

Higher Grounds: Practical Guidelines for Forging Learning Pathways in Upper Primary Education

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Abstract

To address chronically low primary school completion rates and the disconnect between learners' skills at the end of primary school and the skills learners need to thrive in secondary school identified in many low- and middle-income countries, more investment is needed to improve the quality of teaching and learning in upper primary grades. Accordingly, we provide guidelines for improving five components of upper primary education: (1) In-service teacher professional development and pre-service preparation to improve and enhance teacher quality; (2) a focus on mathematics, literacy, and core content-area subjects; (3) assessment for learning; (4) high-quality teaching and learning materials; and (5) positive school climates. We provide foundational guiding principles and recommendations for intervention design and implementation for each component. Additionally, we discuss and propose how to structure and design pre-service teacher preparation and in-service teacher training and ongoing support, fortified by materials design and assessment, to help teachers determine where learners are in developmental progressions, move learners towards mastery, and differentiate and support learners who have fallen behind. We provide additional suggestions for integrating a whole-school climate curriculum, social-emotional learning, and school related gender-based violence prevention strategies to address the internal and societal changes learners often face as they enter upper primary.

Introduction: Upper Primary in LMICs

In 2018, the World Bank's report *Learning to Realize Education's Promise* (World Bank, 2018) noted with alarm that millions of children in low- to middle-income countries (LMICs) were exiting primary grades without having achieved the basic competencies required for further learning. This report and others pointed out that although more children are in schools and overall primary enrollment and completion rates across LMICs are relatively high—out of every 100 learners enrolled almost 90% complete primary education—these successes were not commensurate with the achievement of learning outcomes at the end of primary education (United Nations Educational, Scientific, and Cultural Organization (UNESCO), Institute for Statistics, 2020; World Bank, 2018). Research evidence indicates 125 million children can neither read nor solve basic problems in mathematics after 4 years of instruction (World Bank, 2018). Additionally, although overall completion rates are high, there remain alarming disparities between countries—Ethiopia, Uganda, Burundi, Madagascar and Mozambique, for example, have an average completion to gross enrollment ratio of roughly 55% (Crouch et al. 2020). These findings indicate that upper primary education is a substantial problem for any policymaker concerned with learning proficiencies at the end of primary education. Although recent international investment in the early primary grades in LMICs is certainly warranted, more attention needs to be paid to strengthening and improving teaching and learning in the upper primary grades. Ample investment in improving the quality of upper primary education is essential for children to exit primary with basic skills.

To this end, we propose key strategies essential to improving the quality of teaching and learning in upper primary grades. The intended audience is policymakers and educational technical leadership concerned about the quality of primary education.

We define upper primary as grade 4 through the end of primary school, which may be grades 6–8, depending on the country. The strategies we propose will support effective transitions from lower primary

into upper primary and will ensure higher levels of primary school completion as well as a resultant increase in learner preparedness for secondary school. To increase the quality of upper primary education, stakeholders should focus on improving the following components:

- Teacher professional development, including pre-service preparation, in-service training, and ongoing support to improve and enhance teacher quality;
- A focus on mathematics, literacy, and core content area subjects;
- Assessment;
- High-quality teaching and learning materials; and
- Positive school climate.

An integrated approach to strengthening these five components in an upper primary program will lead to improved holistic learning outcomes for upper primary learners. Some of these program elements have been proven to increase learning outcomes in lower primary whereas other elements are essential to maximizing the quality of teaching and learning in upper primary grades. Although there is an abundance of research on education in the lower primary grades in LMICs, our literature review revealed scant research on international education programs in LMICs that specifically target teaching and learning improvements in upper primary. Available studies are predominantly small scale, and we use this evidence to give insight into the components needed to develop successful upper primary programs. The key evidence we used to inform our recommendations were recent studies on the upper primary grades in Africa, particularly Kenya, the Democratic Republic of Congo, Rwanda, and South Africa (Bethell, 2016; Botes & Mji, 2010; Currin & Pretorius, 2010; Makalela, 2014; Milligan, Clegg, & Tikly, 2016; Pretorius, 2014; Pretorius & Currin, 2010; Soendergaard & Cachaper, 2008; Torrente, Alimchandani, & Aber, 2016; Webb & Webb, 2016). Given the limited evidence from LMICs, we also used research from high-income countries (HICs) to supplement our analyses and recommendations (Baker, Geva, Kieffer, Lesaux, Linan-Thompson, Morris, Proctor, & Russell,



COVID-19 Consideration

We recognize that because of restrictions on human gatherings during the novel coronavirus disease 2019 (COVID-19) pandemic, any upper primary intervention will also need to be increasingly flexible, innovative, and equitable to address the new levels of disruption layered onto the already dynamic social and psychological needs of adolescents. Considerations specific to the COVID-19 response are discussed at the end of these guidelines.

2014; Cecil, Gipe, & Marcy, 2017; National Council of Teachers of Mathematics, 2014; Schumacher, Taylor, & Dougherty, 2019; Tompkins, 2010). Recognizing the diversity of learners in these grades, our recommendations focus on the need to fortify developmental progressions in literacy, mathematics, and core content area subjects; integrate social and emotional learning (SEL) in teaching and learning; and create positive school climates (CASEL, 2017; Frey, Fisher, & Smith, 2019; Torrente, Alimchandani, & Aber, 2016).

As learners exit early childhood and enter early adolescence and upper primary grades in school, their social and economic role outside of the home may also change, sometimes drastically. Altered realities for learners in upper primary vary greatly among LMICs but can include issues and stigma around feminine hygiene (Miiro, et al. 2018), calls to join the workforce, increased childcare responsibilities, disruptions caused by regional conflict, and early marriage (UNICEF, 2018). Teaching strategies and professional development discussions must be couched in these realities to ensure, first, that new instructional strategies do not create more barriers to schooling; second, that interventions respond to identified barriers (discussed further in Component 5); and third, that interventions draw on social, cultural, and economic resources and assets when possible.

In the following sections we describe specific examples of the kinds of activities that should be implemented to strengthen teaching and learning in these grades to ensure that learners achieve the minimum proficiency requirements to move on to secondary and tertiary education. The next several sections describe each of the five components

and how they can ensure a positive and successful educational experience for learners in an upper primary education program.

Component 1: Fostering Teaching Quality Through Professional Development

The goal of teacher professional development (TPD) is to facilitate teachers' learning throughout their careers, from pre-service to in-service, and to provide ongoing teacher support. In some contexts, the term "teacher professional development" is used to refer only to in-service training. However, in much of the literature on teacher development and learning, the term refers to development throughout the teacher's career. This report uses the term "teacher professional development" in line with this definition. In upper primary, pre-service and in-service teacher training and support should aim to develop teachers who understand developmental progressions, use developmentally appropriate pedagogy, have sound content knowledge, possess and use appropriate pedagogical knowledge and practices, use assessments to inform practice effectively, and are reflective practitioners. Using the research literature from LMICs and HICs, the following sections first discuss the core knowledge and practices both pre-service and in-service TPD should focus on, then present specific design recommendations for pre-service education, in-service training, and ongoing teacher support essential to improving teacher quality in upper primary.

Instructional Practices and Developmental Progressions

There are several terms and practices essential for teaching and learning in upper primary grades, including the following:

- Developmental Progressions
- High-leverage Practices
- Differentiated Instruction and Universal Design for Learning
- Content Knowledge and Pedagogical Content Knowledge

Developmental Progressions

Pre-service education and in-service teacher training should focus on teacher understanding of and responsiveness to developmental progressions in upper primary subjects. Developmental (or learning) progressions are the sequences of curriculum knowledge and skills or learning pathways learners are expected to follow, learn, and master in school subjects as they advance in school. As such, developmental progressions can serve as road maps that help teachers determine where learners are in the learning process and point teachers toward how they might differentiate and support learners who have fallen behind. A focus on developmental progressions includes ensuring that teachers both know about equitable and inclusive educational experiences for learners in these grades and how to provide them (Adams, Jackson, & Turner, 2018; ACARA, 2020; Kim & Scoular, 2017; Ministry of Education, New Zealand, 2010; Waters, 2018). To bolster teacher understanding and application of developmental progressions, teacher education, in-service teacher trainings, and ongoing teacher support should all provide teachers with the tools (such as the development of professional learning communities) to help them plan and align learning and assessment across grade levels and subjects with a particular emphasis on

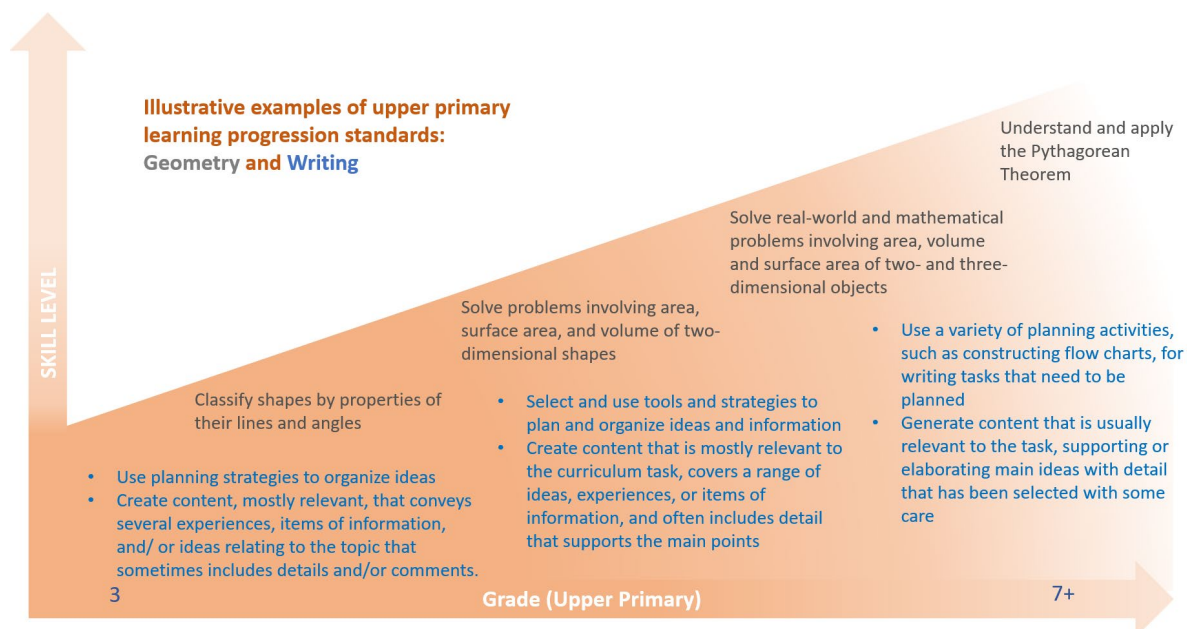
literacy and mathematics. This is important to ensure cohesion in curriculum implementation across the primary grades and smooth transitions from lower to upper primary. Upper primary teachers need to understand these developmental progressions, the essential skills needed at each level, and how they can use their instructional time to enhance these skills. Figure 1 provides an illustrative example of developmental progressions, in this case focusing on geometry and writing.

High-Leverage Practices

High-leverage practices (HLPs) are basic, core professional knowledge and pedagogical skills that help learners understand content and support their SEL development in school (Ball & Forzani, 2011). Vital for both lower and upper primary grades, these critical practices are skills that demonstrably impact student learning outcomes across content areas. The TeachingWorks Center at the University of Michigan has identified 19 examples of HLPs, including implementing classroom routines, leading group discussions, explaining and modeling content, practices, and strategies, and checking student understanding during and after lessons (<http://www.readingrockets.org>; <http://www.teachingworks.org>). High leverage practices can provide teacher trainers

Figure 1. Upper primary learning progressions

Upper Primary Learning Progressions



Source: Writing—Ministry of Education, New Zealand (2010); Geometry—NGA Center for Best Practices & Council of Chief State School Officers (2010).

and educators with the tools needed for “providing high-quality, structured, and sequenced opportunities to practice” (McCray, Kamman, Brownell, & Robinson, 2017, p.2), leading to the achievement of all students.

Many HLPs cut across disciplines but may look different when applied in each subject. For example, drawing on students’ background knowledge, or the knowledge they bring to the classroom, is a teaching practice that enhances students’ understanding in all subjects and can be incorporated into TPD. In literacy, this can include asking learners to make connections between a text and their own experiences or drawing on second-language learners’ knowledge of vocabulary in their first language as a bridge to second language comprehension. In math, this could involve making links between mathematics that learners encounter outside of school and formal mathematics taught in the classroom.

Differentiated Instruction and Universal Design for Learning

As with lower primary interventions, successful programs in upper primary will build teacher capacity to integrate differentiated instruction and universal design for learning (UDL) principles into their instruction (Hayes, Turnbull, & Moran, 2018). The principles of UDL and differentiation of instruction are particularly essential in the upper primary grades because the academic, social, and cognitive ability of learners in these grades vary considerably, and these approaches will help teachers provide developmentally appropriate and inclusive practices for the diverse learners they teach (UNICEF, 2018). Universal design for learning “addresses macro, upfront planning” (Ministry of Education, New Zealand, 2021) to ensure all learners have full access to everything in the classroom. This may include using learning materials that allow learners to access to subject matter content, such as texts in braille or videos, and providing learners with options to demonstrate their learning in different ways. Differentiated instruction comprises “micro-planning that occurs once teachers know the needs of the students in their class” (Ministry of Education, New Zealand, 2021). Teachers can differentiate instruction through four elements in the classroom:

(1) the targeted content, or knowledge, skills, and understandings the learner is learning; (2) the process—the activities that help students understand what they are learning; (3) the product—the ways in which learners demonstrate their learning; and (4) the learning environment (Tomlinson, 2014). Using these approaches and strategies to scaffold learning for diverse learners will help teachers identify where individual learners are in their learning and how to move them to where they need to be at the end of primary school. This should involve teacher training and pre-service preparation that emphasize innovative ways of thinking, teaching, and learning, especially how to use the learning environment, learner funds of knowledge (i.e., the social and cultural experiences learners bring to the classroom; González, Moll, & Amanti, 2006), and assessment information to determine learner progress along learning pathways (Ministry of Education, New Zealand, 2021).

Content Knowledge and Pedagogical Content Knowledge

In upper primary, subject matter is more complex and requires teachers to have a deep understanding of the content of multiple subjects, accompanied by the knowledge and skills of how to teach the multi-step processes involved in arriving at answers at this level and pedagogical approaches to facilitate learners’ development of higher-level thinking skills. This is imperative because, as research on teacher quality indicates, many teachers in LMICs have little mastery of country curricula. A study by the World Bank on fourth-grade teachers in some sub-Saharan African countries indicated teachers were unable to perform mathematics tasks from the upper primary level curriculum. For example, they could not correctly subtract double-digit numbers or divide fractions (World Bank, 2021). Similarly, 56 percent of teachers in Afghanistan could not solve basic algebra problems (Beteille & Evans, 2019). These echo findings from earlier assessments undertaken as part of the Southern and Eastern Africa Consortium for Monitoring Educational Quality studies (Bethell, 2016). In Lao PDR 2.4 percent of teachers scored 80 percent or more on a Lao language and math assessment whereas results of a teacher assessment in Bihar, India, indicated 25–33 percent of teachers

could not answer basic math and language questions. Likewise, 60 percent of teachers in Indonesia scored below 50 percent on an assessment of math content and pedagogical knowledge (Beteille & Evans, 2019, p.6).

Teacher language proficiency in the target language of teaching and learning (LoTL) is also an issue. Research conducted in LMICs has also indicated that teachers may not have sufficient proficiency in the target LoTL to teach it effectively (Clegg & Afitska, 2011; Erling et al. 2017; Sibanda, 2017; Tshuma & Le Cordeur, 2017; Ulla, 2017). These shortcomings have important implications for TPD. Programs must respond to the specific needs of pre-service and in-service teachers by starting where teachers are in their knowledge and then building their content knowledge and pedagogical content knowledge to teach effectively. This means teacher educators and teacher training facilitators must have a firm grasp of content and the skills to teach content areas effectively. TPD should also include learning experiences for in-service and pre-service teachers that focus on learning by doing, teaching metacognitive strategies and how these strategies can be applied to new tasks and situations, problem solving, and direct experiences that teachers can then implement with learners in their classrooms (Loucks-Horsley et al., 2010). The next section describes the ways in which pre-service teacher education in LMICs can be improved to strengthen overall teacher quality.

Pre-Service Teacher Education

To sustain teaching and learning approaches that might first be introduced through in-service training, intervention programs will need to work with teacher education departments to envision and implement improvements to pre-service education for the upper primary grades. Reviews of pre-service programs in LMICs have revealed that teacher pre-service education programs often have theory-oriented curricula that are not sufficiently based in practice (Barnes et al., 2018; EFA Global Monitoring Report Team, 2015; Westbrook et al., 2013; Zuilkowski et al., 2021). These programs also do not typically incorporate pedagogical content knowledge sufficiently, and many are weak in their

ability to strengthen pre-service teachers' core content knowledge. To foster teacher skills and expertise, pre-service preparation should focus on the teaching and application of HLPs, such as leading discussions, interpreting learner work, and using and monitoring developmental progressions. As is the case for lower primary education, pre-service programs should ensure that teachers gain strong conceptual understanding and pedagogical content knowledge in relevant subject areas (see Component 2) (Zuilkowski et al., 2021). Additionally, teacher education programs should prepare pre-service teachers for work in schools by providing multiple opportunities to enact these HLPs in the subjects they will teach, such as through practica at local schools. Upper primary programs must also support ministries of education, teacher education institutions, and school administrators to develop simple, sustainable forms of teacher induction that support the early stages of a teachers' career. These induction programs would provide novice teachers with the support (coaching, mentoring, and professional networks) to enable them to continue to develop skills vital for teaching effectively (Cobold, 2007; Godwin & Bellinger, 2019; Gomendio, 2017). Learning to teach using digital technologies such as computer programs, mobile applications, e-learning platforms, and digital learning resources will increasingly play a key role in teacher preparation, and pre-service teachers should learn how to use technology effectively through their course work and practica in schools.

Teachers are key to successfully improving student learning outcomes, thus strong TPD is essential. At the same time, ensuring that the school environment will be conducive to their efforts toward improved instruction is also important. The literature shows that other factors such as strong school leadership, the introduction of learning support staff, and strong educational systems with appropriate accountability also help improve learning outcomes (Godwin & Bellinger, 2019). As with lower primary, effective upper primary programs will need to collaborate closely with country governments to facilitate changes in systems and policies that support changes in teaching and learning in pre-service teacher institutions as well as in schools in general (Pritchett, 2015).

In-Service Teacher Training and Support

Successful in-service teacher training for the upper primary grades should have many of the same characteristics and components as trainings targeted for lower primary teachers. For effective teacher training in lower primary grades, program implementers should

- Reduce the amount of content in the training, focusing on only key topics, to avoid cognitive overloading;
- Allocate significant time for modeling during the training of trainers (ToT) and teacher training, using champion or key teachers for modeling where possible;
- Increase time allocated to practice (based on the high-quality modeling) and prioritize practicing in pairs and triads;
- Format the training manual to maximize ease of use, including the use of icons, illustrations, and graphics;
- Include time management techniques during ToT;
- Ensure facilitators understand the program theory of change and adult learning principles;
- Ensure training manuals, teachers' guides, and student textbooks are key resources used throughout the training; and
- Prioritize shorter trainings (no more than 5 days long) multiple times during a year, over longer, one-time training.

Additionally, based on research studies in the upper primary grades in LMICs, upper primary teacher trainings should consider the following:

- Start from what teachers already know and can do. This will involve surveys and lesson observations to understand which aspects of upper primary content and pedagogy teachers find most challenging.
- In bilingual and multilingual contexts, explicitly model using bilingual scaffolds like translanguaging strategies that support the transition to the LoTL.
- Stagger more frequent trainings across the school year to introduce increasingly complex content and pedagogy close to when topics will be taught in the curriculum.

- Model and practice developing formative and summative assessments in line with topics to be taught next. Include demonstration of data analysis, interpretation, and lesson adaptation using a real set of classroom assessments.
- Include time for teachers to reflect and discuss how they might use the new strategies in their classroom contexts.
- Include the development of professional learning communities where teachers can meet in small groups to foster collaborative learning and build on pre-existing expertise.
- Schedule time in professional learning community meetings to analyze, interpret, and adapt planning using real sets of classroom data.
- Include training on simple, practical remediation techniques teachers can implement with learners who enter upper primary grades lacking the basic skills in literacy and numeracy taught in early primary.
- Leverage smaller in-service trainings to include the use of manipulatives for mathematics and correct use of various types of equipment, which aid teachers to teach subjects such as science and technology effectively.
- Include training for teachers, head teachers, and other school leaders that incorporates approaches for engaging communities and families to strengthen learners' home learning environments and strategies for supporting student motivation in school (RTI International, 2021).

Using forms of digital technologies for teaching and learning should become an integral part of in-service TPD. Participation in online courses developed with ministries of education and tertiary institutions should be linked to teacher career advancement. As teaching and TPD turn to virtual, distance, or e-learning programs, governments must address equity issues to ensure that both learners and teachers have equal opportunities to learn (UNICEF, 2017).

Multi-Faceted Ongoing Teacher Support

Research on TPD in the early grades has indicated the need to combine various types of ongoing teacher support, such as coaching, mentoring, and professional learning communities (Craig et al., 1998;

Pouezevara, 2018; Westbrook et al., 2013; SABER, 2014). After initial teacher training opportunities, upper primary systems should provide multi-faceted opportunities to support teachers in deepening their learning and honing their skills. This follow-up support can be provided through a combination of on-site job-embedded support (Pretorius & Currin, 2010; Themane & Thobejane, 2019), inter-school professional networks, and external coaching/mentoring. For example, programs should work with teachers to select and develop academic leaders or change agents in schools who can lead professional learning at the school level, thereby ensuring capacity building, continuity, and sustainability after a particular training or intervention program is over. Cluster-level professional learning communities (PLCs) can give teachers more opportunities to share experiences and challenges, and to reflect together on their practice. In PLC meetings, whether within a school or with teachers from a cluster of schools, teachers might undertake activities such as planning future lessons together and subsequently discussing their experience, sharing common challenges and trouble-shooting together, and demonstrating lesson activities for each other and providing/receiving feedback. Coaching mechanisms are also a proven approach for supporting teachers where pedagogical supervisors or similar officers observe teachers' lessons, provide expert feedback on their practice

and advice regarding challenges, and reflect and troubleshoot together with teachers across schools. Digital technologies also offer opportunities for enhancing and expanding ongoing support options. Some examples that have proven effective include SMS for additional communication between coaches and teachers; use of platforms such as WhatsApp, Viber, or Skype to extend professional learning community discussions; Interactive Voice Response and interactive apps that can provide information or mini-modules on selected topics per need and interest (Carrol, 2020; Burns, 2011; Gaible & Burns, 2005; Jukes et al., 2016)

The precise combination of support and mechanisms used will depend on the context and should be built on any mechanisms that might already be in place. Table 1 shows some of the pros and cons of various common support modalities and can be used to guide decision making around teacher support design.

TPD programs in upper primary in LMICs, from pre-service to in-service and ongoing support, should include skill development opportunities for teachers to effectively implement HLPs to understand and take advantage of developmental progressions (discussed in detail in the following sections) within subject areas. These factors are essential to ensuring effective transition to upper primary and beyond.

Table 1. Teacher support modalities: pros and cons

Modality	Pros	Cons
In-school coach	<ul style="list-style-type: none"> • Relatively inexpensive. • Allows for frequent observation/feedback. • Can help ensure school-level commitment. 	<ul style="list-style-type: none"> • School administrators often are too overloaded to handle this role. • Difficult to monitor. • May involve extra training and support for school staff to take up role.
External coaching visits	<ul style="list-style-type: none"> • Coaches can have higher-level training and can be a conduit for other experts to provide additional information. 	<ul style="list-style-type: none"> • Expensive. • If coach-to-school ratio is high, or if travel is difficult between schools, teachers may receive few visits.
School-level teacher professional learning communities	<ul style="list-style-type: none"> • Inexpensive approach. • Can create a positive school environment for trying new approaches. 	<ul style="list-style-type: none"> • Less effective if only a few teachers per school. • Without enough support, meetings can lose focus or reinforce misconceptions.
Cluster-level teacher PLCs	<ul style="list-style-type: none"> • Can be relatively inexpensive and can energize teachers. • Can be effective for finding solutions to problems or issues. 	<ul style="list-style-type: none"> • Groups need time and a budget for teachers to meet. • Also need support to ensure that joint solutioning is technically sound.
Support via digital technology	<ul style="list-style-type: none"> • Can help bridge gaps where frequent in-person communication is not possible or where an expert cannot visit all schools frequently. 	<ul style="list-style-type: none"> • Most effective combined with other approaches. • Connectivity and access to digital devices must be considered.

Note: Table data are adapted from Ralaingita, W. (2020). Structured pedagogy guide. *Teacher professional development: Ongoing teacher support*. <https://scienceofteaching.s3.eu-west-3.amazonaws.com/index.html#/lessons/zoE4mHcRFAc6b9MhPeRdcZDGMc4ia48l>

Additional Resources for Fostering Teacher Quality

Craig, H. J., Kraft, R. J., & Du Plessis, J. (1998). *Teacher development: Making an impact* (No. 19009). The World Bank. https://people.umass.edu/educ870/teacher_education/Documents/Craig-book.pdf

Meija, J. (2020). *Structured pedagogy guide. Teacher professional development: Teacher training*. <https://scienceofteaching.s3.eu-west-3.amazonaws.com/index.html#/lessons/fXgYqtaQQv3m7AJ3fMS2p-ig3K5aHt2n>

Pflepsen, A. (2018). *Coaching in early grade reading programs: Evidence, experiences and recommendations*. https://pdf.usaid.gov/pdf_docs/PA00TXZ9.pdf

Ralaingita, W., (2020). *Structured pedagogy guide. Teacher professional development: Ongoing teacher support*. <https://scienceofteaching.s3.eu-west-3.amazonaws.com/index.html#/lessons/zoE4mHcRFAc6b9MhPeRdcZDGMc4ia48l>

Villegas-Reimers, E. (2003). *Teacher professional development: An international review of the literature*. International Institute for Educational Planning. <http://www.iiep.unesco.org/en/publication/teacher-professional-development-international-review-literature>

Component 2: A Focus on Numeracy, Literacy, and Core Subject Areas

Improving the quality of upper primary fundamentally depends on improving teaching in the core subject areas. In this document we focus on numeracy, literacy, and the core subject areas. To improve pedagogical methods in these subject areas, this section describes the specialized HLPs, developmental progressions, content knowledge, and pedagogical content knowledge that teachers in the upper primary grades need to know.

Teaching Mathematics in Upper Primary

In some ways, the focus of mathematics instruction and interventions in mathematics in upper primary will be like those in lower primary. Instruction at both levels should develop conceptual understanding, support procedural competency, and strengthen students' ability to use these skills for solving problems. However, in upper primary, mathematics concepts will become progressively more complex and abstract. Each new concept will rely on strong mastery of the basic skills learned in lower primary (Bethell, 2016; National Council of Teachers of Mathematics, 2014; Soendergaard & Cachaper, 2008).

To be effective, teachers must be skilled in the following pedagogical practices needed for teaching mathematics, as identified through reviews of research literature in high- and low-income country contexts: (1) developmental progressions, (2) mathematical models and representation, (3) explanation and justification, and (4) linking in-school and out-of-school mathematics (National Research Council et al., 2001; National Council of Teachers of Mathematics, 2014; Sitabkhan et al., 2019; Sitabkhan & Platas, 2018). In the subsections below, we present the implications for instruction and TPD in upper primary mathematics in terms of these four practices.

Developmental Progressions in Mathematics

Developmental progressions in mathematics describe how children's learning progresses from simple to more complex understanding within a single domain (for instance, number sense) or subdomain (for instance, cardinality). In upper primary, students are expected to take basic understanding developed in early primary and apply it in more advanced ways. In addition, new topics within domains are introduced. For example, while students may have been introduced to basic fractions in lower primary, they may undertake operations on fractions and begin to work with different forms of fractional numbers (e.g., fractions, decimals, and percentages) in upper primary.

What Should Teachers Know and Be Able to Do?

As noted previously, mathematics in upper primary build on concepts from lower primary and often become more abstract.

Teachers will need to have mastered both the math concepts and be able to identify whether/where learners have gaps in core math skills. They will need to be able to support learners to fill in those gaps before expecting them to grasp more complex concepts. Teachers will also need to be able to use assessments to determine whether a struggling student is not understanding the new materials sufficiently or if they have not mastered the earlier, more basic material, and then provide support to them appropriately.

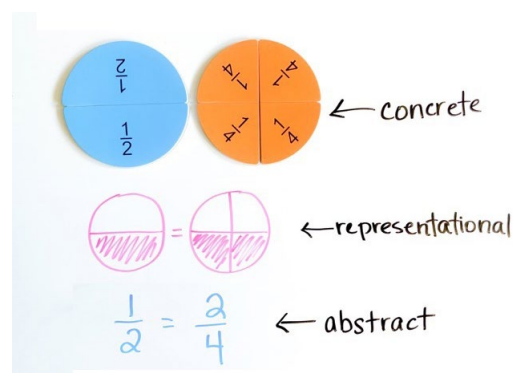
Teacher Professional Development

TPD should build teachers' content knowledge. As noted previously, some teachers struggle to solve the mathematical problems they themselves are teaching. Therefore, improving upper primary mathematics instructional quality will depend in part on helping to fill in some of the content knowledge gaps that these teachers often have. In addition, TPD will have to focus on pedagogical content knowledge, including formative assessment and remediation so that teachers can learn about and practice both formal and informal assessment techniques and using information from those assessments to make a remediation plan (see Component 3). For example, teachers can be introduced to simple assessment approaches during training, like exit cards. During training they might practice making their own and simulate using them with other teachers along with a discussion of how to remediate depending on student responses. Then, when they meet with other teachers in their PLCs, they could reflect on their use of exit cards and plan for remediation together. Along with assessment planning, teachers should also practice learner error analysis—that is, figuring out where learners may be “going wrong.” For example, teacher training can include student examples and have teachers try to identify what mistake has been made, followed by discussions on how to help learners improve. Teachers can be coached on having learners “think aloud” as they solve a problem, which can help them spot the error. Such practice can be helpful for teachers to build skills in identifying gaps and targeting remediation.

Mathematical Models and Representation

Figure 2 depicts the different ways a concept may be represented, which can include pictures, drawing, objects, and symbols or numbers. As in lower primary, models are used in upper primary to tie abstract concepts to concrete models, which supports student understanding. For example, early grade students may use counters whereas upper primary students may rely more on base-ten blocks. Teachers in upper primary will also build on representations that students learned in lower primary, scaffolding students' learning. Pictures, drawings, and diagrams become more commonly

Figure 2. Concrete-Visual-Abstract progression for fraction concept.



Source: Gray, S. (2020). *Teaching math using the concrete representational abstract model*. <https://shelleygrayteaching.com>. Figure used with permission from the author.

used than concrete objects, with the expectation that students have already mastered the more concrete model. In addition, learners at this level will begin to make more connections to and among different symbolic representations of the same concepts—such as understanding the relationships among $\frac{1}{4}$, 0.25, and 25 percent.

What Should Teachers Know and Be Able to Do?

Teachers will need to know several different, appropriate models and representations for mathematical concepts and know how different representations are connected. They will need to be able to decide when to use a particular model, how and when to shift to more abstract representation, and how to guide learners to use mathematical models and representations.

Teacher Professional Development

Teachers can be supported in this area through explicit training on the associations among manipulatives, pictures/drawings, diagrams, and abstract representation along the developmental progression in a particular domain or subdomain (e.g., different models for place value and how they relate to each other). Teachers should also be given an opportunity to practice using models, both in solving problems and in instruction through microteaching or simulations. For example, teachers may be given the opportunity to become familiar with manipulatives, such as fraction strips, using these materials themselves to solve a problem similar to

those that learners would do in class. Then, teachers can also practice instructing the same and similar activities to each other. This can help ensure that teachers grasp the relationship between the model and the target math concept and that they will have the confidence to use the model with their learners.

Explanation and Justification

Explanation and justification refer to when learners explain or justify their thinking, describe how they arrived at a solution to a problem, or comment on someone else's solution. In upper primary, students can be increasingly asked to explain their thinking in writing and "show their work" when completing problems. This can also relate to helping them using metacognition for problem solving—where students are encouraged to plan, carry out a problem-solving approach, and then check their work.

What Should Teachers Know and Be Able to Do?

To master modeling explanation/justification and support students' use of such processes, teachers will need to build a strong conceptual understanding and be able to explain their own mathematical thinking. In addition, they will need to develop an ability to identify errors in learners' mathematical thinking and scaffold support for them as well as an ability to plan for and manage constructive discussion in their classroom.

Teacher Professional Development

Although it can take time for teachers to master this area of instruction, they can be supported by professional development that helps build their own content and pedagogical content knowledge through practice in explanation and justification. In other words, teachers work through problems, explain their thinking, and comment on each other's solutions, with scaffolding from a trainer. Training can also include explicit discussion of tips for facilitating positive discussion in the classroom and responding to "wrong" answers constructively and modeling and practicing explanation and justification techniques in the classroom. In Figure 3, students in Luang Prabang, Laos are playing a math game during a "Discovery Day" festival in, organized by Big Brother Mouse. Games offer an opportunity for students to

Figure 3. Upper primary math games



Source: "Discovery Days" festival in Luang Prabang, Laos, organized by Big Brother Mouse, a literacy organization; photo by Blue Plover [CC BY-SA 3.0], via Wikimedia Commons.

explore math topics, and professional development can help teachers harness those opportunities for rich mathematical discussion in the classroom.

Linking In-School and Out-of-School Mathematics

Out-of-school, or informal, mathematics involves skills learners have developed over time, building on an innate sense of quantity. It is typically context specific and uses non-generalizable strategies. In-school, or formal, mathematics typically involves symbols and uses generalizable strategies. Linking these two forms of mathematics can help learners understand in-school math better and apply strategies they have learned in the classroom to real-world contexts.

What Should Teachers Know and Be Able to Do?

To ensure strong linkages between in-school and out-of-school mathematics, teachers need to be familiar with relevant out-of-school mathematics and recognize where the two might be linked to draw on real-world examples during lessons. For example, in many countries, learners will be exposed to decimal numbers at stores or markets and may be able to do simple calculations with them. Teachers could draw on this out-of-school mathematics knowledge to help them build a more general, conceptual understanding of decimals and undertake more complex operations. Teachers also need to be able to create problems that will support learners in making these connections and applying formal mathematics

to out-of-school contexts, and vice versa. Thus, in the same example, teachers might utilize the shop context to have learners practice applying their developing understanding of decimals in a realistic problem-solving context.

Teacher Professional Development

TPD can help teachers develop these skills by guiding them to brainstorm and discuss ways in which learners use informal mathematics with guided support to then map those informal uses onto formal mathematical concepts. It will also be beneficial for teachers to practice jointly developing practical problems, focusing on target math concepts, and to practice carrying out lesson activities using practical problems.

Teaching Literacy in Upper Primary

We define literacy as “writing, speaking, listening, viewing, visually representing, and critical thinking applied in a social context to enable a person to function effectively in his or her group and community” (Cecil et al., 2017, p. 20). This definition encompasses multiliteracies that 21st-century learners in the upper primary grades in LMICs should learn and acquire. Therefore, developmental progressions in literacy in the upper primary grades comprise teaching of the four language domains and viewing, which is a form of visual literacy. In general, developmental progressions in literacy and language describe levels of language proficiency from beginning or novice to mastery or expert command of a language. For example, New York State Bilingual Common Core New Language Arts Progressions has five levels: entering, emerging, transitioning, expanding, and commanding (EngageNY, 2014). The Australian Curriculum, Assessment and Reporting Authority (ACARA) English as an Additional/Dialect learning progression has four levels: beginning, emerging, developing, and consolidating (ACARA, 2015, p.3). Teachers will need to determine learner proficiency levels using language progressions, regardless of learner ages, and provide linguistic scaffolds to develop learner language skills in the target LoTL, which in the case of mother tongue bilingual education programs may be three languages. Providing linguistic scaffolds to help learners develop

language proficiency in the target LoTL is essential in LMICs where educational systems have early-exit models of mother tongue instruction, which require learners to transition to instruction wholly in international languages such as English, French, and Portuguese from grades 3 or 4 (Erling, et al., 2017; Sibomana, 2020). Literacy research in the upper primary grades in LMICs indicates learners had reading skills and oral language proficiency below their grade level in the target LoTL (Abiria et al., 2013; Clegg & Simpson, 2016; Erling et al., 2017; Pretorius & Currin, 2010; Sibomana, 2020). Consequently, upper primary literacy programs will need to provide focused attention to supporting the language transition period for learners. We recommend particular care and attention be paid to the skills of teachers in the language transition year, which is often grade 4.



Successful Upper Primary Study: Language and Mathematics

Source: Botes & Mji (2010). Language diversity in the mathematics classroom: Does a learner companion make a difference?

Country: South Africa

Researchers explored the effects of a visual multilingual “learner companion.” This glossary-like resource provided illustrations, defined and described mathematics terminology in English and several South African languages. The study involved measuring the mathematics performance of 2,348 learners in grades 4, 5, and 6. Workshops were offered for teachers. The learning outcomes of learners in the treatment group improved.

Teaching Reading in Upper Primary

Developmental Progressions in Reading and Viewing

Developmental progressions in reading comprise knowledge and skills that learners must master to meet the curriculum reading requirements as they progress through school. Using developmental or learning progressions in reading to move learners toward mastery is vital in the upper primary grades in many LMICs, because of the challenges of transitioning to international LoTLs in grade 4, which include learning the increasingly complex and abstract subject matter in the LoTL and preparing to take high-stakes end-of-primary examinations.

What Should Teachers Know and Be Able to Do?

To teach reading effectively in the upper primary grades, teachers must know the parts of language (i.e., phonology, morphology, semantics, syntax, and pragmatics) of learners' mother tongues and the LoTL. Furthermore, teachers should know and understand reading theory, literacy development, the five components of reading (phonemic awareness, graphophonemic awareness, vocabulary, reading fluency [including in oral reading], and reading comprehension [Bulat et al., 2017; National Reading Panel, 2000]), text types and genres (e.g., fiction, and informational texts or nonfiction), and visual literacy. Most importantly, teachers should be able to know how to apply the knowledge of how learners acquire language skills over time and how learners can learn these skills most efficiently.

Teacher Professional Development

Considering what teachers should know and be able to do, teacher training should consist of training in HLPs in reading, the remediation of reading, explanation, modeling and practice of reading comprehension strategies, and provision of bilingual scaffolds to support learners in their transition to the LoTL, particularly in grades 4 and 5. Research in LMICs and HICs indicates that translanguaging pedagogy, or bridging, can be used as a bilingual scaffold. This pedagogical practice involves explicit, systematic, and organized instruction using learner mother tongue languages to scaffold language learning in the target LoTL (García, 2009; García & Sylvan, 2011; Hesson et. al 2014). Translanguaging has been found to be effective whether the goal of instruction is to develop bilingual proficiency or transition learners into proficiency in the target LoTL (Botes & Mji, 2010; Kerfoot & Van Heerden, 2015; Makalela, 2014; Milligan et al., 2016; Sowa & Robledo, 2020; Van Staden, 2016).

To teach translanguaging in a teacher training, code-switching can be used as a springboard to explain that learner linguistic repertoires are assets and how translanguaging strategies can be used to scaffold literacy and language learning. Next, the facilitator will model several examples of translanguaging strategies for reading. Teachers will select one

strategy, incorporate it into a lesson plan, and practice teaching the strategy with peers. Using peer feedback, teachers strengthen their lesson plans and teaching and then, if possible, practice translanguaging strategy with learners in a teacher training practicum school. After this activity, teachers will reflect on their experiences, discuss their strengths and challenges and how to continue to solidify translanguaging strategies. These discussions and continued practice should be taken up during school or cluster-level PLCs.

Translanguaging Strategies



- Learners read a text in their mother tongue and explain it in writing or orally in the target LoTL.
- Learners make predictions in mother tongue, read silently in target LoTL, and check their predictions in both mother tongue and target LoTL.
- Learners read two texts of similar content in mother tongue and target LoTL, then study the sound and syllabic features of the two languages.

Teaching Writing in Upper Primary

Developmental Progressions in Writing

Writing progressions describe the continuum of skills learners need to draw on when they start to compose texts. This continuum starts with emergent writing, moves to writing simple and complex sentences, and then transitions to a variety of increasingly complex and sophisticated types of academic writing genres and text types in the upper primary grades.

What Should Teachers Know and Be Able to Do?

To teach writing successfully, teachers should know and understand the language features—phonology, morphology, semantics, syntax, and pragmatics of the target LoTL and the mother tongue. Teachers can then use this knowledge to explicitly teach learners the differences and similarities between their mother tongue languages and the target LoTL as seen in the example in Table 2. Additionally, teachers should know how to implement the writing process, teach about text types and genres as well as various writing strategies.

Table 2. Example of bilingual scaffold: T-chart

Filipino	English
ang silya ni Maria	Maria's chair
ang kapatid ni Gloria	Gloria's sister
ang aso ni Matt	Matt's dog

Note: The table provides an example of a contrastive analysis in the form of a "T-chart" like the one above that teachers can use as a bilingual strategy to teach learners to examine the differences and similarities between the use of possessives in Filipino and English.

Teacher Professional Development

Professional development on writing for upper primary teachers should equip them to teach writing using various strategies—including integrating technology—for multiple purposes, starting from guided, interactive writing and sentence frames and then progressing to critically responding to texts, writing multimodal texts, and drafting formal essays using the writing process. Using writing frameworks, modeling, and practice, teachers can be guided to develop rubrics for scoring the different types of writing genres and text types as well as practice scoring using authentic learner writing samples (Ministry of Education, New Zealand, 2019; Education Northwest, 2020). As they learn how to score learner work, teachers will also be directed as to how to interpret these scores and use them to improve learner writing. Teacher practice for developing rubrics and scoring learner work should also continue in their school or cluster-level PLCs. Additionally, trainings should provide teachers with multiple opportunities to practice a variety of writing genres themselves and support them in improving or enhancing their skills in using writing to integrate the language domains. Other professional development opportunities for teachers should include the explicit teaching of grammar, spelling, and vocabulary using authentic contexts; how to explain and model the writing process using graphic organizers; and how to provide multiple and sustained opportunities for learners to write.

Teaching Oral Language in Upper Primary Developmental Progressions in Oral Language

Developmental progressions in oral language consist of the continuum of speaking, listening, and viewing skills that lead learners toward language proficiency

and help them meet the demands of the curriculum. Viewing, a receptive skill like listening, involves the ability to comprehend, analyze, interpret, evaluate, and create print and digital media. Often called the fifth language skill, viewing involves "reading" visual media or multimodal texts using metacognitive strategies such as predicting, making connections, and inferring (Canadian Common Curriculum Framework, 1998). Multimodal texts are texts that consist of two or more semiotic modes. Examples of semiotic modes are written and spoken language as well as visual and auditory forms of communication. Print multimodal texts comprise picture books, graphic novels, comics, newspapers, posters, and brochures. Digital multimodal texts are audio-visual and comprise film, video, slide shows, websites, and digital stories. Research in both LMICs and HICs posit viewing skills are paramount for 21st century learners and are a resource for fostering learner proficiency in the target LoTL (Abiria, et al. 2013; Callow, 2011; Makalela, 2015; Serafini, 2012). Table 3 illustrates oral language developmental progressions in oral language for English learners developed in Australia.

What Should Teachers Know and Be Able to Do?

In addition to having comprehensive knowledge of the features of language stated previously, upper primary teachers must know how to scaffold learner academic oral language proficiency in the target LoTL. Research evidence indicates that language learners will first pick up basic interpersonal communication skills, the language used for social interactions. Teachers will need to understand that learners need more time to develop the academic language proficiency needed to be successful in upper primary (Cummins, 2017). They will need to understand the vital role that language proficiency plays in literacy development and have a toolbox of strategies like interactive read-alouds to improve learner listening, viewing, and speaking skills.

Teacher Professional Development

Trainings for teachers should include explicit ways to improve and strengthen learner listening, speaking, and viewing skills. Teacher trainers should demonstrate how to conduct classroom conversations

Table 3. English as an additional language/dialect (EAL/D) language progressions**Beginning English (Years 3–6)**

Student progress can be monitored during the school year using the EAL/D learning progression. It is important to note that placement on this continuum should be based on a body of evidence and not just one work sample, and ability in one mode is not an indication of ability across all modes.

Language Domain: Listening	Language Domain: Speaking
<p>Description of learners: Learners at the beginning of this phase have some print literacy in their first language and are new to the sounds of English. In this phase, they begin to attend to the sounds of English and identify individual words, phrases, tones, and inflections. Learners at the beginning of this phase communicate using gesture, isolated words, and well-known formulaic expressions. In this phase, they begin to communicate verbally and nonverbally in familiar social and classroom situations.</p>	
<p>Students will be able to</p> <ul style="list-style-type: none"> Identify some known vocabulary as single words and sometimes in a sentence sequence of sounds when the known word is stressed (e.g., give me your book). Understand a narrow range of action verbs (sit, run, kick, sing). Recognize some common phrases in familiar contexts (e.g., on the desk). Listen to texts read aloud and identify events and characters when supported by pictures. Use contextual cues and first language to follow communication in everyday classroom routines and sometimes seek help from others. 	<p>Students will be able to</p> <ul style="list-style-type: none"> Begin to express needs and respond to simple directions and questions using single words or nonverbal responses such as shrugs. Distinguish between spoken English and first language/dialect. Use a limited range of concrete home and school vocabulary that is high frequency. Exhibit beginning understanding of word order in simple phrases and sentences. Watch, listen, imitate, and repeat words and phrases and rely on English speakers to support and interpret their utterances.

Note: Adapted from the Australian Curriculum Assessment and Reporting Authority (ACARA, 2015).

and discussions that support learner oral academic language proficiency in the target LoTL (Cummins, 2017), how to use bilingual scaffolds to support learner transition to the LoTL, and ensure learners have multiple opportunities to speak and express themselves, then have teachers practice these skills. This might involve teachers working in small groups to practice asking factual and inferential questions, then trying out their learning in practicum schools. Teacher trainings would also provide teachers with tools to monitor and assess learner oral language and viewing skills, including the development of rubrics for oral language assessment. Teachers could use audio recordings of authentic learners speaking to learn how to use the rubrics to assess learner speaking skills. Finally, the trainings would cover teaching teachers how to use media and digital technology to build learner oral language and viewing skills.

Interactive read-alouds are an excellent whole-class pedagogical strategy that involves HLPs, which pre-service and in-service teachers can practice (see Interactive Read Aloud and HLPs textbox). This strategy is an effective way of improving learner skills in the four language domains and viewing. During interactive read-alouds, teachers read a text that is beyond the instructional reading level of most

learners in a class, pausing in places to discuss text content with learners. Through teacher questioning and think-alouds, learners construct meaning and actively process the language, ideas, and illustrations of the text (Fountas & Pinnell Literacy, 2019).

Interactive Read Aloud and HLPs

Interactive read-alouds can help teachers practice the following HLPs:



- Leading a group discussion
- Explaining and modeling content, practices, and strategies
- Eliciting and interpreting student thinking
- Learning about students' cultural, religious, family, intellectual, and personal experiences as resources for use in instruction

Teaching Content Area Literacy Skills in Upper Primary

Developmental Progressions in Content Area Literacy

Content area literacy is the ability to use literacy skills, study skills, and strategies needed to make sense of the complex academic language used in texts for content areas like science and social studies (Chauvin & Theodore, 2015; Ivey & Fisher, 2005,

2006; National Academies of Sciences, Engineering & Medicine, 2018). Because literacy is the foundation of all learning, any program targeting the upper primary grades should include capacity building for content teachers on how to support literacy development to support learner comprehension of content area texts. Upper primary learners in LMICs typically must learn both a new language and subject content; therefore, it is vital for teachers to be equipped to teach language, literacy, and content.

What Should Teachers Know and Be Able to Do?

In addition to knowing the principles, concepts, and developmental progressions of the content area subjects they teach, teachers in the upper primary grades will need to understand literacy development and how to use reading, writing, oral language, and viewing to support learning both the language and content. Content area teachers have three roles. First, they must teach learners subject matter with challenging and increasingly complex texts, vocabulary, terms, and concepts. To master content area subjects, teachers need to move learners toward more in-depth critical thinking, evaluation, analysis, synthesis, and creativity (Council of Chief State School Officers [CCSSO], 2007). Second, teachers must provide learners with the support and academic language necessary to make content comprehensible using various learning and instructional strategies (Echevarria, Vogt, & Short, 2016). Using word study to explore root words, suffixes, and prefixes across content area subjects is one way to teach vocabulary and academic language. Learners can learn that the prefix *frag* or *fract* means break, as they learn about fractions in mathematics and words like fragment and fracture in science (Ellery & Rosenboom, 2011). Third, teachers will need to help learners understand that the skills, comprehension requirements, and text structures involved with reading mathematics, science, and social studies texts or textbooks are different, and they must use “effective learning strategies with each” (CCSSO, 2007, p.4). The Preview and Predict strategy provides an example of how learners can learn how to use text structures to facilitate comprehension, the steps of which are illustrated in the subsequent textbox.

Preview and Predict Strategy

- Learners preview the text/textbook chapter and explore titles, subtitles, bold print, illustrations, charts, and graphs (1 minute).
- In pairs, learners write three things they think they will learn about in complete sentences (3 minutes).
- Partners share their list with another pair, and the list is condensed or expanded (3 minutes).
- Teachers write the final lists on board or chart paper (3 minutes).
- Teacher reads the first section of the text and reviews predictions with learners (5 minutes).

Source: Echevarria, Vogt, & Short (2016).

Teacher Professional Development

Teacher trainings must incorporate instructional strategies that content area teachers can use to strengthen student academic language. To ensure this melding of subject content with language, teachers in these grades must be equipped to reinforce learner understanding of texts by making texts comprehensible. They will need to employ reading comprehension strategies such as visualizing, asking questions, activating prior knowledge, and summarizing (Chauvin & Theodore, 2015; Cecil et al., 2017). Instructional strategies teachers must strengthen or improve include how to explicitly teach subject matter vocabulary and concepts and how to teach both language and content (Botes & Mji, 2010; Echevarria, Vogt, & Short, 2016; García 2009; Makalela, 2014; Kerfoot & Van Heerden, 2015; Webb & Webb, 2016). During teacher trainings and school-based professional development, content area teachers can be taught through modeling and practice what language objectives are, how to develop and integrate these objectives in their lesson plans or schemes of work and how to use them to assess learner understandings of language and content. In addition to coaching, the expectation would be that

Grade 4 or 5 Lesson on Fractions

- **Content objectives:** Represent common fractions ($1/2$, $1/3$, $1/4$, $1/5$, $1/6$, $1/8$, $1/10$) on 10 by 10 grids.
- **Language objectives:** Identify fractions when asked. Orally describe or explain what the fractions mean.

Adapted from a Sheltered Instructional Observation Protocol (SIOP) lesson plan sample: Center for Applied Linguistics (CAL; 2009).

teachers would collaborate in their school or cluster-level PLCs to improve their teaching of language and content.

Teaching Content Area Subjects in Upper Primary

Developmental Progressions in Subjects

As with literacy and mathematics, learning progressions for content area subjects such as science and social studies (geography, history, economics, civics) provide teachers with learning pathways to help learners master skills in these subjects and apply them to real life. In science, developmental progressions reflect big ideas in science and how they are sequentially organized from basic to complex knowledge (National Research Council, 2010). Social studies developmental progressions describe the building blocks of social studies disciplines from the least sophisticated, such as understanding chronological order in history in early primary, to using this understanding in more sophisticated ways like developing graphic organizers or timelines of historical events using years and decades.

What Should Teachers Know and Be Able to Do?

Content area teachers in the upper primary grades should have basic ideas and conceptual understandings of content, pedagogical knowledge, and pedagogical content knowledge. Science teachers should have a grasp of life, physical, and earth sciences. In addition to general teaching skills, these teachers should have more specialized skills or pedagogical content knowledge such as how to model and teach scientific inquiry (National Research Council, 2010). Social studies teachers' knowledge should include basic understandings of historical, geographic, and economic concepts. They will need to be equipped with instructional strategies, which include scaffolding learners' critical thinking, vocabulary learning and research skills, such as locating sources.

Teacher Professional Development

In addition to including strategies that help deepen teacher conceptual knowledge of content, TPD should also cover teaching HLPs. For social studies, an HLP is knowing how to lead discussions and

support learners in knowing how to discuss, debate, or argue (e.g., arguing for or against decisions made by contemporary or historical figures). In science, HLPs include modeling and explaining to scaffold learner construction of explanations and engaging learners in the scientific method or teaching them how to "do" science using scientific language and practicing inquiry-based learning through authentic experiences. Learners would be taught to understand and use scientific words like hypothesis, claim, and evidence, and authentic experiences might involve observing, recording and making sense of scientific phenomena like the growth of a plant, or what happens when you mix oil and water (TeachingWorks Resource Library, 2021).

TPD should ensure that teachers also learn to "do" science or social studies. The interventions should facilitate immersive, hands-on teacher learning experiences that involve extensive modeling and practice where teachers explore, discover, and test their ideas. In professional development meetings and training sessions, teachers should be given time for reflection to see how the strategies they are learning and experiencing can best translate to their classroom contexts through small-group discussions. Teachers should also be guided in developing lessons and practicing lesson implementation with learners in practicum schools (National Research Council, 2010). These reflection sessions and practice lessons fit into a cycle of learn, test, reflect, adapt, and communicate what interventions should strive for among content area teachers in all schools. For example, a teacher covering grade 5 science in a school may attend a training where she and other science teachers make their own water filters, using plastic bottles, sand, and rocks. Ideally, the teacher would then go back and implement this unit in her own class, with the support of a coach or subject area lead. In a meeting of other teachers in her school, the teacher may reflect on the lesson and adapt the unit by having students make filters in pairs or by developing a worksheet to help struggling students organize the content being covered. When appropriate, she could then model this lesson for a neighboring grade 5 science teacher, other science teachers at her school, or at a nearby practicum school.

Additional Resources for Numeracy and Literacy Instruction

Evans, N., Srikantaiah, D., Pallangyo, A., Sugrue, M., & Sitabkhan, Y. (2019). *Towards the design and implementation of comprehensive primary grade literacy and numeracy programs. A working paper by the Global Reading Network*. Prepared by University Research Co., LLC. (URC) under the Reading within REACH initiative for USAID's Building Evidence and Supporting Innovation to Improve Primary Grade Assistance for the Office of Education (E3/ED). <https://www.globalreadingnetwork.net>

Broad discussion of design considerations for numeracy and literacy programs. While focused on lower primary, many of key issues discussed are relevant for upper primary.

Sitabkhan, Y., Davis, J., Earnest, D., Evans, N., Ketterlin-Geller, L., Lutfeali, S., Ngware, M., Perry, L., Pinto, C., Platas, L., Ralaingita, W., Smith, K., & Srikantaiah, D. (2019). *Instructional strategies for mathematics in the early grades*.

A working paper developed by the Mathematics Working Group. In-depth discussion of key numeracy instructional practices, in the context of early grades.

Baker, S., Geva, E., Kieffer, M. J., Lesaux, N., Linan-Thompson, S., Morris, J., Proctor, C. P., & Russell, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school. Educator's practice guide* (What Works Clearinghouse, NCEE 2014–4012). National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, US Department of Education. https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/english_learners_pg_040114.pdf

Detailed instructional strategies for teaching literacy and content area subjects in the upper primary and middle school grades.

Cecil, N. L., Gipe, J. P., & Marcy, M. E. (2017). *Literacy in grades 4–8: Best practices for a comprehensive program* (3rd ed.). New York: Routledge. <https://doi.org/10.4324/9781351217347>

Comprehensive discussion of instructional strategies for literacy in the upper primary grades.

Component 3: Assessment (Of, For, and As Learning)

In the previous section, we presented guidance on the pedagogical emphases upper primary programs should have in literacy, numeracy, and content areas. In this section, we describe how assessment should be included as part of the instructional package in upper primary across subject areas. Within upper primary interventions, as in lower primary, three types of assessment should be considered: assessment *for* learning (formative); assessment *of*

learning (summative); and assessment *as* learning (self-monitoring and checking work) (Earl & Katz, 2006). These three assessment types are differentiated by their purpose—how results are interpreted and used. With limited resources, upper primary interventions should strategically invest the most in assessment for learning, with adequate attention to assessment as learning, and reduce the investment in the summative assessments of learning that currently pervade so much of upper primary instruction in LMICs. We recommend the following inputs:

- **Training** should provide teachers with an assessment menu ranging from quick, simple, and uniform assessment activities to longer-term and more differentiated rubrics, portfolios, and oral language assessments that teachers can choose from. During school-level trainings, teachers can share their experiences in adapting these assessments in their classroom or through virtual learning modalities. Teachers should also be trained on classroom management approaches that enable different types of assessment—for example, how to facilitate a session for writing self-reflection journals or the norms teachers should establish to regularly administer quick checks for understanding at the end of a lesson.
- Materials for teachers should include an assessment reference guide that is either integrated in newly developed teacher guides or supplemental to existing guides. Reference guides with samples and templates of assessment activities will help teachers facilitate different methods of gathering evidence on student learning: questioning, observation, conversations, anecdotal records, rubrics, quizzes and tests, and learning logs. These templates should include instructional decisions that can be made based on assessment results, depending on whether the assessment is “for learning,” “as learning,” or “of learning.” Examples of possible instructional decisions are presented in Table 4.

Materials should include prompts for both assessment planning and assessment marking and use of results. Planning prompts can include “What are your learning goals for students?” and “Do students know their learning goals?”

- **Support** for teachers at the school level to use assessment—particularly *assessment for learning* and *assessment as learning*—should include substantial resources to train, mentor, and equip head teachers, coaches, school leaders, or peer

Table 4. Examples of assessment tools and instructional decisions teachers may consider

Thumbs up/thumbs down
<p>Assessment for learning (AFL): “Do I need to review this concept before moving on?”</p> <p>Assessment as learning (AaL): Students have some control over the pace of teaching. “Do I want my teacher to slow down and repeat, or keep moving?”</p>
Reading logs
<p>Assessment for learning: For students who log a high number of pages read, “are there more challenging books I can give them to read?” For students who log a low number of pages read, “What topics are these students interested in? Do I have any text on these topics? Have I observed this student reading aloud recently?”</p> <p>Assessment as learning: Charting their own progress can also motivate students to read more. “This student has been reading more pages each week. How can I recognize this and encourage her?”</p>
Weekly quiz
<p>Assessment as learning: Return math quizzes to students and ask them to (1) correct any problems they got wrong and (2) circle any step where they made a mistake. Ask “can anyone share where they corrected a mistake?”</p> <p>Assessment of learning (AoL): “Has any student failed two quizzes in a row? Is this student at risk of falling behind in the unit?”</p>
Rubric
<p>Assessment as learning: By using a simple checklist to revise their own or a partner’s writing, students can reinforce spelling words, vocabulary words, grammar, sentence structure, and other skills while developing good writing habits.</p> <p>Assessment of learning: <u>Presentation Rubric</u></p> <p>“Which rubric components did students score poorly on—understanding of the content or ability to communicate this understanding?”</p> <p>“How can I design next week’s activities to re-enforce rubric components that students scored poorly on?”</p>
Exit ticket
<p>Assessment for learning: “How many students got this wrong?” Pair students who got exit ticket correct with those who did not. If most of the class got the exit ticket wrong, re-teach. If a handful of students got exit ticket wrong, pull them aside for extra support.</p> <p>Assessment as learning: Exit tickets can be made into a fun game that also helps students recall what was taught. For example: “With your partner, write down as many parts of the plant as you can in 30 seconds.”</p>

learning leaders to facilitate teacher meetings that gradually build teachers’ assessment capacity. Meetings—or calls—should be centered around teachers showcasing formative assessment approaches they have adapted for their own classroom and should emphasize different ways to give learners feedback on their progress along the developmental progressions and toward learning goals. During these sessions, meeting leaders will walk teachers through marking and interpreting assessments they have used in class and should lead discussions on how to plan lessons using the information from these assessments. For teachers with access to a smartphone, learning management applications can support teachers to record, organize and interpret assessment data. (See “Additional Resources” at the end of this component for recommended technologies.)

Assessment for Learning (Formative)

Using formative assessments to inform instruction is critical in helping teachers identify where learners are on a learning progression continuum and plan how to move them forward. This is especially important in upper primary when, as stated previously, teachers have learners matriculating from lower primary with different levels of foundational skills and with different levels of target LoTL proficiency in bilingual and multilingual contexts.

The following are four critical questions that can be used in planning formative assessments and that should be woven into materials and teacher professional development—with a concentration on questions three and four:

1. Why am I assessing?
2. What am I assessing?
3. What methods of assessment should I use to collect evidence of learner learning?
4. How can I use the information from this assessment (Earl & Katz, 2006)?

Helping teachers develop different types of assessments and use formative assessments to target lessons is a difficult undertaking, especially in systems where teachers historically have relied on summative assessment. Programs can increase and improve teachers’ use of formative assessment through the

Assessing Understanding: Describing a Food Web

Assessment: Write a paragraph describing a food web.

Tasks:

1. Topic previewed and learner prior knowledge accessed using mother tongue. The teacher may use feedback during the preview to adjust the pace of instruction or review foundational concepts.
2. Learners observe, record (drawing, labeling), and share aspects of food webs through observations made outside the classroom (e.g. what birds eat, how plants grow) in mother tongue. **AfL:** Teacher uses learner recordings and sharing to assess their understanding of food webs. The teacher may correct misunderstandings during sharing and may re-teach any concept that is misrepresented in drawings (to the whole class or with a small group, as appropriate).
3. Learners read about food webs in target LoTL and develop graphic organizers and bilingual word banks of animal and plant species. **AfL:** Teacher uses Q&A, graphic organizers, word banks to assess learner understanding. The teacher may use this information to pair learners based on their ability: ideally, a student with a strong understanding of the food web but low LoTL proficiency may be paired with a student with strong LoTL use but who is struggling to understand food webs.
4. Learners use graphic organizers to write paragraphs in target LoTL. **AaL:** Learners use checklists to assess their work or the work of peers. The teacher may extend this assessment by asking students to note one strength in their writing (e.g., "I spelled every word correctly") and one weakness ("I did not write enough details to support my main idea"). Students should revise their work, using checklists as a guide.
5. Learners read/present their paragraphs to the class and explain their work in their mother tongue. **AoL:** Teacher uses rubrics to assess written and oral presentations. Rubric results should be communicated to parents. Teachers should review results of the class as a whole to determine if students learned the required content (food webs) and key skills. The teacher may decide to remediate or give review assignments for some or all students if performance is poor.

Adapted from Hesson, Seltzer & Woodley (2014).

combination of training, material, and ongoing support inputs (Moss & Brookhart, 2019) discussed at the beginning of this section. Given these constraints, it is especially important that approaches to formative assessment are not overly ambitious or standardized and that the four-question planning and reflection process described above is prioritized. Teachers should be included in the design of these formative assessment structures so that the activities are simple

and doable and do not add substantial additional burdens to teachers but focus on how instruction can be improved with simplified formative assessment. Formative assessments should also be adaptable to large class sizes and can include thumbs up/thumbs down, exit tickets, and graphic organizers that give a quick snapshot of student understanding.

Assessment *as* Learning

It is important for assessment to be used to develop learners' emerging metacognitive skills. These activities need to be supported by daily and weekly class norms.

To achieve these objectives, programs should work with teachers to develop "small dose" assessment as learning activities. For example, learners can swap writing and check one another's use of plural nouns, or pairs of learners can drill each other on multiplication tables, using a hardcopy table to keep score. These simple, student-focused activities can be designed to give teachers time to take attendance or to observe individual learners. Ideally, these types of activities can be embedded in professional development sessions so that teachers experience them firsthand.

Student Self-Assessment Checklist for Written Report

Name _____

Date _____

- My writing has details that support the main idea.
- My writing has a beginning, a middle, and an end.
- My writing helps the reader know who is talking.
- My writing has adjectives and other descriptive words that make it interesting to read.
- My writing has correct grammar, spelling, and punctuation.

Source: Adapted from a report-writing sample produced by Rubric Maker (n.d.).

Assessment of Learning (Summative)

Summative assessments in upper primary are similar to those in lower primary in design and use, except that the value placed on these exams, particularly standardized assessments, increases as learners get closer to the end of primary examinations. In most contexts, summative assessments are the most popular—and sometimes the only—form of assessment. One danger in this overemphasis on summative assessments is that summative assessments administered by the education system are often not fully validated, do not align to the curriculum, or require mastery of a second or third language. It will be difficult to shift education systems away from these high-stakes assessments as long as secondary schools place limits on admission.

Therefore, high-quality programs should consider a two-pronged approach to summative assessment: (1) work with education systems at the national and subnational levels to review end-of-primary and other key assessments for their validity and alignment to learning progressions in the curriculum; and (2) leverage the importance of these exams as an incentive for teachers to buy into key professional development opportunities that will support instructional improvement.

The system-level review and reform of high-stakes assessments will require evidence on assessment validity, political will, and opportune timing. If interventions deem this level of reform critical and possible during program design, they should develop a road map informed by any past assessment reform efforts in comparable or neighboring countries. In countries where neither review nor reform are realistic and the provision of privately developed exams is widespread and sanctioned, creative programs may endeavor to develop, test, and distribute their own year-end assessments of learning. This may require delicate campaigns for buy-in at the local and school levels or a national mandate, because local actors may also be beneficiaries of private assessment preparation programs that reinforce ineffective pedagogical methods and memorizing facts.

To leverage the value placed on high-stakes exams, the skills and content covered in TPD should be explicitly linked to exam topics early on. In contexts where system-level exams are valid and aligned to the curriculum, teachers should also be trained and given resources to create classroom-based summative assessments of the skills, competencies and content included in system-level exams. Like assessments for learning, assessments of learning should be used to plan upcoming lessons by determining the level of learners' knowledge needed for the next curriculum unit and where their performance falls on the developmental continuum. An increased focus on pedagogical skills and what learners can do is essential to improving the use of summative assessments in addition to reducing the emphasis on the ability of learners to memorize and retain facts, which adversely effects pedagogy.

Additional Resources for Assessment

Du Plessis, J. (2003). *Continuous assessment: A practical guide for teachers*. Improving Educational Quality Project.

In-depth manual on continuous assessment strategies for teachers.

Earl, L., & Katz, S. (2006). Rethinking classroom assessment with purpose in mind: Assessment for learning, assessment as learning, assessment of learning. Western Northern Canadian Protocol. <https://digitalcollection.gov.mb.ca/awweb/pdfopener?smd=1&did=12503&md=1>

Discussion on how to teach assessment for, as and of learning.

Tangerine. (2018). *Tangerine: Teach—Classroom assessment for immediate results*. <http://www.tangerinecentral.org/class>

Provides information on how to use this software for classroom assessment.

Component 4: Teaching and Learning Materials in Upper Primary

Teaching and learning materials and resources are essential for successful teaching in the upper primary grades. As is the case in the early grades, teaching and learning materials in upper primary must be good quality, cost-efficient, simple to use, successful in facilitating learning, language-supportive (i.e., they must scaffold the learning of language and content), and meet the real needs of learners in classrooms. Student textbooks should be linked to teachers'



Successful Upper Primary Study: Language-Supportive Teaching and Learning Materials

Source: Milligan et al. (2016). Exploring the potential for language-supportive learning in English medium instruction: A Rwandan case study.

Country: Rwanda

Researchers explored the development of language-supportive science and social studies textbooks and the introduction of language-supportive pedagogy in language learning for 1,241 grade 4 Rwandan learners. The use of both methods led to significant improvements in learner outcomes.

Some characteristics of language-supportive textbook design:

- Range of oral language, reading, writing, and hands-on activities
- Visuals to support learner understanding
- Reading passages are short, have short sentences, and use simple grammar
- Limited number of academic words, subject-specific words
- Bilingual glossaries

guides with embedded lesson plans. These guides should contain information that supports teacher thinking and implementation of teaching activities, with suggestions for differentiating instruction, assessment, correcting student language, and how and when to use bilingual scaffolds to support learning and understanding.

These core materials should be complemented with supplementary materials for each target subject. For literacy this includes bilingual and multimodal texts that are linked to learner developmental progressions and infused with content for strengthening SEL competencies and critical thinking. The goal of the supplementary materials should be to introduce learners to a wide variety of texts types and text genres (Hwa, 2020; Milligan et al., 2016; Piper et al., 2018; Robledo & Gove, 2019). For numeracy, this includes sufficient manipulatives so learners can use them individually or in small groups. Although there is a large array of possible manipulatives to select for use in upper primary, focusing on a small number that can be used for a variety of topics and strongly support conceptual understanding will reduce costs and be easier for teachers to manage. For example, providing base-ten blocks and fraction manipulative

sets, then training teachers to use them effectively, will support key learning across multiple domains in upper primary mathematics. Note that while it is sometimes popular to encourage teachers to make their own manipulatives, it is unlikely that teachers would be able to make enough for all students to use, and this approach reduces the likelihood that teachers will use them in class.

In addition to science textbooks and teachers' guides in the upper primary grades, teachers and learners should be provided with resources such as posters, flash cards, and locally sourced manipulatives such as bottle caps, plastic bottles, plants, seeds, coins, and clay, which will help them learn and implement the scientific method in practical and hands-on ways.

Also, depending on the context, adequate teaching and learning materials might already exist, and an upper primary quality improvement focus would be better targeted at supporting teachers with training and ongoing support in the use of these materials. Technical support teams may need to collaborate with ministries of education to develop resource toolkits or teacher resource packs comprising teaching resources, descriptions of teaching practices, video clips of modeled teaching strategies, and approaches to assessment for teachers. The development of resource toolkits may also be an option to support teachers in using existing textbooks that may not meet the previously stated criteria for teaching and learning materials. All newly developed teaching and learning materials should be piloted and revised accordingly before distribution. In addition, planning to gain feedback from teachers and undertake further revision should also be anticipated from the outset.

Teaching and learning materials in LMICs should be culturally relevant, responsive to the needs of learners and include sustainable systems for producing these materials. In other words, they should be designed based on country needs and not imported entirely from external sources. To build capacity and strengthen country publishing industries, governments and their partners might collaborate with publishers and authors to prepare teaching and learning materials, particularly children's literature

(e.g., fiction and informational leveled readers and chapter books) that meet the above criteria.

Finally, we recommend that any materials developed for upper primary be open source, easily available, and digitally accessible to support teachers and learners (Robledo & Gove, 2019; Spaul, 2020).

Component 5: Social and Emotional Learning, School Climate, Culture, and Prevention of School-Related Gender-Based Violence In Upper Primary

As learners enter upper primary, they may face both internal physical and cognitive changes and new sex-specific societal expectations, including military conscription, workforce participation, childcare, and early marriage (UNICEF, 2018). A growing body of evidence shows that learners of this age learn better in schools that are happy and safe environments and that to achieve this ambience, all actors in the school community—including head teachers, teachers, parents, learners, and community members—must discuss and agree upon a shared vision for their school and how to achieve it (Randolph, Edwards, & Norman, 2019).

Upper primary learning interventions can leverage the curriculum and school organizational structures to integrate SEL, school climate, and school-related gender-based violence (SRGBV) components that also strengthen coherence from lower to upper primary through a single school culture. Such interventions can mitigate risks posed by learners' changing emotional, physical, and social states (DelGiudice, 2018; UNICEF, 2018), in two ways: (1) building learners' capacity to respond to these changes as well as parents' and teachers' capacity to support them; and (2) reducing barriers to school attendance by engaging all members of the school in a shared vision of what their school should look like and how students, teachers, parents and staff add value to their community.

SEL programs, according to Durlak et al. (2011) are those that “foster the development of five interrelated sets of cognitive, affective, and behavioral competencies: self-awareness, self-management,

social awareness, relationship skills, and responsible decision making” (Durlak et al., 2011, p. 406). Tested approaches to building learners' capacity to respond to social and environmental change point to the integration of SEL across the curriculum (Jones and Bouffard, 2012). School climate relates to the “feel” of a school and how the behaviors and relationships of individuals in the school and community impact this feeling. A positive school climate is one in which the whole school and school community fosters safety and respectful, trusting and caring relationships (Aspen Institute, 2021) whereas the culture of a school refers to the values and norms that underpin those behaviors and relationships. (Randolph et al., 2019, Kane et al., 2016). As students encounter more complex content and competencies along developmental progressions, it is critical they have the skills to express themselves while learning in an environment where they feel safe and encouraged to do so. Effective interventions can start by identifying and adapting an integrated SEL, SRGBV prevention, and school climate curriculum that facilitates “grassroots” school-level dialogues and action planning. Programs will need to develop an approach for building buy-in to such a curriculum at all levels of the education system (Glewwe & Muralidharan, 2016). Timely data feedback cycles, where they can be embedded, will provide necessary information to improve and adapt the curriculum as more is learned about the specific needs of upper primary learners across subnational contexts or in the aftermath of time-bound systemic shocks. Consultative workshops and participatory research should be planned and budgeted for at every step of development, adaptation, or revision of an integrated SEL/SRGBV/school climate curriculum. Information gleaned from such activities can be shared with partners, nongovernmental organizations, civil society organizations, and government to support buy-in and capitalize on a country's past experiences and existing resources, recognizing the unique assets of the intervention context.

Interventions that initially map out existing referral systems and services for victims of SRGBV and other at-risk youth and that conduct key informant interviews or focus group discussions to understand perceptions of school staff who are perpetrators of

SRGBV and other forms of violence will be better positioned to respond to incidents as they are reported.

An example of a SEL/SRGBV curriculum is the Journeys curriculum. Originally created in Uganda, this curriculum engages teachers, head teachers, learners, and community members in activities and discussions that support a safe and happy school climate. Teachers and communities can co-create activities and present them in an SEL matrix. The activities then can be adapted and integrated into an intervention curriculum and materials (RTI International, 2017a, 2017b, 2017c).

SRGBV prevention and school safety hinge on clear referral and accountability systems in the community; social norms that condemn sexual violence and other forms of violence by school staff and students; and collaboration between school leadership, local government leadership, caseworkers, healthcare workers, parents, and the police. These larger systems must first be understood by interventions so that gaps can be addressed, as appropriate, at the national level through policy reform and at the local government level through service delivery coordination. These efforts should run in parallel to the school-based interventions discussed throughout this section to create a broader community environment conducive to safe and supportive schools.

SEL competencies should be integrated into everyday teaching and learning. This would comprise teachers learning and modeling these competencies and weaving them into their daily teaching of academic subjects. Interventions can start by building teachers' understanding of how to create safe classroom environments where learners feel comfortable enough to make mistakes, through TPD sessions. Next, they can support teachers to add learning outcomes for SEL competencies to their lesson plans. Examples of these learning outcomes could be taking turns during discussions, respectfully disagreeing, problem solving, and demonstrating effective written and oral communication in all content areas. Teaching these skills is just as important to encouraging students' critical thinking as it is to their social and emotional skill-building.

Integrating SEL, SRGBV, and School Climate – Grade 5 Numeracy Teacher TPD Workshop

- Teachers practice using prompts that ask learners to explain and justify their solutions to a set of word problems.
- Teachers practice prompts that encourage and cheer learners on as they talk through their solutions.
- Teachers practice prompts that foster a growth mindset in learners, for example, considering challenges in math as catalysts for growth.
- Teachers participate in collaborative brainstorming to integrate key issues and interests of upper primary learners into word problems.
- Teachers collaborate to integrate learner reflection activities in their math lessons.
- Teachers collaborate and practice how to help learners set goals and regularly reflect on these goals.

For those developing SRGBV, school climate, and SEL interventions for upper primary, four key guidelines should be considered:

- **SEL, school culture and climate, and SRGBV are interdependent.** To be effective, interventions must address all three areas.
- SEL, prevention of SRGBV, and improved school climate should be integrated throughout the curriculum, using relevant and contextually and culturally appropriate frameworks such as the Collaborative for Academic, Social and Emotional Learning (CASEL's) five core competencies (CASEL, 2017): self-awareness, self-management, responsible decision making, relationship skills, and social awareness, or the five core competencies of Frey, Fisher & Smith's (2018) SEL framework, which are identity and agency, emotional regulation, cognitive regulation, social skills, and public spirit.
- SEL is **culturally relevant**. Constructs and concepts must be defined for the context of each LMIC before interventions can be developed (Jukes, 2019).
- **SRGBV prevention** goes beyond the walls of a school and should consider local health, education, and protection services and referral systems.

School management will need to communicate expectations clearly to upper primary teachers on their new role as facilitators of student dialogue and as student advocates, while program staff will need

to support teachers to meet these expectations. This starts with creating opportunities for teachers to reflect upon their own experiences at school and to gauge how these past experiences are connected to their current school climate and to their learners' social and emotional well-being.

Additional Resources for Integrating Social and Emotional Learning

Collaborative for Academic, Social, and Emotional Learning (CASEL). (2021). *CASEL: SEL implementation tools and resources*. <https://casel.org/resources-support/>

Provides information on how to teach SEL skills.

RTI International. (2017b). *Journeys: Activity handbook for pupils*. Developed under the USAID/Uganda Literacy Achievement and Retention Activity. <https://shared.rti.org/content/journeys-activity-handbook-pupils>

Provides guidance for primary-age students to build positive school climates and prevent SRGBV.

RTI International. (2017c). *Journeys: Activity handbook for teachers*. Developed under the USAID/Uganda Literacy Achievement and Retention Activity. <https://shared.rti.org/content/journeys-activity-handbook-teachers-and-school-staff>

Provides guidance for teachers and school staff on how to build positive school climates and prevent SRGBV.

RTI International. (2017a). *Journeys: Activity handbook for community members*. Developed under the USAID/Uganda Literacy Achievement and Retention Activity. <https://shared.rti.org/content/journeys-activity-handbook-community-members>

A resource for communities on how to collaborate with schools to build positive school climates and prevent SRGBV.

Inside Mathematics. (2021). *Social and emotional learning and mathematics*. The University of Texas at Austin, Charles A. Dana Center. <https://www.insidemathematics.org/common-core-resources/mathematical-practice-standards/social-and-emotional-mathematics-learning>

Resource for integrating SEL into mathematics teaching.

Conclusion

Since the adoption of the Millennium Development and Sustainable Development Goals for education, much of the focus of international education development has been on improving teaching and learning in the earliest grades. This is no doubt a worthwhile endeavor. However, researchers, implementers, and donor agencies have found that

millions of children in grade 4 and above are unable to read and solve basic mathematics problems, and millions more are not achieving minimum proficiency levels in reading and mathematics by the end of primary. Consequently, more emphasis needs to be placed on ensuring learning gains achieved in lower primary successfully transition to upper primary and on strengthening education in these grades, using the approaches described in this guidance. This level of attention will ensure that learners are equipped to reach their full potential, transition to secondary and/or tertiary education, and become productive citizens.

As focus by donors and implementers turns more toward improving teaching and learning in upper primary, we recommend considering the unique contexts of LMICs and, as of 2021, the problems posed by the pandemic. New interventions should begin by understanding the barriers to quality upper primary education, then seek solutions to these problems before finally implementing the intervention. For example, it is crucial for upper primary quality improvement programs to include broad collaborations with educational stakeholders to ensure elements in educational systems that pose challenges to effecting change in upper primary education are tackled and solved (Pritchett, 2015). Without changes at the system level, changes at the upper primary level will not be sustainable.

As we have presented, the most important elements of successful and effective upper primary programs are (1) pre-service preparation and in-service TPD as well as ongoing teacher support to improve and enhance teacher quality; (2) a focus on mathematics, literacy, and content area subjects; (3) learning assessments; (4) high-quality teaching and learning materials; and (5) SEL and a positive school climate. We posit that even though forms of delivery will currently be different because of the pandemic, these essential components will not change; however, the content may have to be modified. Upper primary programs must therefore be contextualized, flexible, innovative, inclusive, and equitable to ensure that learners achieve proficiency levels by the end of primary education.



Additional Note: Considerations for COVID-19

As school systems in some countries open and others remain locked down in the face of COVID-19, early evidence suggests severe learning loss that may continue even when in-person instruction resumes, with anecdotal reports describing teachers who are under-equipped to “make up” months of lost instructional time. Evidence also shows that the COVID-19 epidemic has increased the risk of anxiety and depression among adolescents and has increased the risk of adolescents with pre-existing mental health issues to practice harmful behaviors.

Research. Where possible, interventions and governments should invest in representative surveys to gain a clearer understanding of students’ learning loss, current learning conditions, teachers’ approaches (if any) to remediation and where additional support to schools, teachers, and families should be targeted. It is likewise critical that programs identify changes in the contexts they are working in as a result of COVID-19—for example, data from 2018 on use of technology by teachers or on homelessness among upper primary learners may no longer be as useful. Mapping exercises, key informant interviews, and participatory research approaches similar to those described under Component 5 may be especially applicable when designing interventions for mid- and post-COVID-19 contexts.

Training. Where schools remain closed, or re-close, the use of various forms and combinations of technology and learning delivery modalities will be necessary to ensure teacher skills and student learning are strengthened and enhanced. Teachers can learn through online courses, collaborate (within and across schools) using internet-based applications such as WhatsApp and Telegram, and participate in virtual PLCs (Cansoy, 2017; Moodley, 2019; Tarisayi & Manhibi, 2017). The best of these technology-supported approaches should be extended beyond COVID-19-related closures to enable the smaller dose, more frequent trainings recommended under Component 1.

Assessment. This is teachers’ ability to develop, administer, and interpret formative assessments that identify where individual learners perform on the learning progression as they return to school. Where possible, teachers should start conducting formative assessments remotely, and interventions should use this time to develop formative assessment materials for diagnosing learners’ levels vis-à-vis the anticipated curriculum and training teachers on their use.

Teacher Psycho-Social Support. Teachers will need additional support to navigate school re-openings. Interventions should budget resources for meetings with teachers in the safest venues available. School leaders and coaches can be trained now to facilitate discussions that build teachers sense of self-efficacy and self-value and help them to set well-being goals for themselves and their learners (Hart, 2020).

Student Psycho-Social Support. In 2021, it is likely that learners will slowly return to school amid ongoing disruptions caused by COVID-19 that may exacerbate their personal, individual changes, as discussed above. Thus, it is critical that intervention materials create opportunities for teachers to learn about the social and emotional well-being and current living situations of their learners. This investigation can be done through discussions; selection of text, music, dance, and drama; and tested curricula, including Journeys, an SEL/SRGBV curriculum.

Teachers should be further equipped with information (provided through trainings, meetings, or online platforms) on identifying learners who may be facing mental health issues or struggling more than normal to adapt to school re-openings. Upper primary-aged learners may express more about their well-being through actions than dialogue, and teachers should be trained to notice withdrawal, increased fighting, recklessness, and other warning signs displayed in and around the classroom (Centers for Disease Control and Prevention, 2019).

Remediation and Differentiation strategies should be emphasized in all materials, training, and home-based learning approaches developed in response to COVID-19 and the next year of schooling. More than ever, learners and schools will need to be met where they are, with their individual needs supported.

Integrated SEL. For the duration of COVID-19-related school closures, the risk of violence and other harmful circumstances for many learners may increase. Programs can support learners with more skills and strategies to deal with these situations by incorporating SEL messages into all distance-learning materials they develop or distribute (Bulat, 2020).

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