Education Value Chain Analysis: A Conceptual Integrated Framework for Learning Loss Recovery and Acceleration

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Abstract: Recognizing the limitations of the existing frameworks and models applied to estimate the learning loss caused by COVID-19 across the world by different studies, and the urgent need for estimating such loss at the different education levels, this paper, employs the Education Value Chain Analysis (EVCA) approach as a new paradigm, attempts to develop and examine a more comprehensive and practical framework that would assist estimating the learning loss, determine its position(s) in the education system and the root causes behind its occurrence. The proposed framework seems to be superior, compared to the existing ones, in estimating learning loss. That would provide sufficient information to help in introducing effective measures and interventions to deal with such loss. For example, the framework would assist in estimating the loss that occurs within the main components of the education system (i.e., Input, process, and outcome). Besides, it helps estimate the loss of different education levels. In addition, the information provided by the framework would help determine the root causes of the learning loss. Hence. provides a checklist of the policy actions, informs the cost-effectiveness of policy interventions, and captures education system efficiency, effectiveness, and quality. Future studies are needed to validate and examine the applicability and usefulness of the proposed framework.

Keywords: Education, Value Chain, Learning Loss, COVID-19

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Introduction

School closures have been a standard tool in the battle against COVID-19. However, their costs and benefits remain insufficiently known. The suspension of face-to-face instruction in schools during the COVID-19 pandemic has led to concerns about consequences for students learning.

Three main approaches or frames are adopted for measuring and tackling learning loss. The psychometric, the commercial, and the economical (see Figure 1). Here, learning loss is defined as predicted cognitive knowledge and skills deficits caused by reduced time in school based on the number of months during which schools are closed and in no in-person education (i.e., Distance –learning). OECD 2020, Kerfeld, M. et.al 2022.

Categories of approaches and frameworks for measuring learning loss	Description
The psychometric	• Here learning loss is framed as predicted skills deficits caused by reduced time in school, which would result in weaker workforce capacity, reduced income for individuals, overall 'human capital' deficiencies for nations, and thereby reduced gross domestic product. • Recommended by OECD and the World Bank
The commercial	• emphasizes the deployment of psychometric tests of the cognitive development of children not in school. • Adopted by international assessment programs: PIRLS, TIMMS, and PISA
The economical	• Here, the tests only measure reading and math, so don't count for anything else we might think of as 'learning'. • This is marketed by the testing companies such as Illuminate, Curriculum Associates, and Renaissance and the consultancy McKinsey and Company

Figure 1: approaches and frameworks for measuring learning loss

The existing approaches and frameworks to estimate learning loss and gaps faced by many critics are summarized as follows:

- Focusing on the $ price rather than the value of education
- looking at learning loss with a very narrow lens – one that's focused on the quantity of learning rather than the quality.
- Ignoring "learning gain"
- Conceptualized from commercial and economic perspectives.
- Concentrate on easy measures (i.e., time (in months) ;
- Ignoring learning social and emotional skills from daily real life
- Not aligned with global competitiveness reports

Aim of the study

Recognizing the limitations of the existing frameworks and models applied to estimate the learning loss and gap caused by COVID-19 and how to recover such loss and gap and to accelerate learning, this paper attempts to develop a framework to help address and tackle the following issues:

- Nature of the learning loss and gap;
- Position (s) of the loss and gap in the education system;
- Root causes behind its occurrence;
- Interventions and actions to recover the loss and gap and to accelerate learning at different education levels;
- Impact of learning interventions & initiatives;
- Implementation plan.

Methods

Study Approach and Concepts: Value-Driven Thinking and Value Creation Process

This study adopted the generally agreed perspective about learning: "Learning is a dynamic process that builds on prior learning, so stagnation leads to growing deficits. Closed schools not only impart less new knowledge but also mean the loss of already acquired skills on which further learning could build" (Oreopoulos and Salvanes, 2011, Kuhfeld et al., 2020). Accordingly, the education system transforms resources (inputs) by carrying out some sort of process (activities) to create educated people or students (outcomes) (see Figure 2).

Figure 2: Value creation process

Main research concepts

Value chain

The central to value-driven thinking and value creation process is a concept called (Value Chain). The value chain is a concept of business management that was first described and popularized by Michael Porter in 1985. According to Porter, a value chain is the full range of activities required to bring a product or service from conception through the intermediary phases of production, delivery to final consumers, and final disposal after use. Porter classified the value-adding activities into two main categories: primary and support activities. The primary activities include inbound logistics, operations, outbound logistics, Marketing, and sales and services. The support activities include procurement, human resource management, Information technology, and infrastructure (i.e., accounting, legal, finance,) (see Figure 3).

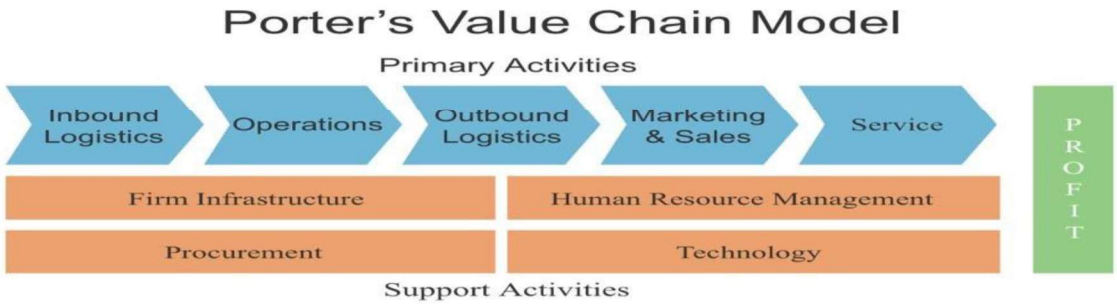

Figure 3: Porter`s Value Chain Model.

Education Value Chain and Value Creation.

Value-driven and value-creation thinking address the education system as a multi-layered construct of various institutions (i.e., chains) that provide education (i.e., create value). The education system starts with kindergartens as the first value chain. Preschool and primary school then continue with secondary education and higher education. Students can enroll in vocational education and training after completing intermediate and secondary school. The student's cumulate competencies (created or added values) (i.e., knowledge, skills, and attitude) while moving from grade to grade within the same level or when transferred to a higher level (Khudair and Abdalla, 2016).

After completing these education processes, the former student regularly enters the labor market and sometimes receives a professional education, either immediately or later. continuing education or "lifelong learning." concept (Kaveh A. and Mya L, 2013). The idea is that learning outcomes are generated and acquired through interconnected and interrelated learning and education operations and activities known as (the value creation process). Figure 4 below illustrates the "lifelong learning" education process as a value-creation process.

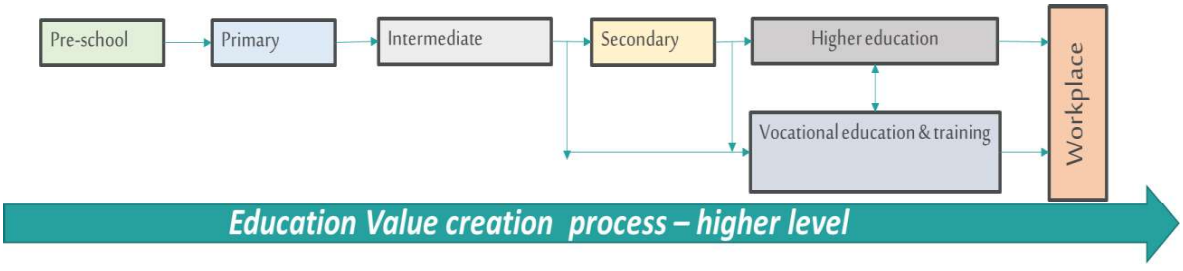

Figure 4: Education value chain.

The Proposed Framework for Learning Loss and Gap Recovery and Acceleration

The framework for learning recovery and acceleration is segmented into a set of operations and activities, (see Figure 5).

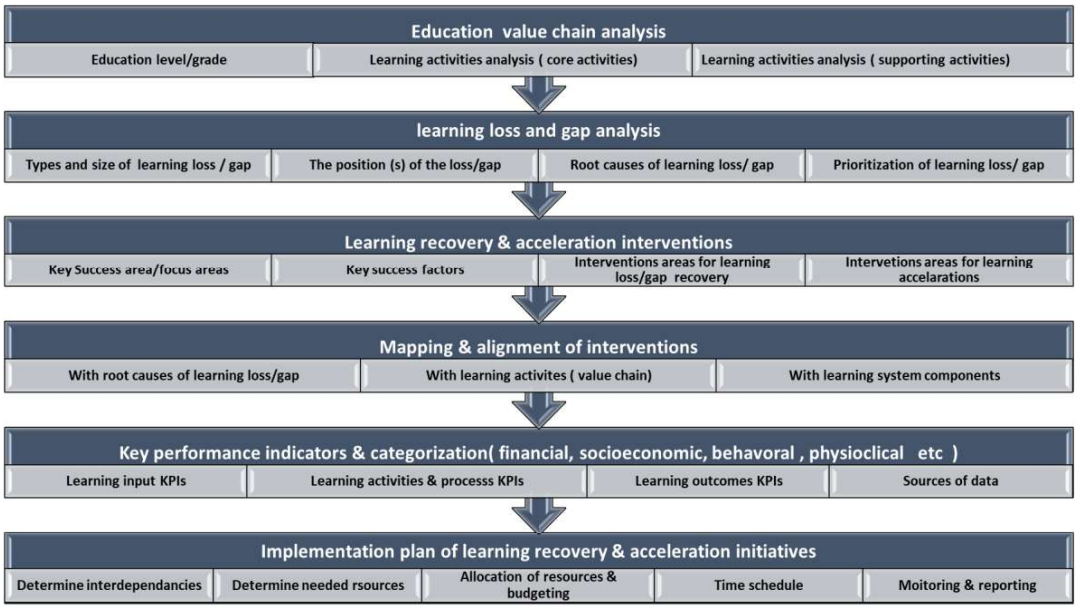

Figure 5: The framework for learning recovery and acceleration steps.

Phases and Components of the Framework

The framework for learning loss and gap recovery and acceleration operations and activities are clustered into four main interrelated and interconnected phases or pillars see Figure 6).

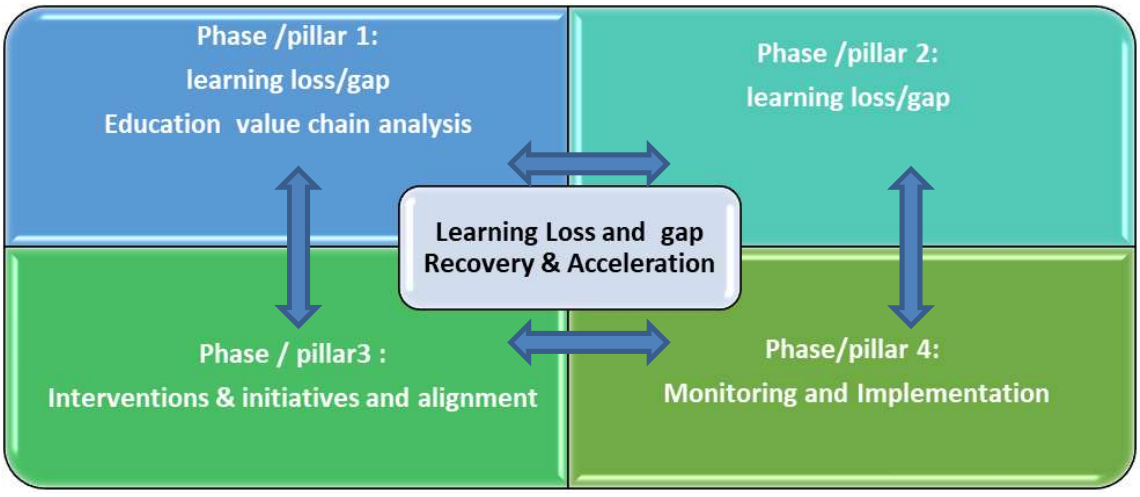

Figure 6: Phases and components of the framework

Phase /pillar 1: Education Value Chain Analysis

This first phase covers the steps of determining the educational level(s) under study, the targeted grade (s), and core and supporting activities of the education value chain and stakeholders (see Figure 7).

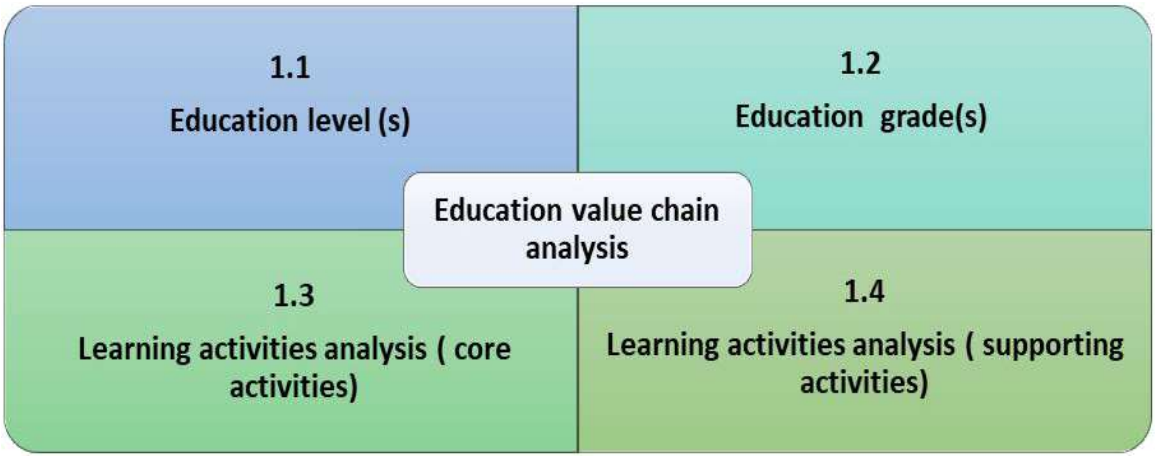

Figure 7: Education value chain analysis.

The education value creation process within each level starts from Curriculum/course development, admission & registration, and material /contents production (upper stream), passing through material distribution/ dissemination and teaching & learning (contents delivery) (middle stream), and finally assessment & evaluation as (downstream). These operations are referred to as core activities (see Figure 8).

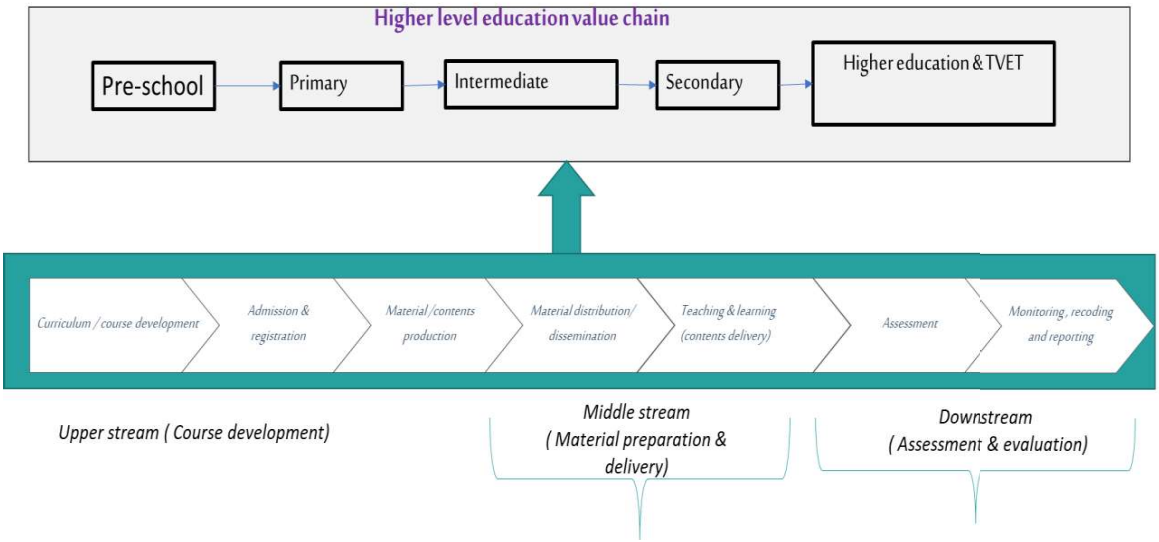

Figure 8: Levels of the education value chain

Adding the support activities including I.T., H.R., and Finance completes the picture of the education value chain (see Figure 9).

The outcome of the first phase of the proposed framework would cover all core and support activities and processes of the education systems at various levels. Hence, shifting the focus from impact and the $ price to the education value creation process.

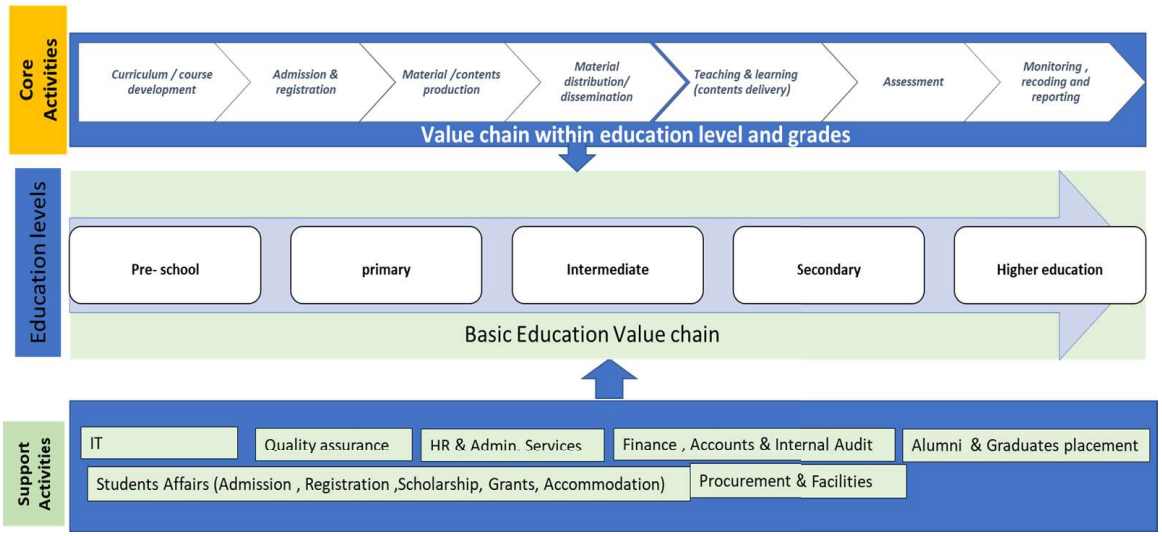

Figure 9: Education Core and Support Activities.

Phase /Pillar 2: Learning Loss and Gap Analysis

Based on the outcomes of phase 1, phase 2 will be devoted to determining the type and size of the learning loss and gap, their position (s) in the learning value chain (i.e., where in K12), and the root causes and stakeholders. Then prioritize the learning loss and gap (see Figure 10).

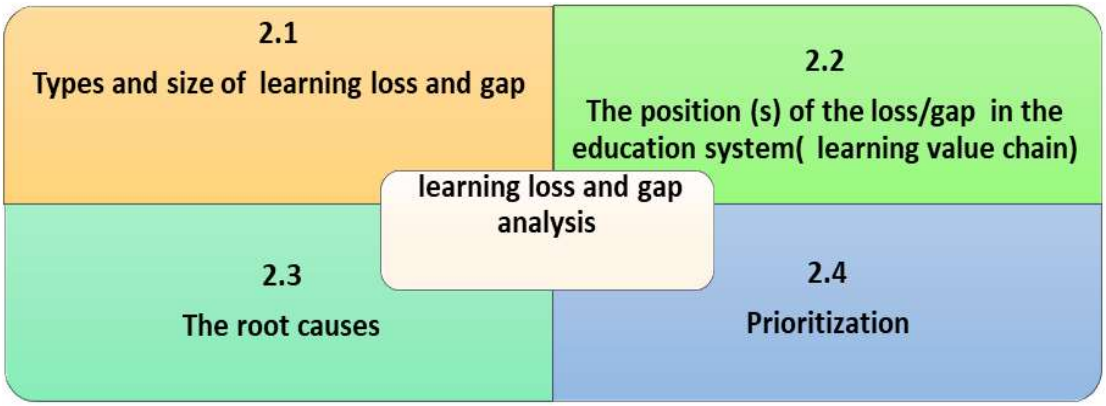

Figure 10: Learning Loss and Gap Analysis.

Having determined the type and size of the learning loss and gap, their position (s) in the learning value chain and the root causes, the outcome of phase 2 of the proposed framework would focus on the quantity as well as the quality of learning rather than on concentrate on easy measures (i.e., time (in months). Determining and prioritizing the root causes of learning loss and gaps would provide sufficient information to help in introducing effective measures and interventions to deal with learning loss and gaps.

Phase/Pillar 3: Interventions Initiatives and Alignment

Based on the outcomes of phases 1 and 2, phase 3 will embark on identifying the focus areas, key success factors, suggested interventions, and initiatives for loss and gap recovery and acceleration. Interventions could be made at different education levels with different stakeholders' needs and expectations (see Figure 11). The interventions for learning recovery might be in the form of remedial, catch-up, accelerated, or bridging programs.

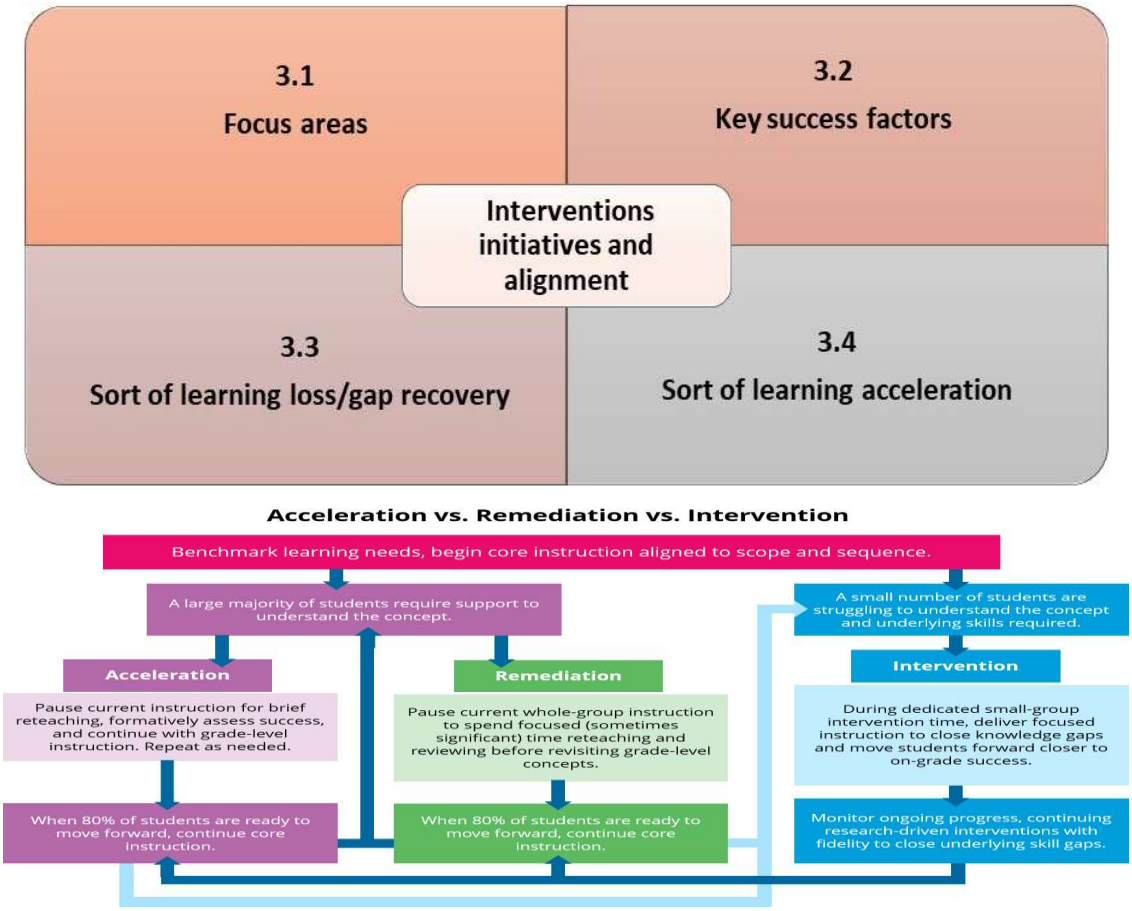

Figure 11: Interventions and initiatives alignment development process.

Having identified the focus areas, key success factors, suggested interventions, and initiatives for loss and gap recovery and acceleration, phase 3 of the proposed framework would provide a checklist of the policy actions, informs the cost-effectiveness of policy interventions, and captures education system efficiency, effectiveness, and quality.

Phase/Pillar 4: Monitoring and Implementation

Finally, phase 4 will embark on developing the implementation plan and the monitoring system. The

development of the plan will start with developing the key performance indicators (KPIs) and identifying the interdependencies between and among the suggested interventions and initiatives. Then determine the resources needed and allocate them to ensure the implementation of the suggested interventions and initiate appropriately. In addition, the schedule for carrying out the task will be constructed. Appropriate monitoring & reporting is needed to provide the necessary information for follow-up and feedback (see Figure 12).

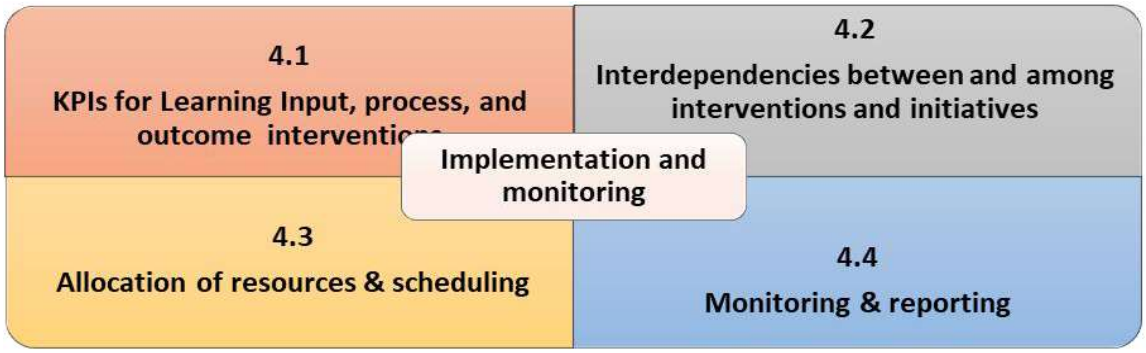

Figure 12: Components of the implementation and monitoring plan.

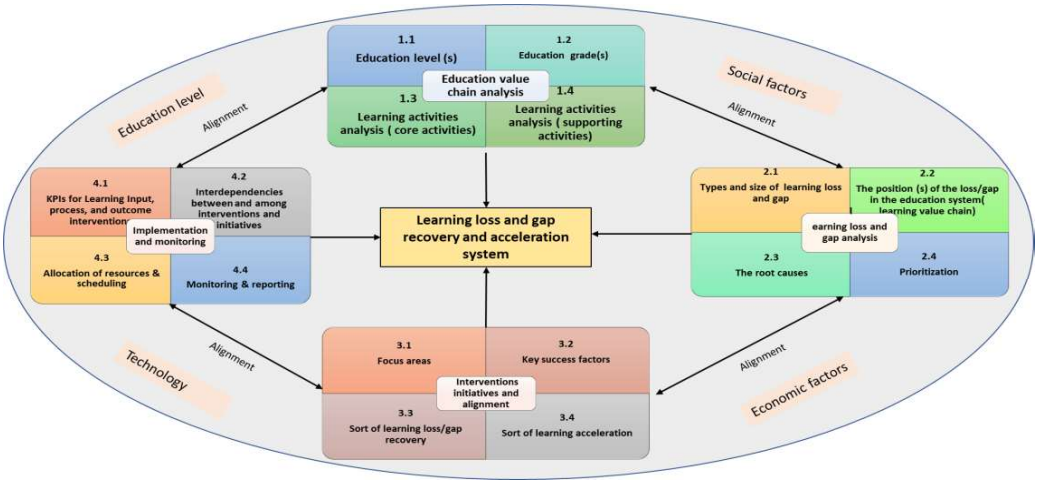

Figure 13: The Integrated Framework for Learning Loss Gap Recovery and Acceleration Put into Context.

The outcome of phase 4, would be commercial and economic perspectives in nature and provides a checklist of the policy actions, informs the cost-effectiveness of policy interventions, and captures education system efficiency, effectiveness, and quality.

Figure 13 illustrated the Integrated Framework for Learning Loss Gap Recovery and Acceleration pillars put into context to reflect the surrounding factors and alignment.

Discussion and Implications

Mapping the pillars of the proposed framework with the limitations of the existing approaches and frames to

estimate learning loss and gap, reveals that the proposed framework helps overcome and tackle all the limitations to different degrees. Pillar 3 (Interventions initiatives and alignment) contributes to overcoming 5 out of 7 limitations (i.e.,70%), followed by pillar 2 (learning loss and gap analysis) which contributes to 3 of the limitations (see figure 14).

Limitations of the existing frameworks and approaches to estimate learning loss and gap		Pillars of the proposed framework			
Code	Description	P1 : Education value chain analysis	P2:learning loss and gap analysis	P3: Interventions initiatives and alignment	P4: Implementation and monitoring
L 1	Focusing on the $ price rather than the value of education	■		■	
L 2	looking at learning loss with very narrow a lens – one that's focused on the quantity of learning rather than the quality		■	■	
L 3	Not helping determine the root causes of learning loss		■		■
L 4	Conceptualized from commercial and economic perspectives			■	
L 5	Concentrate on easy measures (i.e., time (in months		■		■
L 6	Ignoring learning social and emotional skills from daily real life			■	
L 7	Not aligned with global competitiveness reports	■		■	

Figure 14: Mapping the pillars of the proposed framework with the limitation of the existing approaches to estimate learning loss and gap.

The practical and theoretical implications and insights discussed in this section stem from the study's outcome (the proposed framework) and its construction.

Practical Implications

The superiority of the framework compared with the existing ones arise due to the following facts:

- Covers all components and sub-systems of education.
- Helps estimate the individual and group learning loss and the gap at different levels and from different perspectives.
- It helps to estimate the cumulative learning loss and gap across time.
- More accurately reflect the quality of the whole education system.
- Determine the root causes of learning loss and gap and their significance.
- Helps capture socioemotional skills and attitudes.
- Provides a checklist of the policy actions.
- Inform the cost-effectiveness and quality of policy interventions.
- Facilitate cost-benefit analysis.
- Helps impact assessments of specific programs.
- Provide information for all types of national and international assessment and competitiveness reports.

If data is available, the proposed framework can be applied and provides information at the various levels of education (i.e., at the student, grade, school, region, national and country levels) (see Figure 14).

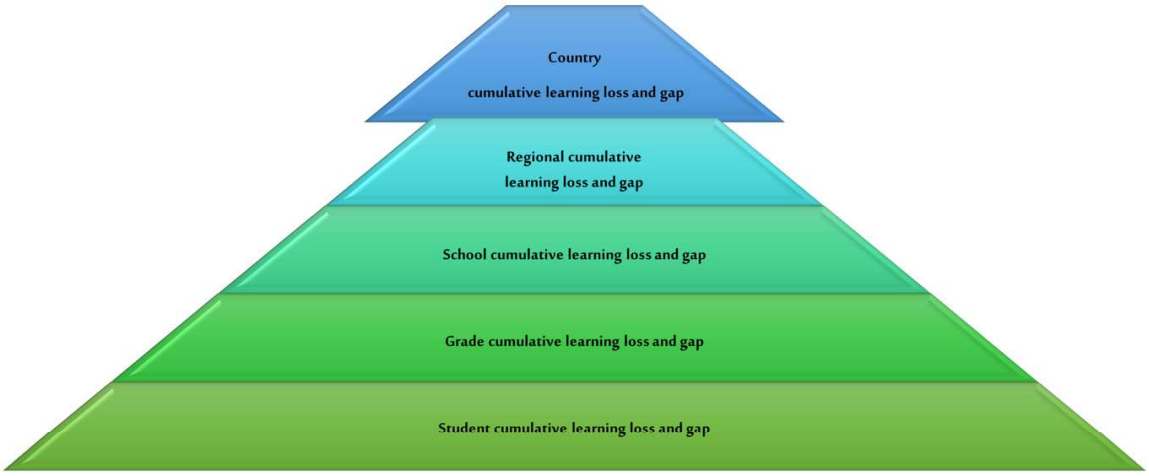

Figure 15: Cumulative learning loss and gap

Theoretical Implications

It is important to understand the framework proposed by this study as a synthesis of conceptual and theoretical frameworks from the outset. The four pillars or phases that make up the framework serve as representations of the conceptual framework. On the other hand, the concepts, principles, and theories drawn from literature and overall trends comprise the theoretical side of the framework. It assists in highlighting the interdependence and even interconnectedness of the different parts. The development of the proposed framework is a dynamic, sense-making process that takes many different shapes and occurs in a non-linear stage. So, it may function in a variety of situations. The study's value-driven approach allowed system components (such as input, processes, and output) to be seen as stages in the creation of value.

The study utilized the general contextual conceptualization (context inside the context). We were able to combine business and education theories and concepts and construct such a complete framework because of the interdisciplinary approach used in this study. The framework's comprehensiveness of its features and parts, as well as how they interact, offers insightful and novel viewpoints that could serve as a new paradigm for future research.

When dealing with learning loss and acceleration, the EVCA approach and perspectives would help develop and implement education strategies and policies that ensure efficient and effective use of the available resources. The degree of interchange, interaction, and interdependence between the components of the EVC should be carefully understood when developing education strategies and policies.

Conclusion and Further Research

The proposed framework is superior, compared to the existing ones, in developing learning loss and gap recovery and acceleration programs. That would provide sufficient information to help in introducing effective measures and interventions to deal with learning loss and gaps. The framework would assist in determining the position of the learning loss and gap that occurs within the main components of the education system (i.e., Input, process, and outcome) and at different education levels. Therefore, the information provided by the framework would help determine the root causes of the learning loss and gap. Hence. provides a checklist of the policy actions, informs the cost-effectiveness of policy interventions, and captures education system efficiency, effectiveness, and quality.

In terms of methodology, the "Value-driven Thinking" approach combined with interdisciplinary viewpoints demonstrated its value in creating a suitable framework for learning recovery and acceleration programs. According to the methodology used in this study, recovery, and acceleration programs are seen as a system with numerous factors that are interconnected, interrelated, and changing over time and geographically. As a result, different study fields can use this methodology and approach. Therefore, the method used to define and address the research problem lends credence to those who favor an interdisciplinary research approach.

Additionally, we can say that the methodology used in this study is distinctive in that it enabled us to define an issue from a real-world setting rather than a hypothetical one. The framework focuses on the simultaneous consideration of theories and concepts from several disciplines and fields of knowledge. To evaluate these underlying assumptions and the applicability of the framework in a practical setting, additional and future research is required.

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