Thinking Outside the Classroom:

Theories of Change and Measures to Support the Design, Monitoring, and Evaluation of Distance Learning Programs

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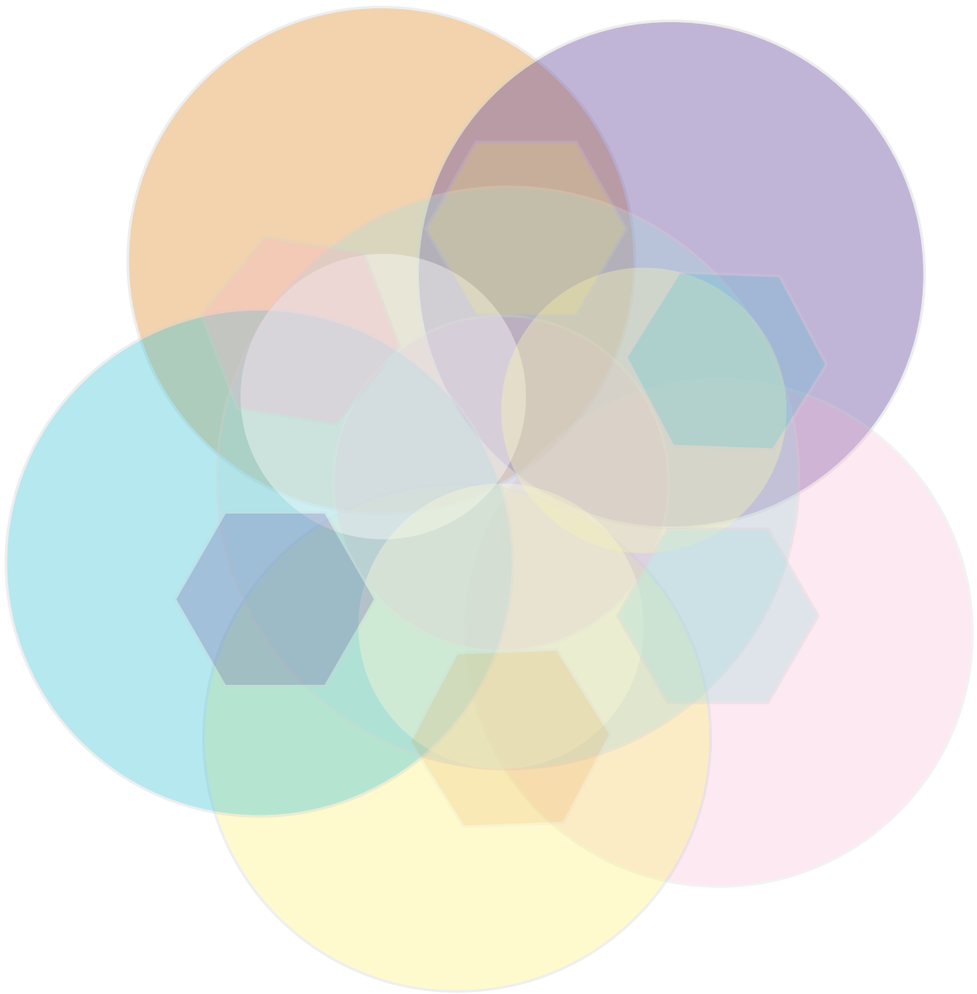

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Dedication and Acknowledgements

This report is dedicated to the 1 billion children worldwide who were out-of-school during the COVID-19 pandemic in 2020 – and to their caregivers and teachers, who worked tirelessly to support their well-being and learning in the midst of unprecedented challenges. Work on this report was supported by funding from the NYU Abu Dhabi Research Institute and Porticus. We thank Kaliope Azzi-Huck, Alison Grace Gilberto Sanzana, and Tracy Wilichowski at the World Bank/Johns Hopkins/UNICEF COVID-19 Education Tracker Initiative and the Primary Education and Learning In Emergencies team at NYU Global TIES for Children for their input and feedback on the report. We also thank Grace Shieh and Jess Castelyn at NYU Abu Dhabi for their work and design expertise in transforming a static Word document into an interactive, usable tool.

Key Definitions

Access: The awareness of educational opportunities, and the feasibility of participating in those opportunities, as determined by technological and infrastructural constraints.

Activities: Processes, events, tools, technology, and actions that are intentionally enacted as part of program implementation using program inputs.

Asynchronus interactions: Interactions with gaps in time between responses (e.g., email).

Caregiver and student mental health: Students' and caregivers' stress, emotional distress and perceived social support. Caregiver and student mental health have a strong reciprocal relationship: one influences the other and vice versa. In practice, this means that strategies targeting either caregiver or student health should be understood as strategies that target both caregivers and students.

Distance education: Any alternative to traditional classroom-based education in which students and teachers do not occupy the same physical space.

Drop-out: Students prematurely ceasing their participation in school.

Education opportunties: The educational content – the activities, materials, and/or events – that is designed, facilitated, and/or distributed by educational institutions with the intent of promoting learning outcomes. Such content can be facilitated and/or delivered in a way that is either synchronous or asynchronous.

Educator-household communication quality (educator-caregiver and educator-student): Communication quality includes both structural and process quality -

Structural quality (quality of logistical factors)

- Time of day: for example, is it a convenient time of day?
- Length of communication: longer communcations are often considered higher quality
- Interruptions: the number of disruptions to communication, whether due to technological failings or something else
- contact made: yes or no
- Relative time spent on different priority topics: the amount of time spent on each of the intended topics

Process quality (quality of interaction)

- **Relationship:** The extent to which facilitator has an existing, positive relationship with caregivers and/or students
- **Responsiveness:** The extent to which the facilitator is attentive to and inclusive of caregivers' and/or students' strengths, interests and needs
- **Emotional climate:** The affective content of the call (e.g., positive vs. negative)
- **Engagement:** The extent and quality of caregiver/student active participation
- **Fidelity to program design:** For example, did the conversation directly touch on schoolwork?

Family/caregiver expectations: Caregivers' and families' aspirations for, desires for, or realistic beliefs about a student's educational future (Okagaki & Frensch, 1998). Can relate to different aspects of student functioning—including attainment (e.g., the highest level of schooling achieved), academic performance, behavior and enrollment/drop-out—and to either short or long-term outcomes (Huguley et al., 2018; Loughlin-Presnal & Bierman, 2017).

Family/caregiver involvement: The quantity and quality of academic support provided by families/caregivers to students.

Future enrollment: Students' upcoming participation in traditional in-person schooling.

Holistic learning: The acquisition of new knowledge, attitudes, and behaviors across multiple domains, including both traditional academic domains such as literacy, numeracy, and science, as well as social, emotional, and cultural domains. Also refers to the retention of previously acquired knowledge, attitudes, and behaviors (i.e., prevention of learning loss).

Inputs: The resources – human, financial, organizational, and community – that an organization has available to direct towards implementing programs.

Outcomes: The specific changes that are expected to occur as a result of the program. These changes may take place within individuals, and include the knowledge, attitudes, and behaviors people are expected to gain a result of participation in the program. Changes may also take place in the household, school, or community settings in which programs are implemented, and include the resources, norms, values, and relationships that may shift within those settings as a result of program implementation. Outcomes may be short-term (i.e., within 1-3 years) or longer-term (i.e., within 4-6 years).

Outputs: The types, levels, quality, and targets of services or activities provided as part of the program.

Self-efficacy: Students' beliefs in their ability to succeed in a particular domain or at a particular task (Wigfield et al., 1998). Academic self-efficacy is a more global characteristic encompassing students' beliefs about academic abilities in general. We focus more on task-specific academic self-efficacy beliefs—that is, students' beliefs in their ability to complete or master a specific academic task.

Student engagement: Student engagement is comprised of three distinct but related components: (1) behavioral engagement, including time spent on learning and educational opportunities, participation in educational opportunities, and completion of tasks; (2) cognitive engagement, including students' perceived value of educational opportunities and motivation to learn; and (3) affective engagement, including students' feelings of belonging to and identifying with educational opportunities (Christenson et al., 2012).

Self-learning paradigm: An alternative to traditional in-person classroom learning in which students engage in in educational opportunities independently, or in the presence of a non-educator adult. In self-learning, student-teacher and student-student interactions – to the extent that they occur at all – either (a) occur at separate times (asynchronously) from the learning activity; or (b) are simultaneous (synchronously) but primarily one-way (i.e., the student cannot respond). This does not mean that all interactions within the self-learning paradigm are necessarily asynchronous, given that the interactions that occur outside the learning activity can be synchronous (e.g., a phone call check-in between students and teachers).

Self-regulated learning: The process by which students monitor their learning progress, consciously orient their behavior towards learning, and adjust their behavior in response to feedback (Butler & Winne, 1995). However, to make things simpler and more measurable, self-regulated learning can also be thought of as a set of behaviors and thoughts that may help students pursue a learning goal (Schunk, 1990). Cognitive self-regulated learning is a student's meta-awareness of their own learning (e.g., Am I understanding? Am I making progress?) (Ridley et al., 1992). By contrast, behavioral self-regulated learning refers to strategies adopted in pursuit of a learning goal: goal setting, goal modification, behavioral adaptations (e.g., asking questions), self-monitoring, and study habits (e.g., note taking) (Zimmerman & Pons, 1986). The specific, observable behaviors that indicate self-regulated learning are likely to range quite a bit across contexts, age groups and tasks. For our purposes, we will also consider executive functioning and attention to be components of self-regulated learning.

Synchronous interaction: Interactions in which responses are delivered in the timing of a "normal" face-to-face interaction. Note that text message can be asynchronous or synchronous depending on the pace of exchange.

Task characteristics: We focus on two characteristics of tasks undertaken by students. Intelligibility is students' ability to understand the task and engage with it in the intended manner. Language is a baseline requirement of intelligibility, but beyond that many additional factors – such as the clarity of directions or access to a literate adult who can provide help – might contribute to intelligibility. Then, students' zone of proximal development (ZPD) refers to the range of un-mastered tasks and knowledge that are close enough to mastered skills and knowledge to make learning possible (Campione et al., 1984). Put simply, a task's proximity to a student's ZPD is a matter of whether the task is not too difficult or too easy. To promote learning, distance education interventions should seek to match students with educational opportunities that are just beyond their existing abilities and understanding. To prevent learning loss, distance education interventions should seek to match students with educational opportunities that are at – not below – their current level.

Theories of change: Theories of change (ToCs) are generalized models of intervention programs that map out the processes through which the interventions are expected to work. In general, they consist of inputs, outputs activities, and outcomes.

Virtual classroom paradigm: An alternative to traditional in-person classroom learning in which students and teachers meet in a classroom setting that is not in-person.

Executive Summary

Background and Aims

Distance education (DE) programs have existed in diverse forms – from traveling storytellers to postal correspondence courses - for centuries. In the past 150 years, they have been used as a strategy to provide educational opportunities for children without easy access to physical educational institutions, including girls; children in rural areas; ethnic, racial, and religious minority children; and children displaced by conflict and crisis. But in 2020, suddenly over 1 billion children worldwide no longer had easy access to in-person educational opportunities due to the COVID-19 pandemic and ensuing school closures.

In an effort to mitigate the threats to children's learning and development and to continue serving students and their families, the vast majority of education ministries worldwide – over 90 percent (UNICEF, 2020) – have enacted policies to provide distance education: learning that takes place without face-to-face interaction. Given both the present challenges and inequities around vaccine acquisition and distribution – as well as the opportunities distance education poses to expand educational access in marginalized communities – distance education is likely to remain a primary mode of education in the near future. Yet while there is a long tradition of distance education, the evidence supporting both the effectiveness and the quality implementation of distance education interventions is slim. Furthermore, it is challenging to build a high-quality evidence base given difficulties in measuring and monitoring learning processes in distance education contexts. As a result, those engaged in the design and implementation of distance education interventions – both now and in the future – may lack the necessary information to guide their decision-making about what strategies to implement and what they can expect those strategies to achieve.

This document is intended to be a living framework for thinking and talking about primary and secondary school-aged distance education interventions, beginning in low- and middle-income (LMIC) and humanitarian contexts and expanding over time to include distance education interventions designed for high-income contexts. In this document, we provide three theories of change (ToCs) for three types of strategies that may be implemented as part of distance education interventions:

1. Strategies to improve access to educational opportunities;
2. Strategies to improve quality of educational opportunities; and
3. Strategies to improve family support for educational opportunities.

We also identify a set of measures that may be a useful starting point for assessing key near-term and long-term outputs and outcomes within the ToCs. In providing this report, we seek to help practitioners, policymakers, and researchers:

1. Deepen their understanding of the factors that are likely to shape children's learning and future enrollment during time away from in-person schooling;
2. Identify how common distance education strategies for primary and secondary school-aged children are expected to work to improve children's learning and future enrollment;
3. By identifying gaps between (1) and (2), generate new or additional strategies that may improve the effectiveness of distance education programs;
4. Identify key outputs and outcomes for assessment as part of monitoring and evaluation efforts;
5. Communicate about distance education interventions more effectively by providing an initial taxonomy of terms and noting common alternate terms; and
6. Identify and adapt measures to support monitoring and evaluation of distance education programs.

How Were the Theories of Change Developed and Measures Identified?

The ToCs in this document are organized by the challenge they seek to address:

1. Improving access to distance education opportunities
2. Improving the quality of distance education opportunities
3. Providing household support for distance education opportunities

We took both an inductive and deductive approach to developing the ToCs. First, we identified two primary outcomes – holistic learning/learning loss and future enrollment/drop-out – and conducted a rapid literature review within the child developmental, economics, and education science literatures to identify the household, family, and student skills and processes that would most critically shape those outcomes in a distance education context. Second, we conducted a targeted scan of peer-reviewed and grey literature on distance education programming, and we held key informant interviews with practitioners and educators who were either engaged in the design or implementation of distance education adaptations or are familiar with these ongoing efforts. Using a framework synthesis approach, we then developed initial theories of change (ToCs #1 and 2) linking current distance education strategies to key household, family, and student skills and processes. This process enabled us to identify gaps in the processes targeted by common distance education strategies. We then looked to other literatures – notably early childhood development (ECD) and secondary and tertiary distance education programming - to think about what other strategies (ToC #3) could be developed and implemented to impact key family/student processes that are critical for learning.

We then sought to identify measurement tools and indicators to assess each of the outputs and short-term outcomes in the ToCs. First, we developed a set of broad criteria for identifying measures, ultimately deciding to give priority to measurement tools: 1) with evidence of reliability and validity; 2) that were designed for or have been used in humanitarian contexts, distance, or home-learning contexts, or low- and middle-income countries; and 3) that seemed feasible for implementation in distance education contexts with critical infrastructure constraints (e.g., poor access to high-quality internet). Second, we conducted a search for measurement tools in the Inter-Agency Network for Education in Emergencies (INEE's) Measurement Library and the NYU Global TIES MENAT Measurement Inventory, both of which contained a number of high-quality measurement tools for a subset of our target outcomes (Caires et al., 2019). We then continued our search in online academic databases, and also reached out to practitioners and researchers who are engaged in measurement development for or evaluation of distance education interventions to get their advice on quality measurement tools and indicators. Third, having identified a sample of measurement tools and indicators, we consulted literature and our contacts to develop guidelines for practitioners to follow in choosing and adapting measurement tools and indicators from our list.

What Stands Out from the Theories of Change?

It's the Relationships, Silly

Children's holistic learning and development is critically shaped by nurturing interactions between a child and his/her/their caregivers, teachers, and peers in safe and secure homes, schools, and communities. Decades of research globally have confirmed the importance of responsive, sensitive, and supportive relationships with adults and peers for children's holistic development from birth through adolescence. A large evidence base has likewise illustrated the importance of social interactions as mechanisms for the acquisition of new academic and social and emotional skills and knowledge.

Lack of access to in-person schooling challenges the ability to form and maintain such supportive relationships and to engage in positive social interactions that promote holistic learning. When learning is expected to occur primarily within the household, increases in caregiver stress and mental health difficulties due to economic and health concerns and social isolation may limit caregivers' involvement in and support for children's educational opportunities. And difficulties in accessing and using technology that enable interactivity may limit children's ability to build relationships with teachers and peers and to consistently interact with them in the course of learning. Developing peer and teacher relationships is a particularly salient developmental goal in the toddler, primary, and adolescent years, as it enables a wider understanding of the world and sets the stage for future academic and social and emotional learning.

Efforts are underway to improve access to distance education opportunities – and also to improve the quality of such opportunities to enable better interactivity with teachers and peers. For example, a recent INEE mapping report noted that education systems are implementing interactive radio instruction, simulated modeling of student-teacher interactions, and SMS-based teacher-student feedback strategies, among others. Efforts also focus on providing the infrastructure – such as internet and tablets – that enable access to e-learning platforms through which teachers and students can interact in real-time.

However, our review suggests that distance education interventions must do more to support, monitor, and promote consistent, high-quality interactions between students and teachers. Positive teacher-student relationships are characterized by close, regular contact, supportive interactions, and effective academic support. Light interventions intended to simulate teacher-student interaction or increase it at the margins are no substitute for such a relationship. A strategy of regular teacher-student check-ins (over phone, internet, or, if possible, in person) may have a better chance of meeting this need.

Furthermore, emotional, social, and financial support for caregivers and family members should be included as a key pillar of distance education interventions. Caregivers and other family members are on the front lines of ensuring children's ability to access educational opportunities and to stay engaged in such opportunities. Yet we identified few strategies beyond sending informational materials that would actively support caregivers to do so. This may be particularly important during a crisis such as a pandemic or armed conflict, given that caregivers are faced with rapidly juggling many new and competing demands, including job loss, illness and death of family members, working from home, and loss of social supports.

Finally, nurturing interactions with teachers and caregivers will ultimately drive children's learning in a distance education context through scaffolding the development of a set of cognitive, social, emotional, and behavioral skills. Through an extensive literature review, we identify three particularly salient "student-level drivers of learning" in a distance education context: student engagement, student self-efficacy, and student self-regulated learning. Our review suggests that distance education programs must focus on bolstering these social, emotional, and cognitive skills in addition to traditional academic skills.

Based on this review, we make three recommendations:

First, we encourage a greater focus on increasing and improving the quality of student-teacher interactions. Teacher-student check-ins may promote student holistic learning in several ways. Teachers can provide direct instruction, help match students with appropriately leveled materials, and bolster several student-level factors known to drive learning (e.g., self-efficacy and student engagement). Access to practice-based teacher professional development opportunities - such as the NYU Global TIES BETTER program - that scaffold teachers' ability to facilitate such interactions can support the high-quality implementation and monitoring of such interventions (Brown, 2021).

Second, we encourage additional and creative thinking about how to provide holistic support to households and families as part of distance education interventions. Caregivers play a central role in children's learning and development, and rigorous evidence from ECD interventions suggests that in-person (if feasible) or phone-based home-visiting models could be adapted to provide support to caregivers of primary and secondary-school aged children. A first step in designing such a program is to conduct a capacity assessment within the context to identify stakeholders within education and protection systems who can play such a role. Teachers may be best suited to the task, but given multiple competing demands, they may not have sufficient time or resources. Alternately, it may be possible to strengthen school-community coalitions, whereby caregivers and/or community members liaise with and provide support to teachers and households. In addition, the provision of household resources – such as through unconditional cash transfers – may be critical for alleviating the economic stress that constrains caregivers' ability to support children's learning and development.

Third, we urge policymakers and practitioners to design and implement distance education programs that focus on supporting both academic and social and emotional learning. Cognitive, social, emotional, and behavioral skills are the building blocks of learning in distance education contexts. Evidence-based social and emotional learning interventions have been proven across hundreds of experimental trials to support such skills and academic achievement in the short- and long-term. To facilitate students' holistic learning and development, teachers and principals should have access to professional development opportunities that support them in integrating social and emotional learning into teacher-student check-ins and curricular materials.

What Stands Out About Measures to Evaluate Distance Education Programs?

There is No Magic Bullet

Many existing measurement tools require adaptation before use in distance education contexts. Many measurement tools we identified were designed to capture processes occurring in traditional schooling, and they need to be adapted to the distance education context. For instance, many measures of family/caregiver involvement reference engagement in children's school-based activities, which will look different in a distance education context. Other important forms of adaptations include translation; changing the structure of the scale (i.e., dropping or revising the wording of items to facilitate phone-based assessment); and adapting items to capture relevant knowledge, skills, and behaviors within the cultural context.

Approaches to measuring child, caregiver, and teacher processes within distance education contexts vary, and each approach has costs as well as benefits. As one example, observational measures – of, say, children's self-regulation – are less subject to social desirability bias than self-report survey measures. But observation measures are more resource-intensive and may be especially difficult to implement reliably in distance education contexts. As another example, while performance-based assessments can capture information about children's ability to apply skills and knowledge to complete a task or solve a problem, they may also require certain physical props or online administration, both of which may be difficult requirements to achieve at scale in LMIC and humanitarian distance education contexts. Measures must be selected to fit with infrastructural constraints in the focal context.

The process of choosing and adapting measurement approaches will also differ by outcome. Some outcomes – such as access or attendance – are best assessed through analysis of administrative or metadata recorded through technology that are often aggregated into indicators. Other outcomes – such as family/caregiver expectations or self-efficacy – are better assessed through measures (e.g., surveys, observations). In addition, only a handful of outcomes have available assessments that use methods other than self-report; for others, self-report is the only or clearly best available means.

The measures identified for inclusion in this report were considered for their use in measuring, assessing and evaluating programs only. We do not recommend that the measures discussed here are used for purposes other than those for which they were developed without the necessary adaptation and testing. We strongly discourage their use in setting population-level benchmarks, assessing students for high-stakes purposes, or for informing decisions about eligibility for resources and services.

Based on this review, we make the following recommendation:

Users of this document should take an active role in choosing and adapting the measurement approaches that best suit their purposes and context. Practitioners are encouraged to apply their expert knowledge of their context and intervention throughout each stage of the process. This includes, but is not limited to:

1. Identifying which measures and measurement approaches best map onto the intervention goal and theories of change;
2. Carefully considering what measurement approaches are feasible in the context;
3. Assessing whether the benefits of any given measurement approach outweigh the costs in the context; and
4. Carefully undertaking adaptations to ensure linguistic, conceptual, and cultural equivalence.

Introduction

Background and Aims

Distance education (DE) programs have existed in diverse forms – from traveling storytellers to postal correspondence courses - for centuries. In the past 150 years, they have been used as a strategy to provide educational opportunities for children without easy access to physical educational institutions, including girls; children in rural areas; ethnic, racial, and religious minority children; and children displaced by conflict and crisis. But in 2020, suddenly over 1 billion children worldwide no longer had easy access to educational opportunities due to the COVID-19 pandemic and ensuing school closures. The massive loss of in-person educational opportunities poses a risk for long-term, negative outcomes in domains such as student achievement, student and family well-being, and future enrollment. But the need to innovate around distance education also presents an opportunity to rethink how to expand access to quality educational opportunities to reach all children.

In an effort to mitigate the threats to children's learning and development and to continue serving students and their families, the vast majority of education ministries worldwide – over 90 percent (UNICEF, 2020) – have enacted policies to provide distance education: Learning that takes place without face-to-face interaction. Given the present challenges and inequities around vaccine acquisition and distribution, distance education is likely to remain a primary mode of education in the near future in a great number of contexts. Yet while there is a long tradition of distance education, the evidence supporting both the effectiveness and the quality implementation of such interventions is slim. Furthermore, it is challenging to build a high-quality evidence base given difficulties in measuring and monitoring learning processes in distance education contexts. As a result, those engaged in the design and implementation of distance education interventions – both now and in the future – may lack the necessary information to guide their decision-making about what strategies to implement and what they can expect those strategies to achieve.

This document is intended to be a living framework for thinking and talking about distance education interventions, beginning in low- and middle-income (LMIC) and humanitarian contexts and expanding over time to include distance education interventions designed for high-income contexts. In this document, we provide three theories of change (ToCs) for three major component strategies that are commonly implemented as part of distance education interventions. We also identify a set of measures that may be a useful starting point for assessing key near-term and long-term outputs and outcomes within the ToCs. In doing so, we seek to help practitioners, policymakers, and researchers:

1. Deepen their understanding of the factors that are likely to shape children's holistic learning and future enrollment during time away from in-person schooling;
2. Identify how common primary- and secondary-school aged distance education strategies are expected to work to improve children's holistic learning and future enrollment;
3. By identifying gaps between (1) and (2), generate new or additional strategies that could improve the effectiveness of distance education programs;
4. Identify key outputs and outcomes for assessment as part of monitoring and evaluation efforts;
5. Communicate about distance education interventions more effectively by providing an initial taxonomy of terms and noting common alternate terms; and
6. Identify and adapt measures to support monitoring and evaluation of distance education programs.

What is a Theory of Change - and Why is it Important?

ToCs provide a model or a roadmap of how programs or interventions are expected to work (Kellogg Foundation, 2004). They do so by specifying the relationships between four main components of a program:

1. Inputs are the resources – human, financial, organizational, and community-based – that an organization has available to direct towards implementing a program.
2. Activities are the processes, events, tools, technology, and actions that are intentionally enacted using the inputs as part of program implementation. They are closely related to outputs, the direct products of program activities.
3. Outputs capture the types, levels, quality, and targets of services or activities provided as part of the program.
4. Outcomes are the specific changes that are expected to occur as a result of the program. These changes may take place within individuals, and include the knowledge, attitudes, and behaviors people are expected to gain a result of participation in the program. Changes may also take place in the household, school, or community settings in which programs are implemented, and include the resources, norms, values, and relationships that may shift within those settings as a result of program implementation. Outcomes may be short-term (i.e., within 1-3 years) or longer-term (i.e., within 4-6 years).

In providing such a model, ToCs are essential tools for assessment, evaluation and improvement of programs. They help us determine what to measure – and when – to detect whether a program is having an impact. They guide hypotheses about why the program is having that impact. And they support revisions to make programs more effective. (See Exemplar #1 below for an illustration of the utility of ToCs for learning about program effectiveness, monitoring program implementation, and guiding program improvements.)

Exemplar #1: Using a ToC for Monitoring, Learning, and Evaluation

All interventions have a way they are supposed to work, but if these processes are not made explicit, it can lead to incorrect conclusions about program effectiveness and poor decision- making. For example, if a school adopts a social-emotional learning program and, a year in, finds no effects on learning or social and emotional skills, should they abandon the program? The answer depends on whether the lack of impact was the result of the program itself or the result of a fixable breakdown in program implementation. ToCs make it easier to identify these breakdowns. A correctly specified ToC might specify that teachers must be delivering the curriculum correctly and consistently for the program to work. Anticipating this, school officials could set up classroom observations and develop a protocol for measuring teacher implementation. If evidence of poor implementation emerges, or if the program appears to be working only where implementation is good, finding ways of supporting teacher implementation would be a more prudent next step than scrapping the program altogether.

How to Use This Resource

This document is divided into two sections. The first section reviews the ToCs, and it is meant primarily to assist users in deepening their understanding of how distance education programs are likely to work and in identifying target outputs and outcomes for measurement. The second section focuses on measurement approaches and is intended to help users identify specific measurement tools and indicators to assess outputs/outcomes from the ToCs.

Part 1: Using the theories of change

The three ToCs in this document have been developed to provide exemplars of common types or packages of distance education interventions. The ToCs are organized by the challenge they seek to address:

1. Improving access to distance education opportunities
2. Improving the quality of distance education opportunities
3. Providing household support for distance education opportunities

As this breakdown suggests, these ToCs are meant as general models of common strategies and processes operating across diverse interventions, not as specific models for any given program. As such, we begin each ToC with a list of common exemplar strategies we have identified through our key informant interviews and literature review. These are not meant to be exhaustive, but to support users in identifying how their own specific program strategies may map to those represented in these ToCs. Then, we largely do not identify specific activities or outputs in these ToCs.[1] Rather, we focus on identifying common short- and long-term household, caregiver, and child outcomes that may be expected to result from each broad type of distance education intervention.

[1] Three exceptions to this—teacher-student communication, educator-household communication and task characteristics—were added due to what we deemed to be their unique significance for the success of distance education interventions.

Those interested in using this document to inform their understanding of a specific distance education intervention should identify the challenge(s) that your intervention seeks to address, and then choose the ToC(s) that best match(es) those challenge(s). Because certain programs may address several different challenges, it is possible that more than one ToC is applicable. For example, for a program that is simultaneously focused on increasing access to distance education opportunities and improving household support for such opportunities, both ToC #1 and #3 would apply and can be combined. We hope this modular approach can serve as a starting point for developing program-specific ToCs unified by a common framework.

As a final note concerning the use of the ToCs portion of the document, the ToCs in this document are intended to apply both to strategies that are currently being implemented, and to strategies that could or may be implemented. This includes strategies that practitioners have considered or are in the process of designing that have not yet been implemented, as well as strategies that are ongoing in alternative contexts and could be applied to primary and secondary education in LMIC or humanitarian contexts. For instance, existing home-visiting interventions in the early childhood development space have switched to phone-based check-ins in response to COVID-19, a strategy that might be applied to supporting families/caregivers of school-aged children when in-person schooling is not available.

Part 2: Identifying measurement tools/approaches

The goal of the measurement section is to guide users of the document through the process of identifying, adapting and utilizing measurement tools/approaches to capture ToC outputs and short-term outcomes. We focus on measurement tools and indicators that capture program outputs and short-term outcomes, and we do not cover measurement approaches for long-term outcomes (i.e., holistic learning and learning loss, enrollment/ drop-out). Approaches to assessing learning in distance education contexts have recently been examined elsewhere (INEE, 2020).

The measurement section has three main parts. The first part gives an overview of the measurement identification process, beginning with the decision of what to measure; moving to the decision of how to measure; and ending on the decisions about how to adapt existing measurement tools for a specific context. In most cases, there are numerous ways to measure a given outcome/output, some of which are better suited to the context and to specific goals for how the evidence will be used. Furthermore, many existing measurement tools require adaptation before use. The majority of measurement tools cited in this document, for instance, were designed to capture aspects of traditional learning and need to be altered so that they align with the distance education context. The second part of the measurement section provides a brief overview of the measurement tools and approaches identified for each of the ToC outputs/outcomes. Considerations specific to that outcome/output or to its measurement approach are highlighted. These overviews are meant to assist document users with deciding between the different measurement tools or approaches provided. Finally, the third part of the document is a table with a complete list of the measurement tools we have identified, broken down by ToC outcome/output.

Interacting with the Theories of Change

To view rationales behind every Path:

Each ToC diagram outlines several paths through which strategies impact outcomes. To view the rationales behind each path, click on the path you are interested in.

For example, if you'd like to see the rationale for Path 0 in ToC #1v, click on the highlighted Path 0 in the ToC diagram. You will be redirected to the rationale underlying Path 0.

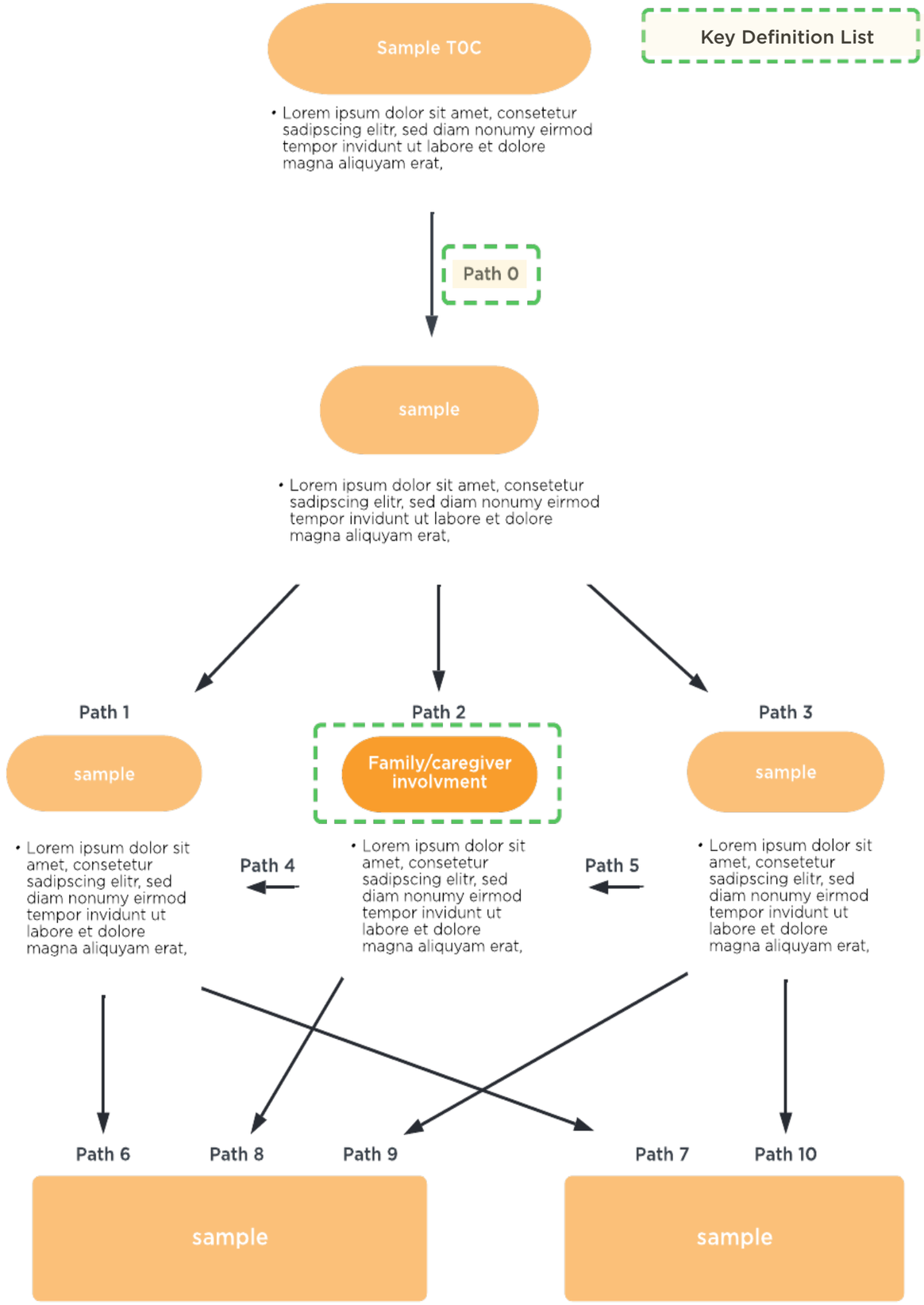
To view key definitions used to describe paths:

Click on "Key Definition List" to review how we are defining each of the outputs and outcomes in the theory of change. The hyyperlink is located in the top right corner of each diagram.

To view measurement tools that assess a construct:

If you'd like to view measurement tools that assess a particular construct, click on the text of the construct in the ToC diagram.

For example, to view measurements tools that assess "caregiver expectations", click on "caregiver expectations" in the ToC diagram. You will be redirected to a table of measurement tools that help assess the construct.



Methodology

Theories of Change Methodology

We identified the challenges distance education efforts are meant to address and developed ToCs for general types of strategies to address those challenges using two methods: a) rapid literature reviews in relevant domains of research; and b) targeted interviews with practitioners and educators who were either engaged in the design or implementation of distance education adaptations or are familiar with these ongoing efforts.

Literature review

We first reviewed the evidence base for distance education programs for primary- and secondary-school aged students globally. We carried out searches on Google Scholar and PsychNet using keywords such as “remote learning” and “distance learning” paired with keywords such as “primary,” “children” and “middle-school.” It became clear that this evidence base was quite thin, and thinner still for contexts outside of the United States. As a result, we expanded our search to target related fields, including research on distance education at the secondary and tertiary education levels, as well as research on related topics in education and learning with strong conceptual overlaps to the present context that would be helpful in identifying and prioritizing pathways in the ToCs. These searches were also conducted on Google Scholar and PsychNet and used keywords such as “remote learning”, “distance learning”, “homework”, “home visits”, “parental involvement”, “self-learning”, “student engagement”, etc. Overall, we reviewed over 200 peer-reviewed journal articles and grey literature throughout the iterative analysis and synthesis process described below.

Key informant interviews

We have conducted 8 interviews thus far. These include interviews with practitioners currently engaged in the design and implementation of distance education programming in pre-COVID humanitarian contexts (4) and in pre-COVID low- and middle-income country contexts (1); practitioners currently acting as consultants to synthesize information on distance education programming in LMIC and humanitarian contexts (2); and an administrator in an online school of higher education. Informant interviews were semi-structured conversations and followed an interview protocol that we developed over the course of the process (see Appendix A).

Analysis and synthesis

We adopted a framework synthesis approach due to its utility for accelerated policy analysis. Framework synthesis is iterative: An initial conceptual framework for the particular policy or process is developed early on in the review, and this framework is continually revised or built upon as new data or insights emerge (Brunton et al., 2020). Our framework synthesis unfolded in distinct, overlapping phases:

1. Familiarization with the fundamental issues and ideas relevant to distance education strategies in LMICs and humanitarian contexts.
2. Discussion with key informants/experts to inform, refine and revise our conceptual understandings, and to identify specific ongoing distance education adaptations being undertaken in response to COVID-19.
3. Development of initial theories of change.
4. Iterative refinement and revision of theories of change through continued literature review and consultation with key informant/experts (Bakrania et al., 2020).

We are currently in the “refinement and revision” stage for each of the ToCs in this document.

Methodological limitations

There are several methodological limitations to our approach. Regarding the literature review, our approach was targeted, rather than comprehensive. This means we set out to identify and synthesize an actionable knowledge as quickly and efficiently as possible, rather than trying to catalogue the totality of relevant knowledge. This makes it very likely that we have overlooked relevant literature. Furthermore, this likelihood is increased by the overwhelming preponderance of U.S. samples in our searches, not only for distance education but also for research on relevant topics in education (e.g., parental involvement). We recognize the need to continue seeking out relevant research conducted in LMICs countries and to use these insights to ‘revise and refine’ the ToCs in this document.

A similar methodological limitation applies to our key informant interviews. It is unlikely that we have obtained a complete picture of the distance education strategies currently being implemented or considered in LMICs and humanitarian contexts. This limitation is somewhat counterbalanced by the intentional generality of our ToCs, which aimed to produce a framework of mediating processes applicable to a wide range of programs and contexts. For example, the mediating outputs/outcomes and processes in ToC #1 are intended to map onto a wide range of access-increasing strategies, including some we have yet to encounter. However, we recognize that strategies may exist that go beyond the scope of our models.

Measurement Identification Methodology

Developing inclusion criteria for measures

We developed a set of broad criteria for identifying measures, deciding to give priority to measurement tools: 1) with evidence of reliability and validity; 2) that were designed for or have been used in humanitarian contexts, distance or home learning contexts, or low- and middle-income countries; and 3) that seemed feasible for implementation in DE contexts with critical infrastructure constraints (e.g., poor access to high-quality internet). The stringency with which we were able to apply these criteria varied across outputs/outcomes according to the availability of suitable measurement tools.

Measure search

We began by conducting searches for measurement tools in the INEE Measurement Library and the NYU Global TIES MENAT Measurement Inventory, both of which contained a number of high-quality measurement tools for a subset of our outcomes/outputs. We then continued our search in online academic databases; we also reached out to practitioners and researchers who are engaged in measurement development for or evaluation of DE interventions to get their advice on quality measurement tools and indicators. Having identified a sample of measurement tools and indicators, we consulted literature and our contacts to develop guidelines for practitioners to follow in choosing and adapting measurement tools and indicators from our list.

Methodological limitations

As with the literature search we conducted when developing the ToCs, our search for measures was targeted rather than comprehensive. Most likely, several suitable measurement tools and indicators for the ToC outputs and outcomes are not included in this list. Even so, in the event that users of this document identify measurement approaches not listed here, the guidelines in the measurement section should still be applicable to thinking through whether and how that measure can be adapted and used in a specific DE context.

ToC Overview

We distinguish between two overall paradigms of distance education: virtual classroom and self-learning paradigms.

- Under the virtual-classroom paradigm, students and teachers meet in a classroom setting that is not in-person (e.g., online chat forum, video call, and phone). Interactions within this paradigm are primarily synchronous and two-way (i.e., people can respond to each other).
- Under the self-learning paradigm, students engage in educational opportunities independently or in the presence of a non-educator adult. In self-learning, student-teacher and student-student interactions – to the extent that they occur at all – either (a) occur at separate times (asynchronously) from the learning activity; or (b) are simultaneous (synchronously) but primarily one-way (i.e., the student cannot respond). This does not mean that all interactions within the self-learning paradigm are necessarily one-way, given that interactions that occur outside the learning activity can be two-way, such as a phone call check-in between students and teachers.

The three theories of change that follow all apply to the self-learning paradigm and seek to describe how program components within this paradigm influence key outcomes. The virtual-classroom and self-learning paradigms are not mutually exclusive, however, and may operate simultaneously in a hybrid form. Potential interactions between the self-learning and virtual-classroom paradigms are outside the scope of this report. In addition, interventions that utilize synchronous communication and exclusively one-way interaction—such as interactive radio lessons—occupy something of a grey zone between the two paradigms. For the purpose of this report, we classify these as self-learning due to the centrality of two-way interaction to the virtual classroom paradigm.

Primary Outcomes of Distance Education Interventions

Uniformly, distance education interventions are interested in promoting students' academic learning, including both preventing the loss of existing skills and teaching new skills. Many interviewees also portrayed distance education interventions as a means of preventing drop-out that migh result from school closures or increasing enrollment when schooling resumes. Indeed, our interviews suggest that preventing drop-out/increasing enrollment[2] is a chief goal of many distance education interventions, treated at least as important learning outcomes. Interviewees also emphasized that distance education may be helpful in bolstering children's social and emotional outcomes – and that such social and emotional outcomes are critical drivers of traditional academic outcomes in a distance education context. The pathways in the ToC models represent the processes through which we expect distance education interventions to achieve these primary student-level outcomes: academic and social and emotional learning (and learning loss), and drop-out and future enrollment.

[2] In the interest of simplicity, we use drop-out and enrollment interchangeably. However, they are distinct concepts. Enrollment refers to initiation of attendance in school. Drop-out refers to an end to enrollment (i.e., leaving school).

Student-Level Drivers of Learning Targeted by Distance Education Interventions

Many distance education interventions may initially target caregivers or teachers, for example, through the provision of informational materials. But many strategies are ultimately expected to work by bolstering students' engagement, self-efficacy, and self-regulation – in short, the social, emotional, cognitive, and behavioral mechanisms that drive holistic learning (and prevent learning loss). We term this set of skills "student-level drivers of learning," and we define each of these below:

Student engagement

We define student engagement as having three distinct but related components: (1) behavioral engagement, including time spent on learning and educational opportunities, participation in educational opportunities, and completion of tasks; (2) cognitive engagement, including students' perceived value of educational opportunities and motivation to learn; and (3) affective engagement, including students' feelings of belonging to and identication with educational opportunities (Christenson et al., 2012).

Self-efficacy

Self-efficacy can be defined as students' beliefs in their ability to succeed in a particular domain or at a particular task (Wigfield et al., 1998). Academic self-efficacy refers to students' beliefs in their ability to succeed academically, writ broadly. We focus more on task-specific academic self-efficacy beliefs—that is, students' beliefs in their ability to complete or master a specific academic task.

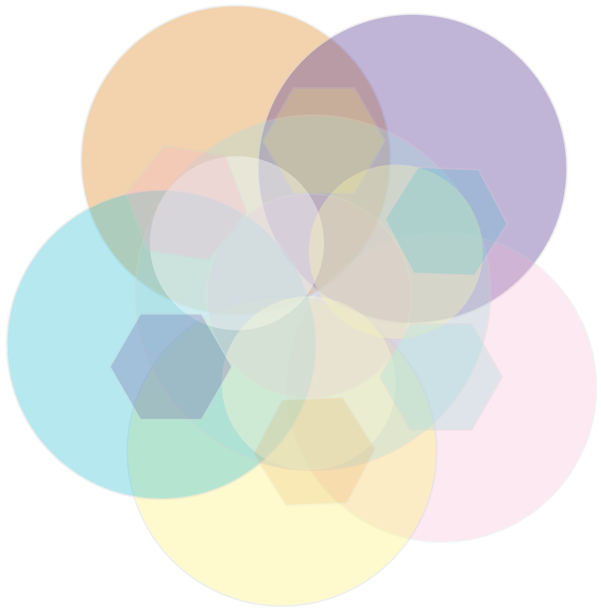
Self-regulated learning

Self-regulated learning is the process by which students monitor their learning progress, consciously orient their behavior towards learning, and adjust their behavior in response to feedback (Butler & Winne, 1995). However, to make things simpler and more measurable, self-regulated learning can also be thought of as a set of behaviors and thoughts that may help students pursue a learning goal (Schunk, 1990). Cognitive self-regulated learning is students' meta-awareness of their own learning (e.g., Am I understanding? Am I making progress?) (Ridley et al., 1992). By contrast, behavioral self-regulation refers to strategies students adopt in pursuit of a goal: goal setting, goal modification, behavioral adaptations, self-monitoring, study habits (e.g., note-taking, question-asking, etc.) (Zimmerman & Pons, 1986). The specific, observable behaviors that indicate self-regulated learning are likely to range quite a bit across contexts, age groups, and tasks. For our purposes, we will also consider executive functioning and attention to be components of self-regulated learning.

There are two important caveats to our definitions of student-level drivers of learning, both pertaining to the fact that the three drivers are complex, multifaceted concepts which are bound to look and operate differently across programs and contexts.

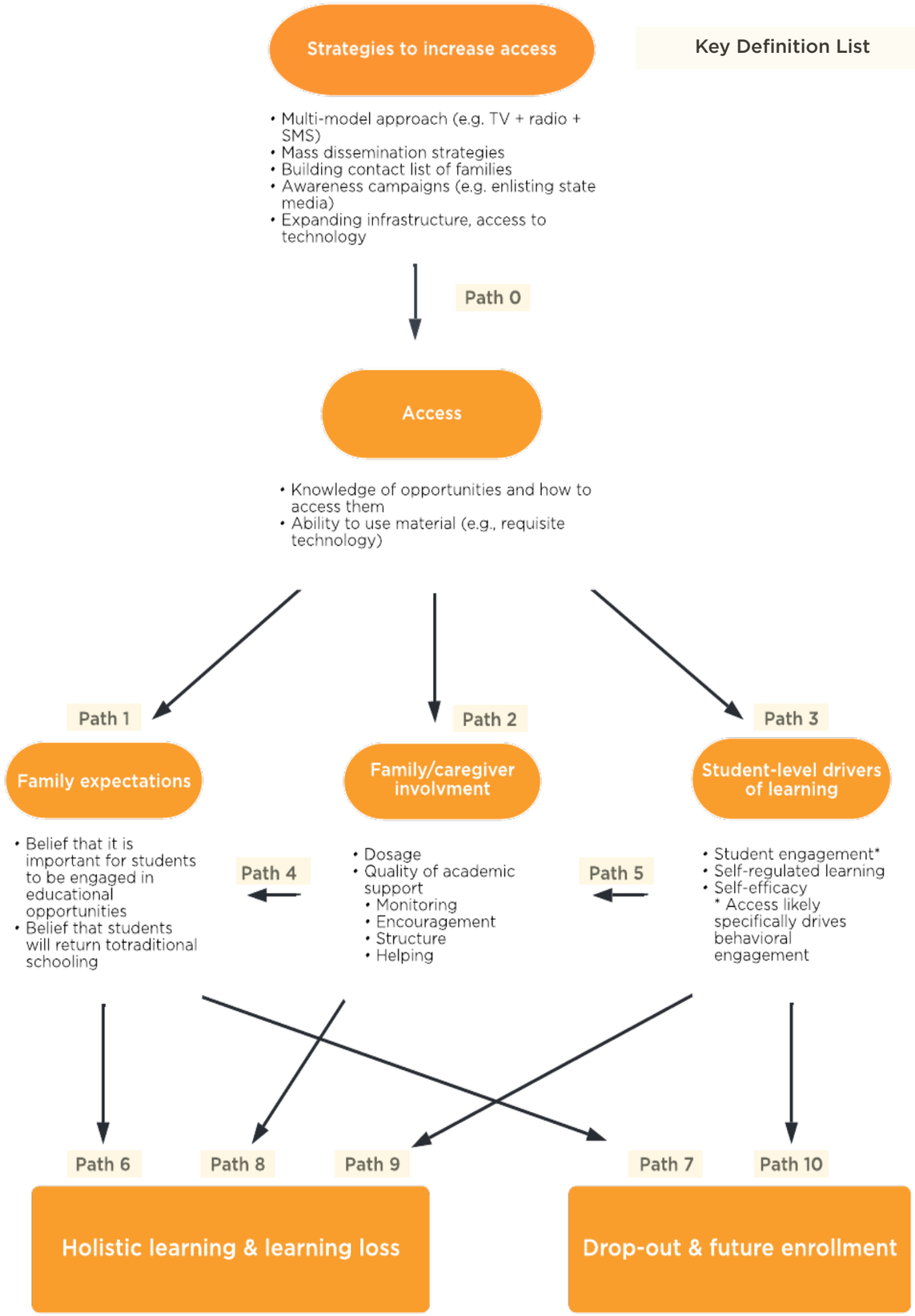
First, although we bundle all three student-level drivers of learning into a single box in our ToCs, not every pathway leading to the "student-level drivers" box signifies an impact on all three of these skills. And not every pathway leading from this box signifies an impact of all three of these factors. For example, one pathway may represent the influence of family/caregiver involvement on affective engagement only. Where necessary, we use the pathway "rationale" section to highlight the specific student-level drivers of learning we view as most relevant to that particular pathway.

Second, because the appropriate operationalization of student-level drivers will vary by context, we advise users of this document to think carefully about which of these drivers (or which subconstructs of these drivers) their program means to target, and how that driver manifests in their context. As an example, progress charts on tablets might directly target meta-cognitive awareness, whereas teacher-student check-ins might target meta-cognitive awareness and self-regulatory behaviors such as planning and organization. Because our aim with these ToCs was to map out general processes that apply to a wide range of programs and contexts, we leave it to users to develop operational definitions of key concepts that best fit their programs.



Theories of Change

#1 Strategies to Increase Access to Educational Opportunities



Assumptions for ToC #1

Assumptions at the program level

Assumption	Applies to Pathways...
• Program has the ability (or permission) to contact families, or else has relationships with organizations that do.	0
• Strategies use technologies that families/ caregivers have access to.	0
• Educational opportunities are sufficiently high-quality: delivery modes -such as books, apps, or technology- are easy to use and well-designed; content is clear, age-appropriate, relevant, and engaging.	0,3,6,9

Assumptions at the program level

Assumption	Applies to Pathways...
• Families/caregivers at least have cell phones with SMS.	0
• Families/caregivers are identifiable by contact information (e.g. cell phone numbers are up to date).	0
• Families/caregivers are sufficiently well-off financially so that the opportunity costs of having children engage in educational activities is not too high.	1,2,3
• Families/caregivers have norms for and previous experience with providing academic support to students.	2
• Families/caregivers have the requisite resources (e.g. time, money, knowledge) to increase their involvement in student learning.	2,4
• Families/caregivers have the requisite psychological and physical resources (e.g. mental and physical health) to increase involvement in student learning.	2,4
• Families/caregivers believe that their involvement will improve student;s chances of reaching those expextations (efficacy).	4

Assumptions at the program level

Assumption	Applies to Pathways...
• Families/caregiver involvement is nurturing: it creates a safe, supportive environment that is responsive to children's needs..	5,8
• Help provided by families/caregivers is sufficiently high quality, meaning helpers have requisite knowledge and skills, understand materials, and communicate clearly to students..	5,8
• Families/caregivers have power over students' decision to return to school.	7

Assumptions at the student- level

Assumption	Applies to Pathways...
• In general, access is a primary barrier to student engagement in educational opportunities.	3
• Students (not just their families) are aware of educational opportunities.	3
• Opportunities are in a language that student understand.	3,6,8,9
• Instructional materials target skills and knowledge in student's proximal zone of development.	6,8,9
• Tasks are intelligible to students.	6,8,9
• Students have some control over the decision to return to school. The direct link between student engagement and future enrollment/ drop-out is likely to vary by age and student's influence over enrollment/drop-out decisions.	10

Assumptions at the school- level

Assumption	Applies to Pathways...
• School is reopening in the near future. Reopened schools will go back to in-person learning.	7,10

What Are Strategies to Increase Access to Educational Opportunities?

We note several exemplar strategies, and classify them as to whether they require low-technology or high-technology infrastructure:

- Mass dissemination strategies:
  As part of the Pakistan Reading Project (PRP), the International Rescue Committee (IRC) uses mass text messages (SMS) to disseminate decodable text, allowing them to reach many students who do not have internet access. Families/caregivers also receive text messages informing them about various educational opportunities (e.g., radio read-alouds), including when new materials will be released. A key step in this effort was a large-scale initiative to collect family phone numbers nationwide. Also, according to UNESCO, printed materials are being mass disseminated in other contexts, such as Cameroon.

- TV/radio:
  Aprendo en Casa in Peru is using television and radio broadcasts to reach large portions of the student population. Along with TV and radio programming of their own design, they collected programming from various external sources, including existing radio interventions and educational TV programs from other countries (e.g., Argentina). Their data shows that TV is by far the most used modality. However, radio appears to be popular in rural regions, which is likely due to a lack of TVs and to the fact that only radio programs have lessons in Indigenous languages. According to the INEE's mapping report, TV is being used across a number of contexts, including Kenya and Chile.

- Social media/WhatsApp:
  A number of programs have been using WhatsApp to disseminate materials and communicate with families/caregivers and students. Our interviews revealed that this was the case with PRP in Pakistan and Aprendo en Casa in Peru. INEE's mapping report finds that WhatsApp is also being used in Ecuador and Libya. In addition, both our and INEE's interviews with practitioners seem to suggest that WhatsApp is one of the most effective means of reaching families/caregivers in this time. Other forms of social media are also being used. For instance, INEE has identified a program in Afghanistan that is distributing materials via Facebook.

- SMS:
  INEE has identified programs in Afghanistan and Sudan that have been sending out educational materials to students and parents via SMS.

- SD cards:
  According to the INEE mapping report, Zambia has been distributing cellphone SD cards with pre-loaded audio lessons.

- Expanding infrastructure/access to technology:
  In Peru, Aprendo en Casa and the Ministry of Education have partnered with technology companies in an effort to distribute tablets to all students in the country. The tablets come with pre-downloaded content. The goal is that students will soon be able to download additional lessons on their tablets as well as access internet at local service centers set up across the country. In addition, the INEE mapping report identifies similar efforts to distribute tablets with pre-downloaded content, such as digital learning games, in the Sudan (e-learning Sudan, ELS) and Myanmar. Finally, the INEE mapping report also indicates that a number of radio instruction interventions have been distributing radios.

How Do We Expect Strategies to Increase Access to Educational Opportunities to Work?

Path 0.

Strategies to increase access can lead to increased awareness of and feasibility of participation in educational opportunities.

Rationale:
Strategies increase access to educational opportunities by raising families' awareness of those education opportunities. They may also facilitate families' ability to access specific delivery modes– for example, through the provision of tablets or internet service – as well as directly increase their interaction with education content provided through various delivery modes. Given pre-existing barriers to access in some contexts, there is a possibility that strategies to increase access during COVID-related restrictions may lead to greater levels of access than before COVID-19.

Path 1.

Access to education opportunities may increase family/caregiver expectations.

Rationale:
Families/caregivers may have greater expectations for their child's engagement in educational opportunities if they know those opportunities exist and are accessible. In addition, families/caregivers may also have higher expectations about their child returning to school when education remains a salient feature of their lived experience during school closures. Finally, the knowledge that there are opportunities that mitigate disruptions to students' schooling may also buoy family/caregiver expectations for students' long-term academic performance and attainment.

Path 2.

Access to education opportunities increases family/caregiver involvement in the form of academic support.

Rationale:
Research from low-income contexts in the U.S. suggests that parents are more likely to become involved when they are aware of opportunities for involvement and when they believe that their involvement can make an impact (i.e., self-efficacy) (Dumont et al., 2014; Green et al., 2007; Williams & Sánchez, 2013). Although there is less research on the predictors of parental involvement in low and middle-income countries, or in humanitarian contexts, the U.S.-based research suggests that both components of access (awareness and feasibility) may at least increase the quantity of family/caregiver involvement.

Path 3.

Access to education opportunities may increase some student-level drivers of learning (particularly behavioral engagement).

Rationale:
Compared to students without access to education opportunities, we expect students with improved access to educational opportunities to, on average, have increased participation in and time spent on such opportunities (i.e., increased behavioral engagement). We expect this effect to be more pronounced for students and households who would otherwise have zero (or close to zero) access if not for the intervention. For some students, improved access to educational opportunities may also increase other student-level drivers of learning, such cognitive and affective engagement or self-regulated learning. But the link is less clear and may be attenuated by the delivery mode, quality of the content, and other factors. For example, research suggests that supportive and nurturing interactions in children's immediate environment are key facilitators of students' affective and cognitive engagement (Finn & Zimmer, 2012). It is possible, then, that increased access to asynchronous delivery modes may have no impact on affective or cognitive engagement, whereas synchronous delivery modes may support such types of engagement. Importantly, our definition of access makes no assumptions about the nature of the education opportunities themselves.

Path 4.

Family/caregiver expectations may promote family/caregiver involvement.

Rationale:
Caregivers who have higher short-term expectations for students' engagement in distance education opportunities and for their re-enrollment upon schools re-opening will on average be more involved in providing various forms of academic support. Increased involvement means investing more resources (i.e., time, effort, money via forfeiture of labor) – and families/caregivers who have greater short-term academic expectations for their children should view that investment as more worthwhile (Zhan, 2006). Studies in the U.S. have shown that high parental expectations are linked to greater involvement, and research from developing countries provides indirect evidence that families' decisions to send their children to school is based in part on their expectations about the value of education (Englund et al., 2004; Huisman & Smits, 2009).

Path 5. Family/caregiver involvement may increase student-level drivers of learning (self-efficacy, self-regulated learning and student engagement). In addition, student engagement may feed back onto family involvement.

Rationale:

Family/caregiver involvement <-> Student engagement:

Students who are highly engaged may elicit more involvement from their caregivers/families. However, it might also be the case that families/caregivers feel less need to be involved when students are already highly engaged, such that high student engagement is associated with lower family/caregiver involvement. In turn, as families/caregivers become more involved in their children's education, children will on average become more behaviorally engaged. For example, studies in the U.S. (Callahan et al., 1998; Fehrmann et al., 2015) have found that parent involvement in homework increases task completion and time on task. Children may also be more cognitively and affectively engaged, but that may depend on the nature of involvement (see Assumptions below).

Family/caregiver involvement -> Self-efficacy:

Certain forms of academic support (i.e., encouragement, structure, helping, monitoring) provided by caregivers may increase students' self-efficacy when high quality. Research has demonstrated a positive link between family/caregiver involvement and student self-efficacy (Fan & Williams, 2009). In providing structure or effective help on schoolwork, caregivers may promote students' sense of mastery and, with it, their self-efficacy (Schunk, 1990). Similarly, through monitoring and encouragement, families/caregivers can help children recognize and celebrate their progress towards learning goals, which will also boost self-efficacy (Butler & Winne, 1995). However, once again, the literature suggests that such positive effects depend on the interactions being supportive and affectively positive (Fan et al., 2011).

Family/caregiver involvement -> Self-regulated learning:

Certain forms of academic support provided by caregivers may also increase aspects of self-regulated learning, including metacognitive awareness and behavioral self-regulation. A number of studies have shown that family/caregiver involvement in education can promote self-regulated learning (Pino-Pasternak et al., 2010; Zhang & Whitebread, 2017). By discussing students' work and providing feedback, caregivers can model meta-cognition and increase students' meta-cognitive awareness (Veas et al., 2019). In addition, families/caregivers can promote behavioral self-regulation strategies such as outlining or forward planning (Veas et al., 2019).

Paths 6 & 7. Family/caregiver expectations may lead to increased holistic learning (and less learning loss), increased future enrollment, and less likelihood of drop-out.

Rationale:

On average, students will learn more when their families/caregivers and caregivers have higher short and long-term expectations. In Western contexts, a wealth of research has shown a strong link between parents' long-term academic expectations and students' academic achievement. Several studies also suggest that high short- and medium- term expectations are also associated with better performance in school (Bowen et al., 2012; Huguley et al., 2018). In addition, if families/caregivers expect students to return to school after reopening, students will be more likely to re-enroll and less likely to drop-out. This link is likely to vary according to the students' age and the family's degree of control over their enrollment/drop-out.

Path 8. Family/caregiver involvement may impact holistic learning (and learning loss).

Rationale:

A meta-analysis of studies conducted in numerous countries (U.S., Mexico, Korea, Egypt, Iceland, Greece, Cambodia, Arabs in Israel) found that parent involvement is associated with higher student achievement (Castro et al., 2015). In addition, a review of U.S. studies on parental involvement in homework—an activity with clear parallels to the parental involvement under self-learning paradigms—cites substantial evidence for parental involvement improving student achievement (Hoover-Dempsey et al., 2001). However, both documents indicate that the positive effects of parental involvement depend on the quality of involvement, and furthermore that poor quality involvement can have negative effects.

Paths 9 & 10.

Family/caregiver involvement may impact holistic learning (and learning loss).

Rationale:

Student engagement:

Meta-analytic evidence from studies across the globe provides compelling evidence that student engagement is tied to higher achievement and learning (Lei et al., 2018). In addition, a review of the international literature on student engagement and achievement cites evidence for each of the three engagement types (behavioral, affective and cognitive) having unique positive impacts (Finn & Zimmer, 2012). Regarding the impact on future enrollment/drop-out, several studies on U.S. and Canadian secondary students have found that student engagement protects against drop-out (Archambault et al., 2009; Fall & Roberts, 2012). However, the link between student engagement and enrollment/drop-out in primary students from low- and middle-income countries is less clear.

Self-efficacy:

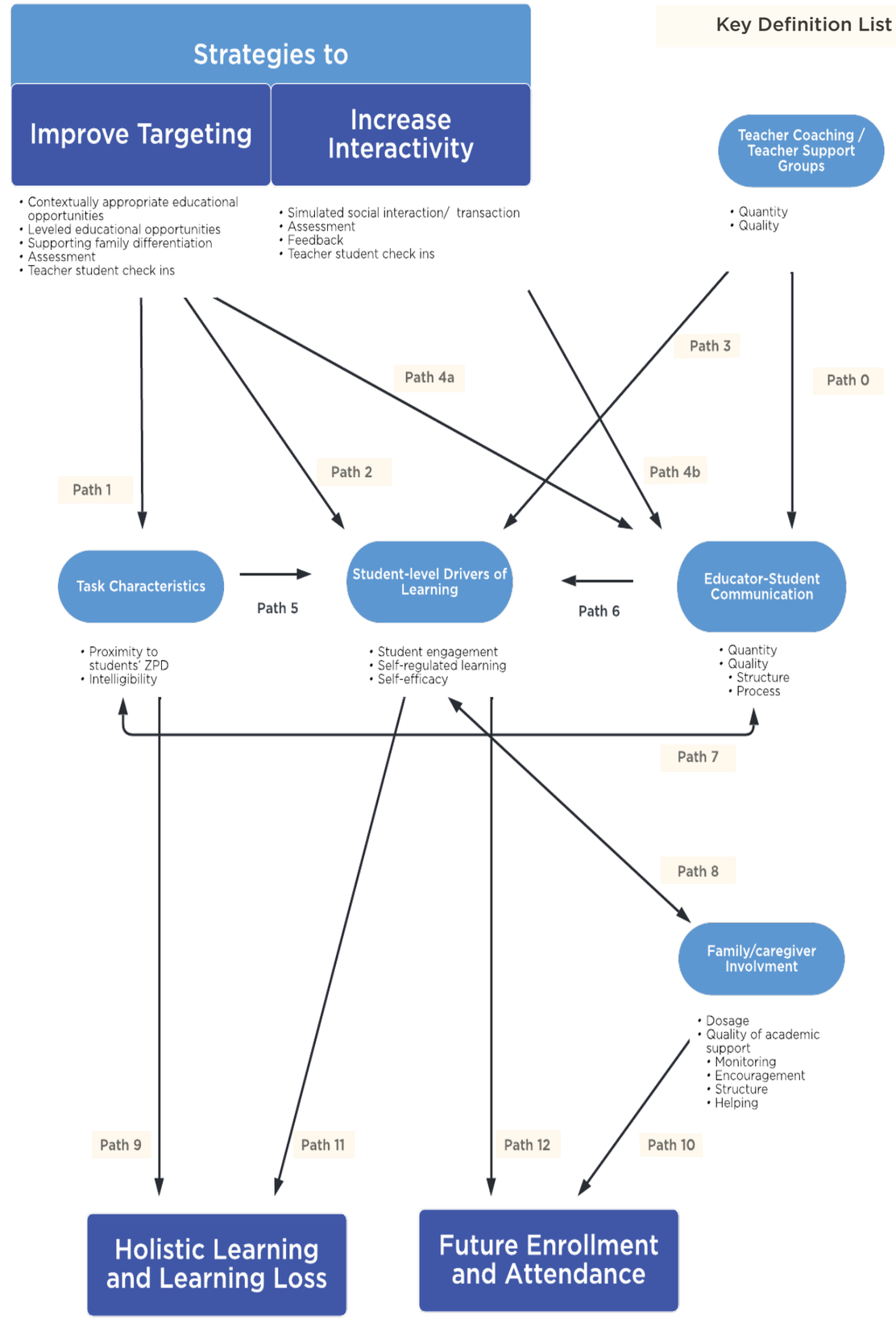
A substantial body of evidence over a diverse range of contexts suggests that self-efficacy (sometimes referred to as confidence) is an influential driver of student learning (OECD, 2019; Richardson et al., 2012; Stankov, 2013; Stankov et al., 2014). This has led some scholars to refer to it as the strongest non-cognitive predictor of academic achievement. Furthermore, student motivation – of which self-efficacy is a crucial component – is particularly crucial to effective education under a self-learning paradigm (UNRWA, 2018). Consequently, we advise prioritizing supports for self-efficacy in distance education interventions. Self-efficacy has also been found to be associated with lower drop-out rates in samples of German adolescents, Luxembourgian undergrads, and U.S. undergrads (Bean & Eaton, 2001; Cambridge-Williams et al., 2013; Meyers et al., 2013; Pössel et al., 2005).

Self-regulated learning:

Meta-analytic evidence has found that meta-cognitive awareness predicts academic achievement in Canadian and U.S. primary and secondary students (Dent & Koenka, 2016). In addition, numerous studies have found that cognitive and behavioral aspects of self-regulated learning predict achievement (Paris & Paris, 2010; Zimmerman, 2010; Zimmerman & Bandura, 1994). As it relates to distance education interventions specifically, a large meta-analysis of online learning programs in the U.S. found that the programs with the greatest positive impact tended to be those that attempted to elicit meta-cognitive awareness (e.g., self-monitoring and self-reflection; Means et al., 2009). The evidence is less clear in terms of the relation between self-regulated learning and drop-outs or enrollment. Self-regulated learning has been identified as a potential protective factor against drop-outs in Native American college students (Patterson et al., 2014, 2016). In addition, one study found that perceived efficacy to self-regulate protected against drop-outs in Italian high school students (Caprara et al., 2008). Finally, self-regulated learning has also been shown to correlate with retention in online courses, suggesting that self-regulated learning may promote behavioral engagement while distance education interventions are ongoing (Lee et al., 2013).

Theories of Change

#2 Strategies to Improve Quality of Educational Opportunities



Assumptions for ToC #2

Assumptions at the program-level

Assumption	Applies to Pathways...
• (For strategies targeting ZPD) Program has adequate resources, knowledge, and capacity to effectively implement differentation across their target population. Perhaps most importantly, program has means to implement on-going assessment.	1
• (For strategies targeting intelligibility through language adapatations) Programs have acces to educational materials in target language or else have the ability to produce those materials.	1
• (For strategies targeting intelligibility through improving clarity) Programs have systems in place for identifying breakdowns in understand and have the ability to make the necessary alterations.	1
• (For strategies involving teacher-student check-ins) Teachers are not suffering from burnoit and have the time and psychological resources to provide consistent and quality support to individual student/families.	4
• Program has the ability (or permission) to contact families/students, or else has relationships with organizations that do.	1,2,3,4a,4b
• Strategies use technologies that families/ caregivers have access to and use regularly.	1,2,3,4a,4b
• Programs have sufficient understanding of students' culture to be able to curate or produce relevant educational opportunities.	2
• Strategies to increase interactivity successfully increase the quantity of social interaction and feedback (i..e. implementation).	3
• Social interaction and feedback are primarily positive.	3

Assumption	Applies to Pathways...
• Program has successfully identified key dimensions of communication quality and developed effective implementation strategies for targeting them.	4
• Programs have direct, regular contact with teachers.	4
• Educational opportunities are sufficiently high-quality: delivery modes - such as books, apps, or technology; content is clear, age-appropriate, and fresh..	2,3,10,11

Assumptions at the caregiver/family-level

Assumption	Applies to Pathways...
• Families/caregivers do not have negative perceptions of teachers..	4
• Families/caregivers are sufficiently well-off financially so that the opportunity cost of having children engage in education activities is not too high.	5,6,8
• Families/caregivers believe that their involvement will have improve student's chances of reaching those expectations (efficacy).	8
• Families/caregivers involvement is nurturing: it creates a safe, supporting environment that is responsive to children's needs.	8
• Families/caregivers have sufficient skills and knowledge to provide high quality academic support..	8
• Families/caregivers have the requisite resources (e.g. time, money, knowledge) to increase their involvement in student learning.	8
• Families/caregivers have the requisite psychological and physical resources (e.g., mental and physical health) to increase their involvment in student learning.	8

	• Families/caregivers have norms for and/or previous experience with providing academic support to students.	8
Assumptions at the student-level	• Students have consistent and quality access to educational opportunities.	1,2,3,5,6,7,8,9,10,11
	• Students understand when and how to comunicate with teachers.	4
	• Opportunities are in a language that student understands.	2,5,6,10,11
	• Tasks are intelligble to students..	10,11
	• Educational opportunities target skills and knowledge in student's proximal zone of development.	10,11
	• Students have some control over the decision to return to school. The direct link between student engagement and future enrollement/ drop-out is likely to vary by age and student's influence over enrollment/drop-out decisions.	12

What are Strategies to Increase Quality of Educational Opportunities?

We define such strategies as those having at least one of the following goals:
1. increasing the interactivity of educational opportunities
2. improving targeting of educational opportunities.

More interactive educational opportunities are those which involve greater social interaction (real or simulated) and provide more consistent, timely feedback. Better targeted educational opportunities are those which are optimally difficult, in students' home language, easy to understand and culturally relevant.

Out of the strategies we identified, our model carves out a special role for teacher-student check-ins, which have the potential to increase interactivity and improve targeting. As many practitioners we interviewed noted, the loss of social interaction (especially synchronous interaction) with peers and educators may be one of the most damaging consequences of restrictions to traditional schooling. Teacher-student check-ins over phone or video chat appear to be one of the most feasible and promising approaches to filling this void. With regard to targeting, teacher-student check-ins can be used to match students to materials that are more suitable for them. Outside of one case (see below), our scoping study found limited evidence of teacher-student check-in being implemented. Although, we did find evidence of teachers being encouraged to keep in touch with students. Exemplar strategies include:

To increase interactivity:

- Interactive voice response (IVR) and interactive radio Instruction (IRI):
  IVR and IRI are forms of audio-based delivery that seek to increase interactivity through methods such as "call-and-response" and "open questions." Interaction is simulated and one-way, meaning students cannot elicit responses from the instructor. For example, the Pakistan Reading Project has set up a 1-800 number so that families/caregivers and students can call in at set times to listen to a read-aloud told by a 'grandmother' character. The read alouds include open-questions and call-and-response, making them interactive while still asynchronous. PRP came to an agreement with the local telecom providers so that all costs are born by the receiver rather than the caller. As another example, in addition to call-and-response, Qitabi 2 in Lebanon has incorporated physical activities into IVR-style lessons including having students spell out words with their fingers or to jump when they hear the correct answer. Many existing IRI models follow a format where radio instruction is delivered in a traditional classroom, and an in-person teacher follows up on the IRI lesson with activities and further instruction. This strategy could be adapted to distance education models by removing the classroom components.
- Using master teachers and modeling student-teacher interactions:
  In the U.S. and Ghana, stakeholders have adopted models where master teachers broadcast lessons to groups of students who are either gathered in person or online (Cadence Learning, n.d.; Johnston & Ksoll, 2017). In the U.S.-based Cadence Learning program, a small number of 'showcase students' interact with the master teacher, asking

and answering questions, in order to simulate interactive and transactional learning enviroments. As far as we know, this model has been adopted primarily under virtual classroom paradigms where a non-master teacher takes over following the master teacher and leads synchronous instruction. However, one can imagine these strategies being adopted for self-learning approaches, such as radio lessons, or used in conjunction with social distancing protocols as students return to traditional schooling.

- Feedback:
  Several ongoing strategies allow students the opportunity to receive feedback on their work and to chart their progress. Some high-technology strategies (i.e., those that depend on reliable, high-quality internet connections), such as e-learning platforms, have internal messaging systems that allow teachers and students to communicate about classwork and share materials. For instance, the INEE's mapping report identifies Noorspace (Jordan), Sistema Uno (Americas), Kasome (Tanzania), and ProFuturo (Zimbabwe) as examples of ongoing feedback strategies over e-platforms. Feedback strategies can also be implemented through low-technology programs. The INEE mapping describes how the Afghanistan Institute of Learning and Shupavu291 in Kenya are attempting to use SMS to provide students with feedback on their work.

- Teacher-student check-ins:
  We define teacher-student check-ins as synchronous conversations between one teacher and one student. The only instance of ongoing teacher-student check-ins we found was in Gambia, where the INEE reports that teachers are initiating phone-calls with students.

To improve targeting:

- Leveled materials and differentiation:
  A number of programs, including PRP and Aprendo en Casa, have worked to organize instructional materials by level and subject (e.g., student books organized by reading level; math worksheets organized by skill). Leveling in and of itself may improve targeting if students and families/caregivers have access to the entire library. But it is likely to be more effective when efforts are made to assess students and match them to appropriate materials. For example, Qitabi 2 in Lebanon is using software to match students with appropriately-leveled materials. Students complete assessments and are matched to different materials based on their scores. In addition to leveled materials, structured teacher guides to facilitate teachers' ability to match students' learning level to such materials may help improve targeting in distance education programs where teachers are actively engaged in instruction.

- Contextually appropriate materials:
  Contextually appropriate means attuned to the cultural values and practices of a given context, and produced in a language that students understand.[3] As part of the PRP, the IRC has developed (and continues to develop) a library of virtual story books and audio stories that can be disseminated through SMS, WhatsApp and email. The stories included contextually appropriate themes and plots. They have also developed stories in a number of local languages (so that students in different regions can participate) and at various reading levels.

- Teacher-student check-ins:
  In addition to providing feedback, teacher-student check-ins may be an effective means of differentiation, as teachers can informally assess students and match them to materials.

- Building a library of instructional meterials:
  In the early stages of their response to COVID-19, Aprendo en Casa in Peru engaged in a large-scale search for instructional materials both in and out of the country. They were able to gather a wide range of materials, which allowed them to target different populations according to academic level, access to technology, and home language. For instance, the program has broken online materials down by subject and grade level, and a large number of educational videos from Argentina has allowed them to provide engaging and intelligible opportunities to large numbers of students.

What are strategies that can support teacher-student check-ins?:

- Teacher coaching:
  In Afghanistan, the IRC has continued professional development through routine phone check-ins. Teacher coaching models under COVID-19 may be an effective strategy for impacting student outcomes via teacher-student communication.

- Teacher support groups:
  The Pakistan Reading Project and the IRC are convening webinars to bring teachers together and provide them with a space to exchange social and professional support. Similar strategies are in development elsewhere. It's possible that these support groups could improve the quantity and quality of teacher-student communication.

3 We recognize that this is complex in countries and contexts in which the language of instruction differs from the spoken language. This is likely a critical issue in distance education that requires additional attention.

How Do We Expect Strategies to Increase Quality of Educational Opportunities to Work?

Path 0. Well-designed and implemented support and professional development programs may support teachers in conducting effective teacher-student check-ins.

Rationale:
High-quality pre-service and in-service teacher training and professional development opportunities will support the quality of student-teacher check-ins. A meta-analysis of studies from primarily high-income countries has shown that teacher professional development opportunities can support the emotional and instructional support provided through in-person teacher-student interactions (e.g.., Egert et al., 2020). Emerging evidence suggests that effective professional development opportunities: will be of sufficient frequency and duration; have focused and clear learning goals, operationalized through a common instructional framework and observation rubric; and provide varied and active learning opportunities that enable the teacher to engage in deliberate practice and delivery of new techniques and content (Brown, 2020). This suggests that effective distance education programming will include not just virtual and self-learning opportunities for students – but for teachers as well.

Path 1. Strategies to improve targeting can improve task characteristics such as the task's proximity to a student's zone of proximal development (ZPD) and its intelligibility. Specifically, they can make tasks easier for students to understand and closer to the optimal level of difficulty.

Rationale:
Strategies to improve targeting can impact the intelligibility of a task, as well as its proximity to the student's ZPD. For instance, programs might seek to revise educational opportunities in order to make them more intuitive. Or programs might seek to match students with educational opportunities that are not too far below or above their existing skill and knowledge level. Matching students to instructional materials based on their abilities or prior mastery requires student-level assessment data, whether pre-existing data or data that is collected in the course of program implementation. In general, the effectiveness of targeting strategies is likely to vary according to the quality of implementation (see Assumptions).

Path 2. Strategies to improve targeting can increase student-level drivers of learning (self-efficacy, self-regulated learning and student engagement), particularly student engagement.

Rationale:
As can be seen in the model above, we expect targeting strategies to boost drivers of learning both directly and indirectly (through task characteristics; Paths 1 and 5). To be clear, we expect the indirect pathway to be the more impactful of these; however, we do expect certain strategies to have a direct effect as well. In particular, strategies intended to improve the cultural appropriateness of educational opportunities may increase cognitive and affective student engagement, by making students more interested or motivated (Hammond, 2014). There is some research backing up the idea that students are more interested in and motivated by educational opportunities that speak to their interests and lived experiences (Djonko-Moore et al., 2018; Feger, 2006; Houchen, 2013; Zyngier, 2008).

Path 3. Strategies to increase interactivity (i.e., feedback and social interaction) may increase student-level drivers of learning.[4]

Rationale:
Student engagement:
There is a good deal of evidence that interactive learning and learning that promotes self-reflection promotes student engagement (Finn & Zimmer, 2012). The importance of social interaction (with peers and with teachers) for driving student engagement has also been well established (Christenson et al., 2012; Nguyen et al., 2016; Pol et al., 2010). Importantly, research indicates that this holds true for distance education, although as far as we can tell very little research has examined drivers of student engagement in primary school-aged distance education (Chakraborty & Muyia Nafukho, 2014; LeeTiernan & Grudin, 2001; McBrien et al., 2009). Two of our interviewees expressed the view that declines in peer and instructor interaction could undermine students' interest or effort in education. Theoretically, it is possible that social interaction could have a larger than normal benefit in situations where the baseline levels of interaction are low.

Self-efficacy:
Feedback on performance is a key contributor to self-efficacy (Adams et al., 2020; Schunk, 1990). It is how students gauge their progress and judge their abilities. An important caveat is that negative feedback – in tone or as evidence of failure – can have negative impacts on self-efficacy (Hattie & Timperley, 2007). Therefore, in order to maximize the positive impact of feedback strategies on self-efficacy, programs should ensure that students are working on tasks that are not too difficult. In addition, research suggests that feedback is most effective when it is consistent and provides students with information about their performance on concrete, proximal tasks, rather than abstract distant goals (Bandura & Schunk, 1981). Digital progress trackers, like those you might find on an e-learning platform or online game, are a promising approach for this reason.

Self-regulated learning:
Feedback is also crucial to fostering self-regulated learning, as it can promote reflective thinking (i.e., meta-cognitive awareness) and adaptive behavior (Butler & Winne, 1995; Lee et al., 2010). In addition, there is some research showing that feedback can boost self-regulated learning in distance education contexts, although the work we are aware of has been conducted only in higher education (van den Boom et al., 2007).

Path 4a & 4b. Teacher-student check-in strategies may improve the quality of teacher-student communication.

How are we defining the quality of teacher-student check-ins?
Quality of communication can be broken down into structural and process quality (see Box #1, below).

Rationale:
As we note above, our research suggests that teacher-student check-ins are a promising approach to dealing with the loss of social interactions in a distance education context. However, the existence of teacher-student check-in strategies does not guarantee frequent or high-quality communication between students and teachers. Instead, the ability of these strategies to deliver the intended outputs likely depends on the extent to which they target key elements of both process and structural quality. In addition, a large body of research out of the U.S. has indicated that the quality and effectiveness of teacher-delivered interventions depends on teachers' fidelity to the program design (Dusenbury et al., 2003; Flannery et al., 2014; Mortenson & Witt, 2019; Stein et al., 2008).

4 Note on age differences: In general, our ToCs do not cover potential moderating effects of age or other individual-level variables. However, although increased interactivity should benefit students of all ages, it is possible that these benefits would be especially great for younger learners who may struggle more with learning on their own.

Path 5. Task characteristics can impact student-level drivers of learning.

Rationale:
Student engagement:
Evidence suggests that students' interest in educational activities increases their emotional and cognitive engagement (Sun & Rueda, 2012). In addition, proximity to ZPD may have a positive effect on engagement (Shernoff, 2010). Students are more likely to disengage from tasks that are too easy or too difficult (Patall et al., 2018).

Self-efficacy:
Research demonstrating the negative impact of failure on self-efficacy suggests that tasks which are too difficult may undermine self-efficacy (Campbell & Hackett, 1986; Hanley et al., 2015; Lyman et al., 1984).

Path 6. Structural and process quality of teacher-student communication may increase student-level drivers of learning.

Rationale:
Student engagement:
A large number of studies have demonstrated that positive teacher-student relationships and interactions can increase student engagement. For instance, studies in the U.S. have found that supportive, warm, and positive relationships with teachers are associated with higher levels of behavioral, cognitive and affective engagement (Baker et al., 2008; Lee, 2012). Similar findings have been found in international samples (Lam et al., 2016; Roorda et al., 2011).

Self-efficacy:
As discussed above, feedback and task difficulty are key drivers of self-efficacy. Therefore, high-quality teacher communication should be able to increase self-efficacy through the provision of feedback. Teacher-student communication may also increase self-efficacy indirectly through its influence on task characteristics (paths 7+6, see below).

Self-regulation:
Through feedback and discussion, teachers can guide students towards a deeper understanding of their learning process and encourage them to engage in adaptive behavioral strategies (Randi & Corno, 2000; Zumbrunn et al., 2011).

Path 7.

Teacher-student communication may improve task characteristics.

Rationale:
Teacher-student communication has the potential to make educational opportunities easier to understand for students and closer to the optimal level of difficulty. First, teachers may be able to match students with instructional materials that are appropriate to their level (i.e., differentiation; Blackburn, 2018). Second, teachers may be able to make educational opportunities more intelligible to students by explaining instructions.

Path 8.

Student engagement may increase family/ caregiver involvement – which in turn may promote student-level drivers of learning.

Rationale:
Family/caregiver Involvement <-> student engagement:
Students who are highly engaged may elicit more involvement from their families/ caregivers. However, it might also be the case that families/caregivers feel less need to be involved when students are already highly engaged, such that high student engagement is associated with lower family/caregiver involvement. In turn, as families/caregivers become more involved in their children's education, children will on average become more behaviorally engaged. For example, studies in the U.S (Callahan et al., 1998; Fehrmann et al., 2015) have found that parent involvement in homework increases task completion and time on task. Children may also be more cognitively and affectively engaged, but that may depend on the nature of involvement (see Assumptions).

Family/caregiver involvement -> self-efficacy:
Certain forms of academic support (i.e., encouragement, structure, helping, monitoring) provided by caregivers may increase students' self-efficacy when high quality. Research has demonstrated a positive link between parent involvement and student self-efficacy (Fan & Williams, 2009). In providing structure or help on schoolwork, families/caregivers may promote students' sense of mastery and, with it, their self-efficacy (Schunk, 1990). Similarly, through monitoring and encouragement, families/caregivers can help children recognize and celebrate their progress towards learning goals, which will also boost self-efficacy (Butler & Winne, 1995). However, once again, the extent to which caregivers' involvement supports children's self-efficacy depends on the child-caregiver interactions being supportive and affectively positive (Fan et al., 2011).

Family/caregiver involvement -> self-regulated learning:
Certain forms of academic support provided by caregivers may also increase aspects of self-regulated learning, including metacognitive awareness and behavioral self-regulation. A number of studies have shown that family/caregiver involvement in education can promote self-regulated learning (Pino-Pasternak et al., 2010; Zhang & Whitebread, 2017). By discussing student's work and providing feedback, caregivers can model metacognition and increase student's metacognitive awareness (Veas et al., 2019). In addition, families/caregivers can promote behavioral self-regulation strategies such as outlining or forward planning (Veas et al., 2019).

Path 9.

Task characteristics (i.e., intelligibility and proximity to ZPD) may influence holistic learning (and learning loss).

Rationale:
Our model identifies an indirect impact of task characteristics on learning through student-level drivers of learning (paths 5+11). However, we identify a direct link as well: All additional factors aside, we expect students on average to learn more as a result of educational opportunities that are intelligible to them and that are within their zone of proximal development (Kazulin et al., 2003). According to Vygotsky's theory of a zone of proximal development, educational opportunities need to go beyond students' existing skills and knowledge – but not too far beyond – in order to promote learning (Gauvain, 2020). Also, a task must be intelligible to result in learning. Furthermore, each of these are necessary but not sufficient conditions on their own. As such, making a task more appropriately difficult will likely not improve learning if the task is unintelligible, and making tasks more intelligible will likely not increase learning if the task is too hard or too easy.

Path 10.

Family/caregiver involvement may promote holistic learning (and prevent learning loss).

Rationale:
A meta-analysis of studies conducted in numerous countries (U.S., Mexico, Korea, Egypt, Iceland, Greece, Cambodia, Arabs in Israel) found that parent involvement is associated with higher student achievement (Castro et al., 2015). In addition, a review of U.S. studies on parental involvement in homework—an activity with clear parallels to the parental involvement under distance education paradigms—cites substantial evidence for parental involvement improving student achievement (Hoover-Dempsey et al., 2001). However, both documents indicate that the positive effects of parental involvement depend on the quality of involvement, and furthermore that poor quality involvement can have negative effects.

Paths 11 & 12. Student-level drivers of learning will impact holistic learning (and learning loss) and future enrollment/drop-out.

Rationale:

Student engagement:

Meta-analytic evidence from studies across the globe provides compelling evidence that student engagement is tied to higher achievement and learning (Lei et al., 2018). In addition, a review of the international literature on student engagement and achievement cites evidence for each of the three engagement types (behavioral, affective and cognitive) having unique positive impacts (Finn & Zimmer, 2012). Regarding the impact on future enrollment/drop-out, several studies on U.S. and Canadian secondary students have found that student engagement protects against drop-out (Archambault et al., 2009; Fall & Roberts, 2012). However, the link between student engagement and enrollment/drop-out in primary students from low- and middle-income countries is less clear.

Self-efficacy:

A substantial body of evidence over a diverse range of contexts suggests that self-efficacy (sometimes referred to as confidence) is an influential driver of student learning (OECD, 2019; Richardson et al., 2012; Stankov, 2013; Stankov et al., 2014). This has led some scholars to refer to it as the strongest non-cognitive (i.e., separate of skills, knowledge or prior performance) predictor of academic achievement. Furthermore, student motivation – of which self-efficacy is a crucial component – is particularly crucial to effective education under a self-learning paradigm (UNRWA, 2018). Consequently, we advise prioritizing supports for self-efficacy in distance education interventions. Self-efficacy has also been found to be associated with lower drop-out rates in samples of German adolescents, Luxembourgian undergrads, and U.S. undergrads (Bean & Eaton, 2001; Cambridge-Williams et al., 2013; Meyers et al., 2013; Pössel et al., 2005).

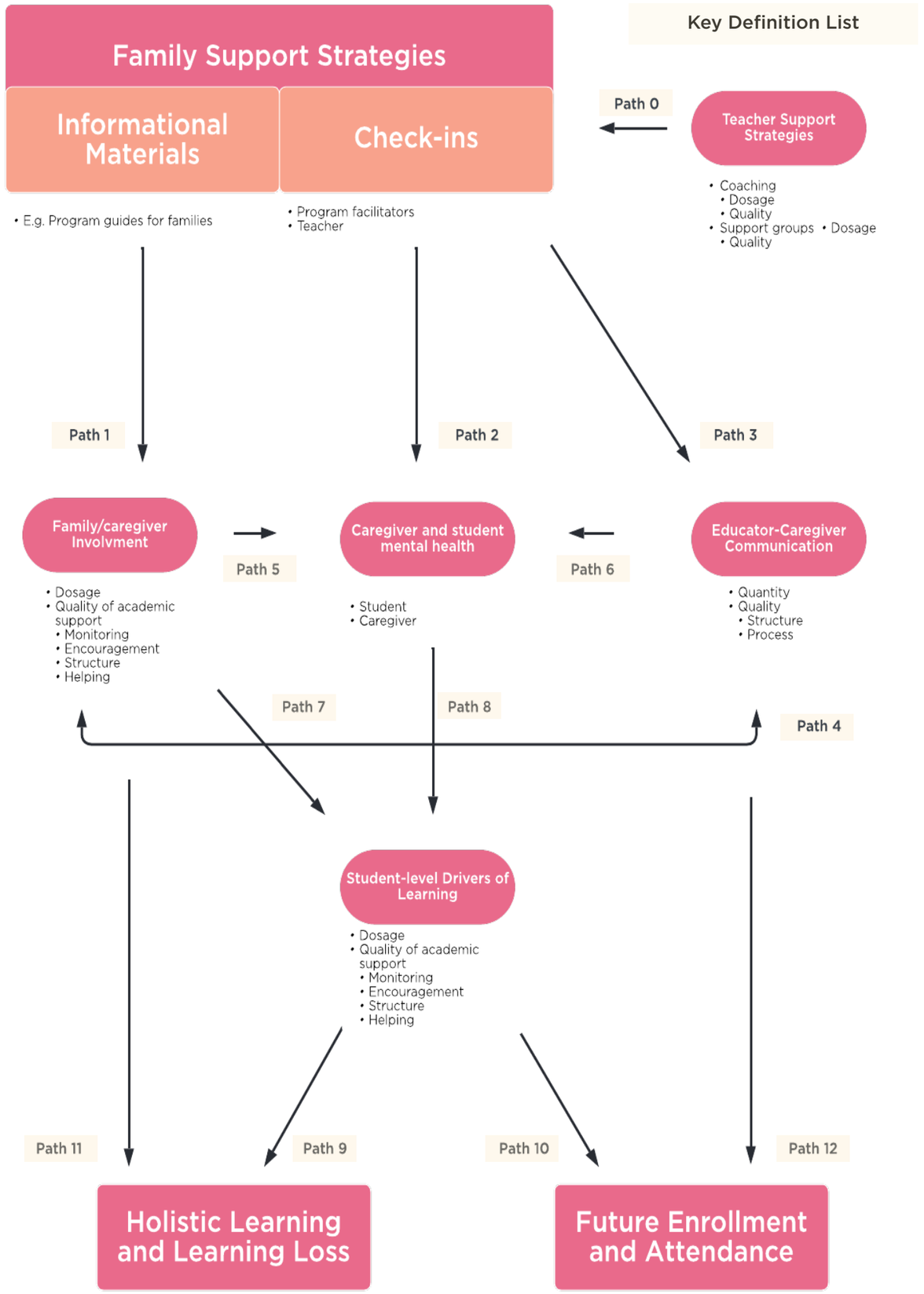
Self-regulated learning:

Meta-analytic evidence has found that meta-cognitive awareness predicts academic achievement in Canadian and U.S. primary and secondary students (Dent & Koenka, 2016). In addition, numerous studies have found that cognitive and behavioral aspects of self-regulated learning predict achievement (Paris & Paris, 2010; Zimmerman, 2010; Zimmerman & Bandura, 1994). As it relates to distance education interventions specifically, a large meta-analysis of online learning programs in the U.S. found that the programs with the greatest positive impact tended to be those that attempted to elicit metacognitive awareness (e.g., self-monitoring and self-reflection; Means et al., 2009).

The evidence is less clear in terms of the relation between self-regulated learning and drop-outs or enrollment. Self-regulated learning has been identified as a potential protective factor against drop-outs in Native American college students (Patterson et al., 2014, 2016). In addition, one study found that perceived efficacy to self-regulate protected against drop-outs in Italian high school students (Caprara et al., 2008). Finally, self-regulated learning has also been shown to correlate with retention in online courses, suggesting that self-regulated learning may promote behavioral engagement while distance education interventions are ongoing (Lee et al., 2013).

Theories of Change

#3 Strategies to Increase Family Support for Educational Opportunties



Assumptions for ToC #3

Assumptions at the program and school level

Assumption	Applies to Pathways...
• Program has the ability (or permission) to contact families, or else has relationships with organizations that do.	1, 2, 3
• Strategies use technologies that families/caregivers have access to.	1, 2, 3
• Families/caregivers have the requisite resources (e.g., time, money, knowledge) to increase their involvement in student learning.	1
• Informational materials are sufficiently high quality: delivered in the appropriate language, contextually appropriate, empowering, and intelligible, etc.	1, 2
• Informational materials are effective at all baseline levels of mental health.	2
• (If teachers are implementing check-ins) Teachers are not suffering from burnout and have the time and psychological resources to provide consistent andquality support to individual students/families.	3
• Programs have identified effective stress coping strategies to pass on to families.	5
• Check-ins are effective at all levels of baseline household well-being.	5
• Educational opportunities are sufficiently high-quality: delivery modes – such as books, apps, or technology – are easy to use and well-designed; content is clear, age-appropriate, and fresh.	9, 11
• School is reopening in the near future.	10, 12
• Reopened schools will go back to in-person learning.	10, 12

Assumptions at the caregiver-level

Assumption	Applies to Pathways...
• Families/caregivers have cell phones with SMS and cell phone numbers are up-to-date and identifiable.	1
• Families/caregivers have norms for and previous experience with providing academic support to students.	1
• Families/caregivers are sufficiently well-off financially, or have sufficient time, so that the opportunity costs of increasing involvement are not too high.	1, 4
• Families/caregivers do not have negative perceptions of materials/facilitators/check-ins.	1, 4, 5
• Communicating family member has close, regular contact with child.	1, 5
• Families/caregivers have access to technology needed to participate in check-ins.	3, 6
• Family/caregiver involvement comprises a non-negligible portion of caregiver-child interactions overall.	7, 11
• Family/caregiver involvement is nurturing: it creates a safe, supportive environment that is responsive to children's needs.	11
• Families/caregivers have sufficient skills and knowledge to provide high quality academic support.	12
• Families/caregivers have power over students' decision to return to school.	6

	Assumption	Applies to Pathways...
Assumptions at the student- level	• Students do not suffer from mental health disorders/syndromes that would require clinical attention and are resilient to less specialized, intensive interventions.	6
	• Students have consistent and quality access to educational opportunities.	7, 8, 9, 11
	• Educational opportunities target skills and knowledge in students' proximal zone of development.	9, 11
	• Opportunities are in a language that the student understands.	9, 11
	• Tasks are intelligible to students.	9, 11
	• Students have some control over the decision to return to school. The direct link between student engagement and future enrollment/drop-out is likely to vary by age and student's influence over enrollment/ drop-out decisions.	10

What are Strategies to Increase Family Support for Educational Opportunities?

We have identified two main strategies that are designed to provide support to families/ caregivers as part of remote learning opportunities: informational materials and check-ins. We note, however, that our scoping study of distance education programs implemented during COVID-19 related school closures did not identify many such strategies being built into remote learning programs. Exemplar strategies include:

- SMS tips for supporting students:
  According to the INEE mapping report, Rising Academies in Sierra Leone is sending text-messages to parents that, in addition to alerting them about upcoming educational opportunities, provide tips for supporting students. The World Bank has also reported that Rising Academies has set up a hotline for parents and students with questions or comments (World Bank, 2020). (Low-technology)

- Parent guides to providing academic and social support to students:
  Several organizations have created informational materials to help parents provide academic and social support to their children.: As part of their self-learning program, UNRWA created a written guide to help families/caregivers support student learning (UNRWA, 2018). The guide includes step-by-step instructions for using instructional materials, tips for providing academic support at various stages of the learning process, and tips for self-care. UNESCO has created tip-sheets for parents on how to support learning and boost their children's motivation in distance education (UNESCO, 2020). In addition, UNICEF has created a series of guides to help parents support their children with academic and psychological challenges under COVID-19 (UNICEF, 2020). (Low, High or No technology depending on method of dissemination).

- Check-ins with families:
  Globally, several programs are using check-in strategies (usually over phone) to support families/caregivers and impact child outcomes. For example, programs supported by the IRC in Syria (Ahlan Simsim) and Jordan (Reach Up and Learn), and the Bangladeshi Rural Advancement Committee (BRAC) have shifted early childhood home visits to phone-based models (International Rescue Committee, 2020). (Low-technology)

In contexts in which teachers or other facilitators are providing family support through check-ins, there are also strategies that can support facilitators in implementing the check-ins:

- Teacher/facilitator coaching:
  In Afghanistan, the IRC has continued professional development through routine phone check-ins. Teacher coaching models under COVID-19 may be an effective strategy for impacting students and families/caregivers via teachers, but also for providing teachers with social support during a time of heightened stress and adversity (High technology).

- Teacher/facilitator support groups:
  The Pakistan Reading Project and the IRC are convening webinars to bring teachers together and provide them with a space to exchange social and professional support. Similar strategies are in development elsewhere. It's possible that these support groups could improve the quantity and quality of teacher-family communication (High technology).

How Do We Expect Strategies to Increase Family Support for Educational Opportunities to Work?

Path 0. Well-designed and implemented support and professional development programs may support teachers or other facilitators in conducting household check-ins.

Rationale:
The quality of training and support provided to teachers or facilitators will support the high-quality delivery of household check-ins. Evidence from diverse sectors – including ECD, public health, and child protection – in both high-income and LMICs has shown that home-visiting models can be effective for: improving caregiver practices; increasing young children's school readiness; and reducing child maltreatment, among others (Britto et al., 2013; Casillas et al., 2016; Engle et al., 2007). However, the effectiveness of such models depends on the availability of high-quality training and capacity-development supports (Britto et al., 2013; Yoshikawa et al., 2018). This includes both pre-service and in-service (e.g., coaching, peer support groups) that focus not just on the transfer of knowledge but on building and maintaining communication and counseling skills (Yousafzai et al., 2014). Given that the majority of evidence in support of home-visiting models is based on in-person approaches targeting ECD, significant innovation and adaptation will be required for implementation in a distance education context with families/caregivers of primary- and secondary-school aged children. Centrally, this involves identifying within a given context and system who is best placed to conduct such check-ins (Yoshikawa et al., 2018). While teachers may be a natural and scalable option – given existing pre- and in-service training systems – nearly half of all teachers leave the profession in the first five years due to stress and burnout (Pianta et al., 2016). Alternately, it may be possible to strengthen school-community coalitions, whereby caregivers and/or community members liaise with and provide support to teachers and households.

Path 1. Informational materials may increase family/caregiver involvement in student learning.

Rationale:
Informational materials, such as the UNRWA parental guide highlighted above, have the potential to increase the quantity and quality of family/caregiver involvement in student learning. These strategies may increase families'/caregivers' sense of efficacy around improving student learning, which in turn might increase their motivation to provide academic support (Hoover-Dempsey et al., 2001). In other cases, they may result in families or caregivers implementing specific academic support strategies, such as providing students with organizational structures (e.g., schedules) or encouragement. Finally, they may indirectly increase family/caregiver involvement as a result of improved caregiver mental health from self-care due to stress management tips (Paths 2-6). There is existing evidence from the U.S. that family stress and caregiver depression are negatively associated with the amount of family/caregiver involvement in student learning (Grolnick et al., 1997; LaForett & Mendez, 2010). Therefore, improved caregiver well-being may lead to a greater quantity of family/caregiver involvement. In addition, a large body across a diverse range of contexts show that parental well-being is linked to more responsive and nurturing parenting styles, suggesting that household well-being could also be linked to higher quality family/caregiver involvement (Bryant et al., 2018; Park & Walton-Moss, 2012; Tan et al., 2012; Weinraub & Wolf, 1983). In order to be effective, informational materials must be in a language that families/caregivers understand and should focus on low-tech, simple strategies.

Path 2. Informational materials may increase household mental health.

Rationale:
Some informational materials may target student mental health, either directly by providing caregiving techniques, or indirectly by targeting the caregivers' mental health through tips for stress management and self-care. Indeed, extensive research suggests that caregiver mental health can impact child mental health (Fitzsimons et al., 2017; Leinonen et al., 2003; Smith, 2004). UNRWA's parent guide includes tips for coping with one's own stress and for helping children cope with theirs in emergency situations (UNRWA, 2018). Other informational materials may indirectly impact student mental health by providing information about COVID-19 or safety tips for avoiding the virus. Early in the pandemic, for instance, Aprendo en Casa and the Ministry of Education focused on disseminating important public health information through tools such as radio, TV and the internet. To the extent that parent and child stress stems from the fear or anxiety about the virus, this information could plausibly increase student mental health. However, informational materials are light interventions, and expectations about their impact on mental health should be tempered.

Path 3. Check-in strategies may increase the quality of educators' communication[5] with households.

Rationale:
The design and implementation (e.g., educator training, see Path 0) of check-in strategies will influence the quality of communication during check-ins. A number of studies from various (albeit mostly Western) contexts suggest that implementation has an important impact on the quality of family/caregiver-facing interventions (Forgatch et al., 2013; Nicholson et al., 2010;Ogden et al., 2006). Program designs may vary in the extent to which they target important dimensions of process and structural quality. Even if the program design takes various dimensions of communication quality into account, the actual quality of communication will still depend on how closely facilitators stick to the model (i.e., fidelity of implementation). An interviewee who works closely with early-childhood home visits and helped develop the above definition of quality advised us that the relational dimensions of quality (i.e., emotional climate, relationship with the family, and responsiveness) should be considered pivotal to the success of the strategy. We therefore advise that practitioners make sure to target these dimensions in the design and implementation of these strategies.

Path 4. Educators' communication with the household may increase family/caregiver involvement in student learning.

Rationale:
The quality of communication with households will impact the extent and quality of family involvement in student learning (Raikes et al., 2006). A meta-analysis of the effectiveness of home-visiting interventions – which have similar models to distance check-ins – found that they tended to have positive impacts on mother-child interactions in low-income contexts in the U.S., and that these effects grew more pronounced as quantity increased (Nievar et al., 2010). High-quality check-ins may improve family/caregiver involvement by increasing families' sense of efficacy around providing academic support, or by promoting their adoption of specific academic support strategies (Hoover-Dempsey et al., 2001). While a full review is beyond the scope of this resource, the logic underpinning many of these links is based in principles of adult-learning (Adult Learning Theory, n.d.). Research suggests that families/caregivers will be more likely to buy into and adopt strategies provided by facilitators when facilitators are responsive to families' needs and dignity: that is, when families/caregivers are granted agency, shown respect, and treated as an expert in their own needs and interests (Roggman et al., 2016). Furthermore, responsiveness is also likely to boost self-efficacy, particularly during times of crisis (Hobfoll et al., 2007).

5 We use here the term "educator" to refer to the individual responsible for conducting the household check-in. As discussed in the rationale for path 0, this could either be a teacher or community members depending on local and sub-national resources and constraints.

Path 5.

Educator-household communication may increase household mental health.

Rationale:

Many home-visiting interventions are based on the expectation that providing social support to families/caregivers will improve their ability to cope with stressors and therefore improve their mental health (Unger & Powell, 1980). Studies from Sweden and the U.S. have shown that social support is associated with lower parental stress and more responsive parenting, which should improve student mental health (Crnic & Greenberg, 1987; McLoyd, 1990; Östberg & Hagekull, 2010). However, the research on home-visits suggests that the ability of these interventions to promote family members' mental health depends on quality (Raikes et al., 2006). In the present context, high-quality communication might facilitate caregivers' uptake of positive adaptive coping strategies, thereby increasing their mental health and, indirectly, the mental health of the child. Furthermore, although we know of no research linking the quantity of such communication to child or caregiver mental health, more consistent contact may allow for more relationship building, and ultimately increased trust and social support.

Path 6.

Family/caregiver involvement may improve household mental health – and household mental health may also shape family/ caregiver involvement.

Rationale:

Parent-child interactions are an important driver of children's mental health (Hollenstein et al., 2005; Hudson & Rapee, 2001). Therefore, family/caregiver involvement may influence student mental health. Here, it is likely that the affective and supportive content of these interactions, rather than their specific forms of academic support, are what would be expected to impact student mental health. Importantly, research suggests that warm and supportive parent-child interactions can have positive impacts on child well-being, and parent-child interactions characterized by conflict and negative emotions can have negative impacts (Herman & McHale, 1993; Lahey et al., 1999; Lippold et al., 2016; Liu, 2003). Consequently, increases in the quantity of family/caregiver involvement risk unintended negative consequences when caregiver-child interactions are negative. This highlights the importance of family support interventions prioritizing the promotion of warm and supportive family involvement and caregiver mental health. Conversely, the mental health of caregivers may influence the dosage of quality of family/ caregiver involvement. Numerous studies from Western contexts suggest that poor maternal mental health (e.g., anxiety, depression) is related to more negative parent-child interactions (Edhborg, Lundh, Seimyr, & Widstrom, 2003; Field, 1984; Williams, Kertz, Schrock, & Woodruff-Borden, 2012).

Path 7.

Family/caregiver involvement may increase student-level drivers of learning. In addition, student engagement may feed back onto family/caregiver involvement.

Rationale:

Family/caregiver Involvement <-> student engagement:

As families/caregivers become more involved in their children's education, children will on average become more behaviorally engaged. For example, studies in the U.S. have found that parent involvement in homework increases task completion and time on task (Callahan et al., 1998; Fehrmann et al., 2015). Children may also be more cognitively and affectively engaged, but that may depend on the nature of involvement (see Assumptions). Conversely, students who are highly engaged may elicit more involvement from their families/caregivers. However, it might also be the case that families/caregivers feel less need to be involved when students are already highly engaged, such that high student engagement is associated with lower family/caregiver involvement.

Family/caregiver involvement -> self-efficacy:

Certain forms of academic support (i.e., encouragement, structure, helping, monitoring) provided by caregivers may increase students' self-efficacy when high quality. Research has demonstrated a positive link between family/caregiver involvement and student self-efficacy (Fan & Williams, 2009). In providing structure or help on schoolwork, caregivers may promote students' sense of mastery and, with it, their self-efficacy (Schunk, 1990). Similarly, through monitoring and encouragement, families/caregivers can help children recognize and celebrate their progress towards learning goals, which will also boost self-efficacy (Butler & Winne, 1995). However, once again, the extent to which caregivers' involvement supports children's self-efficacy depends on the child-caregiver interactions being supportive and affectively positive (Fan et al., 2011).

Family/caregiver involvement -> self-regulated learning:

Certain forms of academic support provided by caregivers may also increase aspects of self-regulated learning, including metacognitive awareness and behavioral self-regulation. A number of studies have shown that family/caregiver involvement in education can promote self-regulated learning (Pino-Pasternak et al., 2010; Zhang & Whitebread, 2017). By discussing student's work and providing feedback, caregivers can model metacognition and increase student's metacognitive awareness (Veas et al., 2019). In addition, families/caregivers can promote behavioral self-regulation strategies such as outlining or forward planning (Veas et al., 2019).

Path 8. Household mental health may promote student-level drivers of learning, particularly cognitive and affective engagement. In addition, self-efficacy may feedback onto household mental health.

Rationale:

Household mental health -> student engagement:

A number of studies suggest that supportive and positive classroom and home environments promote student engagement (Finn & Zimmer, 2012). Family stress has been shown to negatively predict and teacher support has been shown to positively predict cognitive and academic involvement in African-American adolescents (Simons & Steele, 2020; Tucker et al., 2002). In addition, a study of primary children in Finland found that social support and stress impacted cognitive and affective engagement (Ursin et al., 2020). Finally, at least one study in the U.S. has shown that students' positive emotions are linked to increased engagement (Reschly et al., 2008).

Household mental health <-> self-efficacy:

There is some evidence suggesting that household mental health (as we have defined it here) may be a driver of self-efficacy. Research on the influence of the home environment, for instance, suggests that perceived social support from caregivers may bolster self-efficacy (Schunk & Pajares, 2002). In addition, research on the sources of academic self-efficacy in undergraduates in Turkey and the U.S., as well as French primary students, suggests that stress and anxiety may reduce self-efficacy (Joet et al., 2011; Solberg et al., 1998; Uzun & Karatas, 2020; Yesilyurt, 2014; Zajacova et al., 2005). We view this evidence largely as suggestive. The literature on the opposite path—self-efficacy's impact on mental health—is clearer, as a number of studies find that greater self-efficacy can lead to improved mental health including among minority adolescents in the U.S., undergraduates in Malaysia and the U.S., and adults in the U.S (Bandura et al., 2003; Dupéré et al., 2012; Karademas, 2006; Rocchino et al., 2017; Soysa & Wilcomb, 2015; Yusoff, 2012).

Paths 9 & 10. Student-level drivers of learning will impact holistic learning (and learning loss) and future enrollment/drop-out.

Rationale:

Student engagement:

Meta-analytic evidence from studies across the globe provide evidence that student engagement is tied to higher achievement and learning (Lei et al., 2018). In addition, a review of the international literature on student engagement and achievement cites evidence for each of the three engagement types (behavioral, affective and cognitive) having unique positive impacts (Finn & Zimmer, 2012). Regarding the impact on future enrollment/drop-out, several studies on U.S. and Canadian secondary students have found that student engagement is correlated with lower drop-out (Archambault et al., 2009; Fall & Roberts, 2012). However, the link between student engagement and enrollment/drop-out in primary students from low- and middle-income countries is less clear.

Self-efficacy:

A substantial body of evidence over a diverse range of contexts suggests that self-efficacy (sometimes referred to as confidence) is an influential driver of student learning (OECD, 2019; Richardson et al., 2012; Stankov, 2013; Stankov et al., 2014). This has led some scholars to refer to it as the strongest non-cognitive (i.e,. separate of skills, knowledge or prior performance) predictor of academic achievement. Furthermore, student motivation – of which self-efficacy is a crucial component – is particularly crucial to effective education under a self-learning paradigm (UNRWA, 2018). Consequently, we advise prioritizing supports for self-efficacy in distance education interventions. Self-efficacy has also been found to be associated with lower drop-out rates in samples of German adolescents, Luxembourgian undergrads, and U.S. undergrads (Bean & Eaton, 2001; Cambridge-Williams et al., 2013; Meyers et al., 2013; Pössel et al., 2005).

Self-regulated learning:

Meta-analytic evidence has found that meta-cognitive awareness predicts academic achievement in Canadian and U.S. primary and secondary students (Dent & Koenka, 2016). In addition, numerous studies have found that cognitive and behavioral aspects of self-regulated learning predict achievement (Paris & Paris, 2010; Zimmerman, 2010; Zimmerman & Bandura, 1994). As it relates to distance education interventions specifically, a large meta-analysis of online learning programs in the U.S. found that the programs with the greatest positive impact tended to be those that attempted to elicit metacognitive awareness (e.g., self-monitoring and self-reflection; Means et al., 2009). The evidence is less clear in terms of the relation between self-regulated learning and drop-outs or enrollment. Self-regulated learning has been identified as a potential protective factor against drop-outs in Native American college students (Patterson et al., 2014, 2016). In addition, one study found that perceived efficacy to self-regulate protected against drop-outs in Italian high school students (Caprara et al., 2008). Finally, self-regulated learning has also been shown to correlate with retention in online courses, suggesting that self-regulated learning may promote behavioral engagement while distance education interventions are ongoing (Lee et al., 2013).

Path 11. Family/caregiver involvement may promote holistic learning (and prevent learning loss).

Rationale:
A meta-analysis of studies conducted in numerous countries (U.S., Mexico, Korea, Egypt, Iceland, Greece, Cambodia, Arabs in Israel) found that parent involvement is associated with higher student achievement (Castro et al., 2015). In addition, a review of U.S. studies on parental involvement in homework—an activity with clear parallels to the parental involvement under distance education paradigms—cites substantial evidence for parental involvement improving student achievement (Hoover-Dempsey et al., 2001). However, both documents indicate that the positive effects of parental involvement depend on the quality of involvement, and moreover that poor quality involvement can have negative effects.

Path 12. Educator-household communication may improve future enrollment/drop-out.

Rationale:
If family check-in strategies include information about how and when to re-enroll in schools, or the importance of re-enrollment, family communication may increase future enrollment and decrease drop-out.

Measurement

Assessing Key Processes and Outcomes in the Distance Education Theories of Change

We have identified tools for measuring each of the constructs in the three ToCs above. Below, we provide guidance on how to choose and adapt these measures for the purposes of assessing and evaluating distance education interventions. We also provide guidance for using the ToCs and measurement section in tandem to guide these decisions. In short, the ToCs should be used to identify key outputs and teacher-, family-, and child-level outcomes to measure; and the measurement section should be used to identify appropriate measurement tools and indicators for doing so. For each output or outcome, we also provide an overview of the available measurement approaches and highlight important factors for practitioners to consider in selecting and adapting the measures. Finally, at the end of this document we provide a table with the names and characteristics of measurement tools broken down by output/outcome. More information on these measures, and in some cases information on how to access the instrument, can be found on the MENAT Measurement Inventory.

Many considerations go into picking the right measure. We recommend that practitioners think through each of these questions listed below when deciding on a measurement strategy (see Tubbs Dolan & Caires, 2020, for a lengthier discussion of these considerations).

Why are You Measuring?

Measures, as well their scoring methods, are often designed for specific purposes: to evaluate a program; to obtain immediate feedback; to screen individuals for services; and to produce population-level data for official purposes. As previously mentioned, the measurement approaches laid out in this document are meant exclusively for monitoring and evaluation of programs.

What are You Measuring?

A key goal of the ToCs is to help practitioners identify short-term outcomes for measurement.[6] The following section provides a step-by-step breakdown for this process (see also a hypothetical scenario of a practitioner going through each of these steps in Exemplar #2, below):

6 The ToCs all assume that learning and/or future enrollment are the primary long-term outcomes.

Step 1: Identify the ToC(s) that best align with the strategies you want to evaluate.

Step 2: Identify the short-term outcomes and pathways that make the most sense for your program. Decisions can be based on:

- The pathways and outcomes that best align with your current or potential future distance education strategies. Remember, the ToCs can be used to identify potential strategies to implement and to identify the appropriate outcomes to evaluate.
- The extent to which the assumptions for each pathway are met in the organizational, economic, social, and cultural contexts in which your distance education strategy is being implemented.
- Other contextual, cultural and logistical issues relating to your intervention context could mean either: i) that a ToC pathway is less likely to manifest as we have described it in your context; or ii) that measuring an outcome would not be feasible in your context.

Exemplar #2: Determining What You are Measuring

Fatima is an M&E specialist working on a distance education intervention in a LMIC country. The distance education intervention disseminates instructional materials to families of primary-aged students via SMS. She wants to use the ToCs to identify outcomes to measure as part of an evaluation of this intervention. She begins by determining which ToCs most align with the program. She decides that ToCs #1 (“Strategies to increase access”) and #2 (“Strategies to improve quality of educational opportunities”) are the most relevant given that the primary goal of the program is increase access to quality learning opportunities. She then attempts to identify short-term outcomes from these ToCs. Starting with ToC #1, access and behavioral engagement stand out as obvious choices. She considers including caregiver expectations and involvement as well, but she doubts that families have the resources to increase their investment (see assumptions for ToC #1, pathways 1 and 2). Fatima then moves to ToC #2. The intervention primarily focuses on improving the quality of educational opportunities through providing materials in the local language, and matching students to materials according to their grade in school. Using ToC #2 as a reference, Fatima first decides to measure the intelligibility of educational opportunities. One purpose of having materials in the local language is to aid students’ understanding of them, but the effectiveness of this strategy remains unclear. Finally, in order to evaluate the efficacy of the leveled materials, Fatima decides to measure the proximity to students’ zone of proximal development and students’ self-efficacy.

How Are You Measuring?

Having identified your key outputs and short-term outcomes of interest, the next step is to decide on the appropriate measures or indicators to capture those outcomes. Indicators are statistics that can be readily observed in or calculated from administrative or descriptive data. The number of hours spent communicating with teachers is an indicator of the quantity of teacher-student communication. Measures, by contrast, refer to specific protocols to tap into psychological and educational concepts (e.g., behavior, attitudes, perceptions, skills) that cannot be readily observed. Scales are the most common form of measurement tools.

Often numerous options will be available for measuring a given outcome. Further, there can be costs and benefits associated with choosing one measure over the other. Below, we review several relevant considerations for making these decisions (see also a hypothetical scenario of a practitioner choosing the method of measurement in Exemplar #3).

Indicators

- Metadata:
  Metadata is collected automatically by program technology (e.g., records of received text messages). Indicators can sometimes be created out of metadata. For instance, the number of text messages could be used as a measure of quantity of teacher-student communication, and number of clicks per minute on a screen could be used as a measure of behavioral engagement.

Measures

- Observational, survey, and performance-based methods:
  Survey methods ask individuals to report on their own or others' thoughts, behavior, emotions or experiences. Surveys tend to be easier and less costly to implement. They are also the appropriate method for capturing mental content and self-perceptions (e.g., self-efficacy). However, surveys are subject to response bias. Observational measures rely on trained researchers and observers' assessment of overt behavior. Observational measures are excellent for capturing outcomes that manifest through observable actions (e.g., student engagement, caregiver-student communication), but are more resource-intensive. Performance-based or direct assessments ask children to demonstrate their skills by completing tasks or activities. Such a method can address the concerns over social desirability and recall bias noted above, and it may be particularly useful for gathering information about skills that are difficult to report on or observe accurately, such as working memory, perspective taking, or self-control. On the other hand, performance-based assessments often require more extensive training to administer, and the resulting data can be complex to process and score. Unfortunately, due to COVID-related constraints and the limited availability of high-quality observational measures, the majority of measurement tools we have identified are survey-based.

- Self- vs. other-report surveys:
  Different reporters can be asked to report on the behavior and functioning of the focal person; caregivers, teachers, and children themselves, for example, can report a child's behavioral regulation skills. We recommend using multiple reporters to measure outcomes whenever possible, as having two measures of the same outcome can protect against measurement error and help improve validity and reliability. However, student self-report measures often diverge significantly from caregiver or teacher reports.

Exemplar #3: Determining How You're Measuring

Fatima is trying to decide how to measure self-efficacy for her evaluation of an SMS-based distance education intervention. She reads through the overview on self-efficacy measures (see below) in order to guide her thinking. The overview explains that measuring student self-efficacy requires self-report. Fatima is concerned about the feasibility of gathering survey data from students under the present circumstances, and decides she needs a measure that is short and can be implemented over SMS. The overview also explains that the identified self-efficacy measurement tools are divided between general and academic self-efficacy. Given the goals of her program, Fatima limits her search to those focused on academic self-efficacy. In the table at the bottom of the document, Fatima finds two measurement tools for capturing academic self-efficacy in primary-aged students. She thinks that one of these tools (the Scholastic Competence subscale of the Self-Perception Profile for Children; Harter, 1988) would be too difficult to implement in her setting, so she decides on the academic self-efficacy subscale of the Self-Efficacy Questionnaire for Children (SEQ-C; Muris, 2001).

How Should You Adapt an Existing Measurement Tool?

The existing measurement tools identified in this document may need to be adapted before use in a particular context, program or learning paradigm. Three types of adaptation should be considered: translation, content, and structure (for a hypothetical scenario of a practitioner adapting existing measures see Exemplar #4):

Translation

The measures identified here are primarily English language. In some cases, versions in Arabic, Turkish, or Spanish are available through the MENAT Measurement Inventory. But translation may be necessary if you cannot find a version of a selected measure in the target language. We recommend using a "forward-and back" translation method as a means of preserving the measure's original meaning. In Step 1, text is translated ("forward") into the target language by native speakers of that language. In Step 2, the text is translated ("back") into the source language (which will usually but not always be English) by native speakers of the source language. In Step 3, the two source language versions of the measurement tool are compared to discern whether the original meaning has been distorted (see Alkasimi, 2020 for a more complete description of this process).

Content Adaptations

Measurement tools will also need to be revised to accurately target the intended phenomenon, setting and cultural context. None of the identified measures were designed with distance education contexts in mind, and many were explicitly designed for traditional classroom contexts. Items referencing traditional classroom contexts (e.g., "while in class/school") can be revised to reference the distance education learning context (e.g., "when working on schoolwork at home"). Existing measures can also be revised to better fit the

cultural norms, values and social circumstances of a program's context. For instance, when adapting a measure for use in a population of Syrian refugee youth in Jordan, Panter-Brick et al. (2017) made the decision to replace "People think that I am fun to be with," with "People like to spend time with me," out of a concern that "fun" was not a relevant concept for their setting. The table below provides some limited guidance for adapting certain scales, but researchers and practitioners should not use these as a substitution for their own careful thinking. Finally, altering the cultural and contextual meaning of a measure is a potential pitfall of translation. Additional steps can be added to a "forward-and back" approach to help deal with this issue (see Alkasimi, 2020).

Structural adaptations

Structural adaptations include dropping items from a measure and altering the organization of items in subscales. Pilot data from distance education programs during COVID-19 suggests that shorter surveys are easier to implement; less resource intensive and costly; and produce more valid data (Angrist et al., 2020; IPA, 2020). Structural adaptations will also sometimes be driven by psychometric considerations, in which case they will occur after data collection. For example, items in an existing scale may not correlate strongly with each other in which case poorly correlated items may need to be dropped to preserve reliability. The structure of multidimensional measures (i.e., measures with subscales) can also vary across contexts, as would be the case when two subscales that were psychometrically distinct in one setting present as a single factor in another. Dropping items pre-data collection can also make sense when certain items clearly do not fit a program's context. Measures designed for school settings, for instance, may contain items that are not easily adaptable to distance education settings.

Exemplar #4: Determining What Adaptations are Needed

In Exemplar #3, Fatima chose the academic self-efficacy subscale of the Self-Efficacy Questionnaire for Children (Muris, 2011) as a measure of self-efficacy. Fatima realizes that this measure requires adaptations before use in her context. First, she implements "forward-and-back" translation of the measure from English into the local language. Second, she enacts several content adaptations. She first revises items to reflect the distance education context (vs. traditional schooling). For example, the item, "How well do you succeed in passing a test?," is changed to, "How well do you succeed in completing your schoolwork?" She then revises items to better reflect the specific tasks students in her program are engaged in. For example, the item "How well do you succeed in passing all subjects?" is replaced with "How well do you succeed in understanding the reading?" Finally, Fatima reduces the number of items to 4 to make it easier to implement over text (i.e., structural adaptation).

Measurement Approaches for Short-Term Outcomes in ToCs #1, #2 and #3

The next sections give an overview of measurement approaches for key outputs and short-term outcomes in ToCs #1, #2 and #3, while also identifying some of the difficulties or confusions that could arise. For some outcomes, we have only identified indicators or measures as potential measurement strategies; for others, we have identified examples of both. The table following these sections provides a list of existing measurement tools (not indicators).

Access

Access is a key short-term outcome for ToC #1 ("Strategies to increase access"). Our definition of access includes two distinct concepts: feasibility to engage in opportunities as determined by infrastructural and technological constraints and awareness of opportunities.

Access is typically measured as a ratio (i.e., an indicator), with the numerator representing the number of households/people receiving (or capable of receiving) program services and the denominator representing the number of households/people the program intends to serve. When measuring access in this way, difficulties can arise around how to define the numerator and, especially, the denominator. The ways you define and count your intended population can affect the calculation and meaning of the indicator. If you are interested in capturing changes to access over time, it is crucial that access is being measured the same way at each time point.

The numerator of an access ratio can be defined in several ways. You can count the number of people/households who have the ability to access program resources or the number who are currently accessing program resources or the number. The ability to participate can be thought of in terms of access to infrastructural or technological prerequisites (i.e., feasibility). In this case, the numerator might be the number of people in your program's intended population that have a cell phone or live near cell towers – in which case access could be calculated as the number of households in your program's population with cell phones divided by the number of households the program intends to serve. The numerator can also be thought of in terms of awareness of the program.

The numerator can also be measured by counting the number of people/households who are already interacting with program resources, as this demonstrates the student or household is aware of and capable of engaging with those opportunities. Metadata (i.e., data collected automatically by program technology) can be used to measure access in this way. However, metadata is most feasible to collect for high-technology strategies. If interactions cannot be recorded automatically, as would likely be the case for many low and no-technology strategies, access can be measured by the total number of resources disseminated. For example, if SMS messages with reading materials are sent to 60% of households in an area, this can be regarded as a measure of access. One problem with this approach is that it may be more difficult to verify receipt of these resources.

Teacher-student and educator-household communication

Teacher-student communication is a key output for ToC #2 (“Strategies to improve quality of educational opportunities”), and educator-household household is a key output for ToC #3 (“Strategies to increase family support for educational opportunities”). At this time, we have not included a measurement tool for the assessing educator-household or teacher-student communication in distance education contexts. Our conceptualization of communication quality is based on a measure currently being developed by our colleagues to capture communication quality in distance education household check-ins for caregivers of young children. Once this tool is finished, we plan to include it in this document, either adapting ourselves or providing guidelines for adaptation. In the meantime, users of this document may consider using existing classroom observation measurement tools, such as TIPPS (Seidman et al., 2017) or TEACH (Molina et al., 2018). Although, such tools were not developed for distance education contexts or for one-on-one interactions, it may be possible to adapt them to capture educator-household and teacher-student communication.

In addition, communication quantity and several components of communication quality can be captured through indicators. The frequency and duration of communications, for example, are suitable indicators of quantity. In general, aspects of structural quality should be easier to assess through indicators than aspects of process quality, including whether contact was made with households, the number of interruptions, the length of communications, the time of communication, and the degree to which the intended topics were covered (i.e., program fidelity).

Task characteristics

Task characteristics are key outputs for ToC #2 (“Strategies to improve quality of educational opportunities”). These two characteristics—intelligibility and proximity to zone of proximal development (ZPD)—are preconditions for learning. For learning to occur, a student must be able to understand the materials and how to use them, and the materials cannot be too difficult or easy. We recommend measuring intelligibility through indicators, such as looking to students’ finished products for evidence of their basic understanding of the task; or through simple survey questions asking students how well they understood the tasks and what was expected of them.

Determining whether a task is too difficult or too easy (i.e., proximity to a ZPD) requires two things. First, you will need some kind of assessment data indicating students’ grade level or past mastery. This can be data you have collected or data you have obtained through student records. Data on the mastery of specific tasks has some benefits over more general grade-level data, as it can be more informative about a students’ capabilities to learn from specific instructional materials. Second, you will need instructional materials that are organized by level (e.g., readers organized by grade) or by requisite skills (e.g., math assignments organized according to skill). With these two elements in place, measuring proximity to ZPD is a matter of determining whether or not (i.e., “Yes or No”) students have the requisite skills or grade level to complete the tasks they are assigned.

Family/caregiver involvement

Family/caregiver involvement is a short-term outcome for ToCs #1 (“Strategies to increase access”), #2 (“Strategies to improve quality of educational opportunities”) and #3 (“Strategies to increase family support for educational opportunities”).

Most existing measures of family/caregiver involvement are designed with the caregivers’ role in traditional schooling contexts in mind. In distance education contexts, the caregiver is far more likely to be the primary adult with whom students interact in the course of learning activities. We sought out measures that capture family/caregiver involvement in homework or, more generally, learning activities taking place in the home. One of the measurement tools we identified was specifically designed to capture parent involvement in virtual schooling.

The measures we identify tap into different aspects of family/caregiver involvement (e.g., helping, monitoring, etc.). We recommend giving preference to measures that best align with the specific family/caregiver involvement behaviors your program targets. We also recommend adapting these measures so that they better capture the behaviors as you would expect them to manifest in your context. Finally, there are multiple caregiver-report and multiple student-report measures for measuring caregiver involvement, which allows for measuring family/caregiver involvement from multiple perspectives.

Family/caregiver expectations

Family/caregiver expectations are a key short-term outcome for ToC #1 (“Strategies to increase access”). Typically, measures of parental expectations have captured parents’ long-term aspirations and expectations for their children’s educational attainment and academic performance (Yamamoto & Holloway, 2010). Distance education strategies may increase both caregivers’ short-term and long-term expectations. Specifically, caregivers may have greater expectations for their students’ academic performance in the present, and greater expectations for their academic attainment in the future, if they have access to quality educational opportunities. We have identified measures of both short-term and long-term family/caregiver expectations.

The definition of ‘expectation’ varies across these measurement tools. Some measures conceive of expectations as an aspiration (i.e., desire) for students’ performance and attainment; others as a realistic prediction for students’ performance and attainment. We recommend practitioners measure family/caregiver expectations in multiple ways unless either short- or long-term expectations are particularly salient for or targeted by the distance education intervention of interest.

Student and caregiver mental health

Student and caregiver mental health are key short-term outcomes for ToC #3 ("Strategies to increase family support for educational opportunities"). We have included measures for both caregiver and student mental health. Although some of these are validated clinical measures, please remember that the measures should not be for diagnosis or clinical evaluation of any sort.

The identified measures cover all three subcomponents of mental health identified in the description of ToC #3: social support, stress and emotional distress. The wording in several of these measures is very general (i.e., without direct reference to specific social or cultural contexts) which may require further adaptation before use.

Student-level drivers of learning

Three student-level drivers of learning are key short-term outcomes for ToCs #1 ("Strategies to increase access"), #2 ("Strategies to improve quality of educational opportunities") and #3 ("Strategies to increase family support for educational opportunities").

- Student engagement:
  We have identified primarily student-report measures of student engagement. These measures touch on different sub-constructs of engagement, making it easier to match measures to specific "types" of student engagement if need be. The Engagement vs. Disaffection with Learning (EvsD; Skinner et al., 2008) scale, which is teacher-report, could potentially be adapted to caregiver report, which would make it possible to capture student engagement from multiple sources. Many of these measures were designed to capture student engagement as it manifests in the classroom. Therefore, it is up to practitioners to adapt the wording of items to fit the distance education context they are working in. In addition to these established measures, behavioral engagement in particular can be captured with metadata that provides evidence of participation in learning opportunities—such as recorded interactions with an app, finished assignments, communications about assignments sent over SMS, sign-ins to online platforms, etc.

- Self-regulated learning:
  The self-regulated learning measures we have identified are all self-report, with the exception of one observational measure specifically for young children. Because our definition of self-regulated learning is akin to certain definitions of cognitive engagement, several measures of self-regulation are referred to as "cognitive engagement" scales. In addition, some of these measures focus specifically on learning processes, where others relate to self-regulation in general. We recommend giving greater consideration to the former.

- Self-efficacy:
  Self-efficacy is a self-perception and can only be measured through self-report. Our self-efficacy measures are divided between those that measure general self-efficacy and those that measure academic self-efficacy. The latter are more appropriate for capturing self-efficacy as we have defined it in our ToCs.

Table 1: Measures to Assess Key Outputs and Outcomes in Distance Education Theories of Change

Student Engagement

Measure	School engagement measure (SEM)- behavioral and affective subscale	School engagement assessment - Valuing of school education subscale	Engagement vs. Disaffection with Learning (EvsD)- emotional engagement and disaffection subscales
Respondent	Student	Student	Student
Psychometric properties	Reliability and validity	Reliability and validity	Reliability and validity
Subcon-struct(s)	Behavioral and affective engagement	Affective engagement	Affective engagement
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	3, 5, 9, 10	3, 5, 9, 10	3, 5, 9, 10
ToC #2	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12
ToC #3	7, 8, 9, 10	7, 8, 9, 10	7, 8, 9, 10
Adaptation Needed?	Items specifically related to classroom context should be adapted or dropped	Items specifically related to classroom context should be adapted or dropped	Items specifically related to classroom context should be adapted or dropped

Student Engagement

Measure	Engagement vs. Disaffection with Learning (EvsD)- emotional engagement and disaffection subscales	Academic Motivation Scale	Motivation and Engagement Scale (MES) – positive thoughts subscale
Respondent	Teacher (could be adapted to caregiver)	Student	Student
Psychometric properties	Reliability and validity	Reliability and validity	Reliability and validity
Subcon-struct(s)	Affective engagement	Cognitive engagement	Cognitive engagement
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	3, 5, 9, 10	3, 5, 9, 10	3, 5, 9, 10
ToC #2	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12
ToC #3	7, 8, 9, 10	7, 8, 9, 10	7, 8, 9, 10
Adaptation Needed?	Items specifically related to classroom context should be adapted or dropped; also needs to be adapted to caregiver report	Items specifically related to class-room and university context should be adapted or dropped; Items should be adapted for target age group	Items specifically related to classroom context should be adapted or dropped

Student Engagement

Self-regulated Learning

Measure	Motivation and Engagement Scale (MES) – negative behavioral subscale	TOOLSEL- inhibitory control and working memory/planning subscales	School engagement measure (SEM)- cognitive engagement subscale
Respondent	Student	Parent/Caregiver	Student
Psychometric properties	Reliability and validity	Reliability, construct validity	Reliability and validity
Subconstruct(s)	Behavioral engagement	Executive functioning, attention	Cognitive and behavioral self-regulated learning
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	3, 5, 9, 10	3, 5, 9, 10	3, 5, 9, 10
ToC #2	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12
ToC #3	7, 8, 9, 10	7, 8, 9, 10	7, 8, 9, 10
Adaptation Needed?	Items specifically related to classroom context should be adapted or dropped	Items specifically related to classroom context should be adapted or dropped	Items specifically related to classroom context should be adapted or dropped

Self-regulated Learning

Measure	School engagement assessment- self-regulated learning, cognitive strategy use and attentiveness	Motivation and Engagement Scale (MES)– positive behaviors subscale	Preschool self-regulation assessment (PSRA)
Respondent	Student	Student	Trained observer
Psychometric properties	Reliability and validity	Reliability and validity	Reliability
Subconstruct(s)	Cognitive and behavioral self-regulated learning	Cognitive and behavioral self-regulated learning	Cognitive and behavioral self-regulated learning
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	3, 5, 9, 10	3, 5, 9, 10	3, 5, 9, 10
ToC #2	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12
ToC #3	7, 8, 9, 10	7, 8, 9, 10	7, 8, 9, 10
Adaptation Needed?	NA	Items specifically related to classroom context should be adapted or dropped	NA

Self-regulated Learning

Measure	The Self-regulation questionnaire	Adolescent Self-Regulatory Inventory (ASRI)	Self-Control Rating Scale (SCRS)
Respondent	Student	Student	NA
Psychometric properties	Reliability	Reliability and Validity	Reliability and validity
Subcon-struct(s)	Cognitive and behavioral self-regulated learning	Cognitive and behavioral self-regulated learning	Behavioral self-regulated learning
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	3, 5, 9, 10	3, 5, 9, 10	3, 5, 9, 10
ToC #2	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12
ToC #3	7, 8, 9, 10	7, 8, 9, 10	7, 8, 9, 10
Adaptation Needed?	Items may need to be adapted to distance education contexts; certain items unrelated to learning may be dropped	Items may need to be adapted to distance education contexts; certain items unrelated to learning may be dropped	NA

Self-efficacy

Measure	General Self-Efficacy Scale (GSE)	New Self Efficacy Scale (NGSE)	Self-Efficacy Questionnaire for Children (SEQ-C) - - Academic self-efficacy subscale
Respondent	Student	Student	Student
Psychometric properties	Reliability and Validity	Reliability and validity	Reliability and validity
Subcon-struct(s)	Overall self-efficacy	Overall self-efficacy	Academic self-efficacy
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	3, 5, 9, 10	3, 5, 9, 10	3, 5, 9, 10
ToC #2	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12
ToC #3	7, 8, 9, 10	7, 8, 9, 10	7, 8, 9, 10
Adaptation Needed?	NA	NA	NA

Self-efficacy

Family/caregiver Involvement

Measure	Self-perception profile for adolescents – Scholastic competence subscale	Self-Perception Profile for Children (SPPC) - Scholastic competence subscale	Home Learning Environment Questionnaire (HLE)
Respondent	Student	Student	Caregiver
Psychometric properties	Reliability and Validity	Reliability and Validity	Reliability and Predictive Validity
Subcon-struct(s)	Academic self-efficacy	Academic self-efficacy	Quantity
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	3, 5, 9, 10	3, 5, 9, 10	2, 4, 5, 8
ToC #2	2, 3, 5, 6, 8, 11, 12	2, 3, 5, 6, 8, 11, 12	8, 10, 11
ToC #3	7, 8, 9, 10	7, 8, 9, 10	2, 4, 5, 8
Adaptation Needed?	Items specifically related to classroom context should be adapted or dropped	Items specifically related to classroom context should be adapted or dropped	Items specifically related to classroom context should be adapted or dropped; If necessary, items need to be adapted to reflect involvement activities that manifest in your context.

Family/caregiver Involvement

Measure	Frequency of parental homework control	Parental involve-ment in homework scale	Parental involvement in students' homework
Respondent	Student	Student	Caregiver
Psychometric properties		Reliability	Reliability
Subcon-struct(s)	Quantity	Helping, monitoring	Helping, monitoring, structure
ToC(s)	1, 2, 3	1, 2, 3	1, 2, 3
Pathways ToC #1	2, 4, 5, 8	2, 4, 5, 8	2, 4, 5, 8
ToC #2	8, 10, 11	8, 10, 11	8, 10, 11
ToC #3	2, 4, 5, 8	2, 4, 5, 8	2, 4, 5, 8
Adaptation Needed?	Can be adapted to capture frequency of any family/ caregiver involvement variable.	If necessary, items need to be adapted to reflect involve-ment activities that manifest in your context.	If necessary, items need to be adapted to reflect involvement activities that manifest in your context.

	Family/caregiver Involvement	Family/caregiver Expectations	
Measure	**Parental Involvement in virtual schooling**	**Immediate performance expectations**	**Realistic attainment expectations**
Respondent	Caregiver	Caregiver	Caregiver
Psychometric properties	Reliability and Validity	NA	NA
Subcon-struct(s)	Encouragement, helping, monitoring, structure	Short-term	Long-term
ToC(s)	1, 2, 3	1	1
Pathways ToC #1	2, 4, 5, 8	1, 4, 6, 7	1, 4, 6, 7
ToC #2	8, 10, 11	NA	NA
ToC #3	2, 4, 5, 8	NA	NA
Adaptation Needed?	If necessary, items need to be adapted to reflect involvement activities that manifest in your context.	Can be adapted to capture parents' immediate expectations for participation (vs. achievement) in one item	May need cultural adaptations

	Family/caregiver Expectations		
Measure	**School behavior expectations**	**Parental aspiration for school attainment**	**Parental expectations for school attainment**
Respondent	Student	Caregiver	Caregiver
Psychometric properties	Reliability	NA	NA
Subcon-struct(s)	Short-term	Long-term	Long-term
ToC(s)	1	1	1
Pathways ToC #1	1, 4, 6, 7	1, 4, 6, 7	1, 4, 6, 7
ToC #2	NA	NA	NA
ToC #3	NA	NA	NA
Adaptation Needed?	Can adapt by replacing behaviors with	May need cultural ad-aptations	May need cultural adaptations

Family/caregiver Expectations			Caregiver Mental Health
Measure	**Parental expectations for school attainment**	**Parental expectations for school performance**	**Parenting Stress Index (PSI)**
Respondent	Caregiver	Caregiver	Caregiver
Psychometric properties	NA	NA	Reliability and Validity
Subconstruct(s)	Long-term	Long-term	Stress
ToC(s)	1	1	3
Pathways ToC #1	1, 4, 6, 7	1, 4, 6, 7	2, 5, 6, 8
ToC #2	NA	NA	NA
ToC #3	NA	NA	NA
Adaptation Needed?	NA	NA	NA

Caregiver Mental Health			Student Mental Health
Measure	**Social support scale**	**The Multidimensional Scale of Perceived Social Support**	**Achenbach Child Behavior Checklist (ACBC)**
Respondent	Caregiver	Caregiver	Caregiver
Psychometric properties	Reliability and Validity	Reliability and Validity	
Subconstruct(s)	Social support	Social support	
ToC(s)	3	3	3
Pathways ToC #1	2, 5, 6, 8	2, 5, 6, 8	2, 5, 6, 8
ToC #2	NA	NA	NA
ToC #3	NA	NA	NA
Adaptation Needed?	May need cultural adaptations	May need cultural adaptations	NA

Student Mental Health

Measure	Youth Self-Report	Strengths and Difficulties Questionnaire	Child PTSD Symptom Scale (CPSS-Sy)
Respondent	Student	Caregiver	Student
Psychometric properties	Reliability and validity	Reliability and validity	Reliability and validity
Subcon-struct(s)	NA	NA	Emotional distress
ToC(s)	3	3	3
Pathways ToC #1	2, 5, 6, 8	2, 5, 6, 8	2, 5, 6, 8
ToC #2	NA	NA	NA
ToC #3	NA	NA	NA
Adaptation Needed?	NA	NA	NA

Student Mental Health

Measure	Center for Epidemiological Studies Depression Scale (CES-D)	Social support scale	KidCOPE
Respondent	Student	Student	Student
Psychometric properties	Reliability and validity	Reliability and validity	Reliability and validity
Subcon-struct(s)	Emotional distress	Social support	Social support and emotional distress
ToC(s)	3	3	3
Pathways ToC #1	2, 5, 6, 8	2, 5, 6, 8	2, 5, 6, 8
ToC #2	NA	NA	NA
ToC #3	NA	NA	NA
Adaptation Needed?	NA	May need cultural adaptations	NA

Student Mental Health

Measure	The Multidimensional Scale of Perceived Social Support	Youth Internal Problems Screener (YIPS)	Child Health and Illness Profile (CHIP) - Emotional comfort and active coping subscales
Respondent	Student	Student	Student
Psychometric properties	Reliability and Validity	Reliability and Validity	Reliability and Validity
Subcon-struct(s)	Social support	Emotional distress	Emotional distress
ToC(s)	3	3	3
Pathways ToC #1	2, 5, 6, 8	2, 5, 6, 8	2, 5, 6, 8
ToC #2	NA	NA	NA
ToC #3	NA	NA	NA
Adaptation Needed?	May need cultural adaptations	May need cultural adaptations	May need cultural adaptations

Student Mental Health

Measure	Child Health and Illness Profile (CHIP) - Family and peer connectedness subscales	Social support scale
Respondent	Student	Student
Psychometric properties	Reliability and Validity	Reliability and validity
Subcon-struct(s)	Social support	Social support
ToC(s)	3	3
Pathways ToC #1	2, 5, 6, 8	2, 5, 6, 8
ToC #2	NA	NA
ToC #3	NA	NA
Adaptation Needed?	Items specifically related to classroom context should be adapted or dropped; May need cultural adaptations	May need cultural adaptations

Educator-household (student or caregiver) Communication Quality and Quantity

Measure	**Teach**	**Teacher Instructional Practices and Processes System (TIPPS)**
Respondent	Trained Observer	Trained Observer
Psychometric properties	Reliability and Validity	Reliability and Validity
Subcon-struct(s)	Quantity and Quality of Communication	Quantity and Quality of Communication
ToC(s)	2, 3	2, 3
Pathways ToC #1	NA	NA
ToC #2	4, 6, 7	4, 6, 7
ToC #3	3, 4, 5	3, 4, 5
Adaptation Needed?	Certain items of subscales may not be suitable to distance education context or to check-ins; Items that could be suitable may need to be adapted	Certain items of subscales may not be suitable to distance education context or to check-ins; Items that could be suitable may need to be adapted

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Appendix A:
Qualitative Interview Protocol

Opening

1. Introduce yourself, thank the interviewee for their participation. Follow this with a brief 1-2 sentence review of our project. Make sure not too reveal too much of what you are trying to get out of the project. Do NOT state what we are looking for.
    a. Ex: "So let me tell you a little about the project. Given the shift to distance education platforms due to COVID, we are trying to get a better understanding of how programs are being adapted - and what success looks like for students in those programs."
2. Invite the interview to give an overview of their program.
    a. Ex: "So before I ask any specific questions about anything I was hoping you could give me an overview of the program and how it works."
3. Ask probing questions to elicit greater detail or to clarify:
    a. Ex 1: "Could you go into a little more detail about [program component]?"
    b. Ex 2: "Is that something that happens regularly?"
    c. Ex 3: "So when you say that X, does that mean Y?"
    d. Ex 4: "Who is in charge of that happening?"

Guided walk through

Explain to the interviewee that you want to do a walkthrough of their program, where you map out the different features of the program, how they work

a. Open up a google doc/virtual whiteboard and share your screen.
b. Work together to create model of the program (see attached template)
c. Make sure to identify all distance education components before going on
d. Throughout the opening, make note (mental or written) of a handful of themes to return to in the later part of the interview.
    i. Ex: "more detail needed on software program"
    ii. Ex: "the role of teacher coaches"
    iii. Ex: "why a certain practice was chosen"

Middle section

In this section, ask more specific questions to ensure that data can be aligned to project goals – the approach will vary depending on data from the opening.

Main themes to cover

a. Access:
    i. What do students need to receive instruction?
b. distance education type:
    i. Face to face? Pure distance or blended?
c. Instructional materials:
    i. What are they?
    ii. How are they expected to work?
    iii. How interactive are they? How is this achieved?
    iv. Do students have opportunity to manipulate the materials?
    v. Synchronous/asynchronous?
d. Teacher factors:
    i. What roles do teachers play in this program?
    ii. Have teachers engaged in training or workshops to transition to distance teaching? What do these trainings look like (length, expectations, etc)?
    iii. What type of planning do teachers engage in?
    iv. Teacher coaching?
e. Assessment:
    i. Is there a monitoring or evaluation component to the program?
    ii. If yes, how is assessment data being conducted?
    iii. How is the information collected being used or planned to be used?
    iv. If no, is there any reason in particular why not?
f. Community building:
    i. What opportunities exist for building a sense of community or for fostering positive relationships, either amongst students or teachers?
    ii. Are these planned out or organic? How are they supposed to work?
g. Student perceptions/experiences
h. Parent roles:
    i. Has your program made any efforts to reach out to parents and get them involved in what you are doing?
    ii. [if asynchronous] Are parents with students as they are working on the materials? Helping them?

Closing

Ask questions that require the interviewee to contextualize their program and their experiences in a more theoretical framework.

a. Ex 1: "you mentioned that you are including "x" component in the program, can you expand on why you think that is important?"
b. Ex 2. What do you expect children to gain from the "x" component?
c. Ex 3: "What's something you wish you could change or add to the program that isn't feasible right now? Why would you want to do that?"
d. Ex 4: "What do you think success would look like for a student in this program?"

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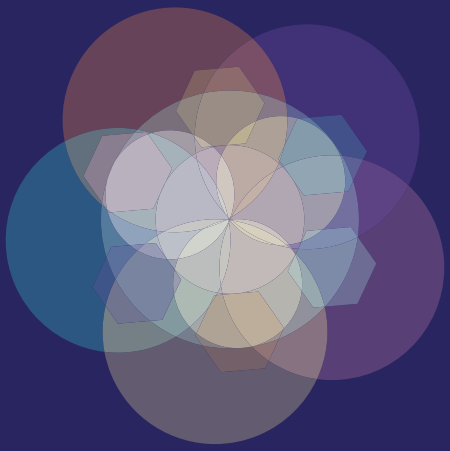

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