

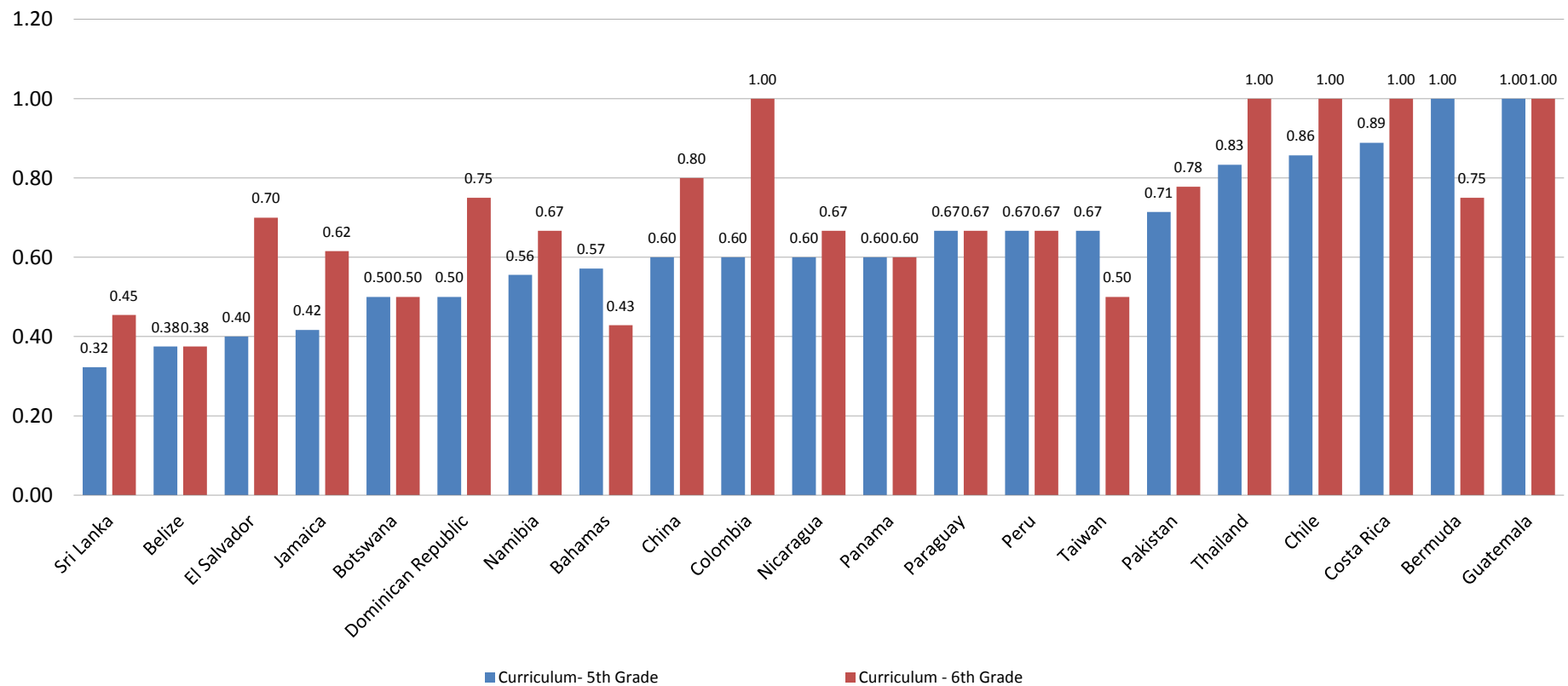
- To what extent do diverse developing countries in the world define similar contents and performance expectations in reading and mathematics in the upper grades of primary education? (the *commonalities* issue)
- To what extent do the content domains of official curriculum statements in reading and mathematics align with those found in relevant textbooks? (the *alignment* issue)
- In which countries are performance expectations in mathematics curricula more (or less) cognitively challenging? (the *challenging curriculum* issue)

Distinguishing more or less Cognitively Demanding Performance Expectations in Math

Least cognitively demanding	Moderately cognitively demanding	Most cognitively demanding
<p>Representing Recognizing equivalents Recalling mathematical objects Using instruments Using computational devices Measuring Using data Classifying data Problem solving Using vocabulary & notation</p>	<p>Comparing Formulating and clarifying problems and situations Developing a strategy Problem solving Relating representations Predicting Verifying Graphing</p>	<p>Developing algorithms Generalizing Conjecturing Justifying and proving Axiomatizing</p>

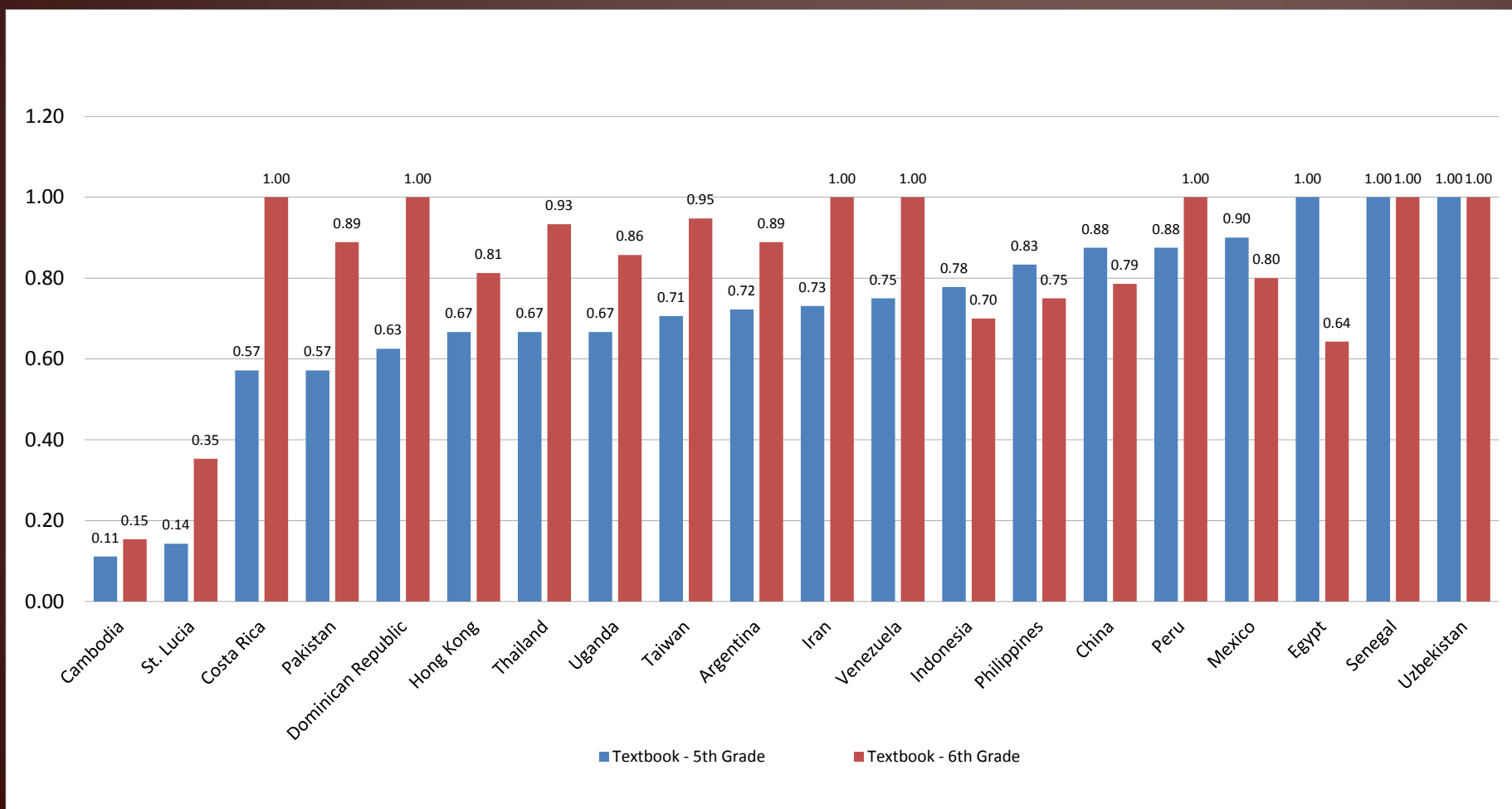
Results: Which countries define challenging performance standards in math guidelines?

Ratio of High performance expectations in math guidelines, by country and grade



Results: Which countries define challenging performance standards in math textbooks?

Ratio of High performance expectations in mathematics textbooks, by country and grade



Overall Summary (1)

- Diverse developing countries hold a fairly consensual and detailed view of what constitutes the mathematics curriculum in upper grades of primary education—both in terms of contents and performance standards. This is especially apparent in mathematics textbooks
- Globalization of policies: evidence of the diffusion and institutionalization of select reforms in math education in the developing world: collecting data; arraying them in simple tables and graphs; understanding simple measures of central tendency and dispersion; and sampling

Summary (2)

- Intended reading curriculum: a more fragmented or heterogeneous picture emerges. Minimal agreement concerning the intended contents and structure of the upper primary grade reading curriculum.
- Performance standards represent the one exception. Most developing countries share common ideas as to the kinds of reading competences students should attain by the end of the primary school cycle
- Not only more commonalities in mathematics than in reading, but there are also more shared contents, or closer alignment, *within* countries between the intended guidelines and textbooks in mathematics

Concluding remarks

- **Exploratory nature of the analyses conducted thus far**
- Clear evidence of substantial differences--in target audiences, contents and alignment—between official curricular guidelines and textbooks
- **More work needed: which factors influence commonalities and alignment patterns in each subject; and which kinds of countries incorporate more cognitively challenging expectations, and for what purposes**
- Policy implications for learning assessments in developing countries (for the end of primary cycle)
- Policy implications for educational governance (esp. in teacher training) due to the lack of alignment between intended curricular policies and textbook contents

Next Steps...Further Research



Next Steps

- Complete coding of existing documents (grade 4, new materials, special languages)
- Obtain more complete information for countries with incomplete files
- Expand ICATA to include official documents in social sciences and sciences and for other grade levels
- Situate ICATA in emerging Institute of Global Education Policy Studies (IGEPS) at University at Albany
- Submit new funding proposals; explore partnerships (IBE, GEI)
- Disseminate findings in conferences, professional meetings and publications

New research and policy questions

- New analyses of existing database—for example, by language group or world region
- Spin-off analyses--e.g., cultural contents in Mandarin reading curricula materials (Wu); Numeracy curricula in Latin America (Valverde/ Romero); Diglossia issues in Arabic speaking countries (Kanaan)
- New research into underlying dimensions of textbooks in mathematics and reading: child centeredness, gender parity, cultural contents
- Invite scholars to explore new research questions

Thank You!

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Copy of report:

http://steinhardt.nyu.edu/scmsAdmin/media/users/jnw216/HMSS/BENAVOT_UIS_Curriculum_Report_for_NYU_Nov17_2011.pdf

web sites:

ICATA: www.albany.edu/eaps/icata/

UIS: www.uis.unesco.org/