Blended Learning through Flipped Classrooms in the CAREC Region- Designing a Data-Driven Flipped Classroom Program

1. Background & Rationale

Learning poverty is an alarming issue developing countries face in many parts of the world. Many low-and middle-income countries faced a learning crisis even before COVID-19 hit: 53% of their children suffered from learning poverty, meaning they couldn't read and understand a simple passage by age 10. After the pandemic caused a crisis within a crisis: 1.6 billion children saw their schools closed, and the most disadvantaged children suffered the biggest learning losses from school closures and economic shocks (World Bank, 2020).

Recent technological developments are considered viable solutions to close the widespread learning gaps worldwide. Industry 4.0, the fourth industrial revolution, integrates advanced technologies such as artificial intelligence, internet of things, 3D printing, advanced robotics AR/VR Systems, services sectors, trade and finance sector. In line with industry 4.0, education revolution is also taking place, where learning is changing entirely. Education 4.0 is a new experience-based education system that uses digital technologies instead of the rote-based system and responds to the needs of the new world through personalised education (Costley, 2021).

Many studies have demonstrated the benefits of incorporating technology into classroom instruction. Technology can be used to help students engage in critical thinking and problem-solving by creating meaningful projects. Likewise, it can be used to redesign and restructure to create a learning environment that encourages the development of higher-order thinking skills in the classroom (Kurt, 2010). Technology fosters greater student collaboration, which is a highly effective learning tool. Students collaborate to create projects or to learn from one another by reading the work of their peers (Keser, Huseyin, & Ozdamli, 2011).

Technology positively impacts student learning, providing meaningful learning experiences, hands-on learning opportunities, and opportunities to collaborate with peers. Technology is a powerful tool for students to learn. It can transform the classroom into an interactive learning environment, deepen engagement in meaningful and intellectually authentic curriculum, and enhance the participation of English language learners and children with disabilities. Teachers should model the use of technology to support the curriculum so that children can see the appropriate use of technology and benefit from exposure to more advanced applications (DePasquale, McNamara, & Murphy, 2003).

There are many ways through which education technologies may be integrated into routine classroom learning activities. Blended learning is a commonly used technique that has a promising impact on student learning levels. Blended learning is "the thoughtful integration of classroom face-to-face learning experiences with online learning experiences." It comes in many forms and can be personalized to each individual.

2. Flipped Classroom Model

The flipped classroom is a favourite among teachers and students and appears to be the direction education will take. Because it uses online and offline learning, two opposite ends of the spectrum, to great effect (Raouna 2022). In a flipped classroom, students watch recorded or online lectures as pre-classwork before participating in discussions, peer teaching, presentations, projects, problem-solving, computations, and group activities during the actual class period. In other words, this method "flips" the typical content presentation, in which lectures and example problems are covered in class, and problem sets, or group projects are assigned for homework (see Roehling, 2018 for details). A thorough meta-analysis of 317 studies regarding the impact of flipped pedagogies on learning by Roehling and Bredow (2021) reveals that Flipped learning positively impacts foundational knowledge, higher-order thinking, and professional and academic skills and is superior to lecture-based learning for fostering all intra-interpersonal outcomes.

Although the beneficial impact of education technologies and flipped classrooms is a widely accepted fact, its application is highly context specific. The socio-economic landscape of the countries has an immense role in determining the application, adaptability, acceptance and performance of technology-assisted learning tools. For instance, the evidence generated during Covid-19 suggests that many education systems fell short of their goal to ensure the continuity of learning due to the digital divide that kept many without access to any remote learning opportunities. Only 25 percent of low-income countries participating in a global study indicated they planned to offer equitable access to remote learning for marginalized communities. Furthermore, recent evidence indicates an “absolute reduction in learning levels”, emphasizing that the effectiveness of these strategies(technology-assisted tools) has been limited and that vulnerable groups tend to be disproportionately disadvantaged(World Bank 2022).

Henceforth, country and region-specific blended learning modules are required that incorporate all the region-specific dynamics while integrating technology into the business-as-usual schools. Against the above backdrop, this study is designed primarily to provide a region-specific blended learning module that aims to improve the quality of education through flipped classrooms. We plan to conduct the study in four CAREC countries offering blended/flipped classrooms to enhance student learning. The 11 members of CAREC are Afghanistan, Azerbaijan, the People’s Republic of China, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. All countries except China have a very grim landscape of education in terms of technology. The learning gap has been amplified in these countries due to wide-ranging disparities in schools’ systems and students' socioeconomic status. Therefore, knowing which blended learning program outperforms in promoting learning for all children is essential.

3. Objectives:

The overall objective of this study is to develop a blended/flipped classroom model for widening access to quality education and learning in the selected CAREC countries by integrating affordable digital technologies.

4. Scope of the Study:

To achieve this objective, the scope of the study will comprise the following:

A Review of What has been Done in the Developed and Developing World

i) To conduct a comprehensive desk review of the evidence on blended learning practices and their impact on the learning levels of students in the developed world
   - This review will guide study instruments and the design of the blended learning/flipped classroom program.

ii) To collect evidence on the blended learning practices and their impact on the learning levels of students in the developing world
   - This review will help us modify study instruments and blended/flipped classroom modules as per the dynamics of the poor countries

Collecting Data on What can be Done in the CAREC Region

i) To determine the feasibility and potential (Performance) of different blended learning/flipped classroom modalities

ii) To determine the factors required for the deployment of different blended learning/flipped classroom modalities

iii) To determine the adaptability and constraints in the adoption of different blended learning/flipped classroom modalities

Policy Recommendations and Proposal of Blended/flipped classroom Program for the CAREC Region

i) To recommend a sound set of policies for integrating Education technology for learning in the CAREC region

ii) To propose a feasible blended/flipped classroom program for the CAREC region to enhance learning levels and quality of education based on study recommendations.

(i) Recommendations on Set of Policies for Integrating Education Technology:

The most important details in this text are the policy suggestions for implementing a flipped classroom model in the CAREC region. The suggestions will naturally arise after the quantitative analysis of the data but these may include investing in infrastructure, providing financial support to students from disadvantaged backgrounds, developing teacher training programs, promoting collaboration among educational institutes in the region, encouraging innovation, and ensuring quality assurance. Investing in infrastructure, providing financial support to students from disadvantaged backgrounds, developing teacher training programs, promoting collaboration among universities in the region, encouraging innovation, and establishing quality assurance mechanisms are all necessary to ensure that the flipped classroom model is implemented effectively and produces desired learning outcomes.

(ii) Proposal for a feasible blended/flipped classroom program for the CAREC region

CAREC region faces challenges such as low access to quality education, high dropout rates, and inadequate infrastructure. To implement a flipped classroom model, it is important to understand the context of the region, identify the target group, and design the model. The proposed flipped classroom model will essentially depict the following features:

a) **The Target Group:** Flipped classroom model is particularly effective in higher education. The study will identify the target group for effective flipped classrooms.
b) **The Model:** The flipped classroom model encourages students to learn by doing, allowing them to collaborate, ask questions, and get feedback. The design will identify the modalities to enhance the interactive learning experience for students.
c) **Resource Development:** A flipped classroom model requires resources such as recorded lectures, online platforms for communication and collaboration, classroom activities, and assignments that require students to apply their learning. The program will assess and identify the availability and access to these resources by the students and teachers in the CAREC region. The insights on the personallised v/s online available resources will be incorporated into the program.
d) **Learning Management Digital Platform:** The program will propose a list of suitable platforms that can be considered in the deployment of the resources as well as the strengths and features of the various platforms.
e) **Learning equipment:** The program will propose a list of equipment needed to deploy and maintain the learning solution based on the proposed implementation model. The list will consider the lack of internet connectivity and available IT support to maintain the IT equipment. Equipment that may be considered include laptops, projectors, mobile phones for internet connectivity etc.
f) **Teachers and Students Training:** Teachers and students need training to make the most of the flipped classroom model. Data and feedback from teachers and students will be collected to evaluate its effectiveness and incorporated into the proposed design.
g) **Scaling up:** The possibilities for scaling up the flipped classroom model to all educational institutes in the CAREC region will be discussed.

5. Methodology and Discussion

i) Data Collection Method:

The data will be collected through structured questionnaires. Separate questionnaires will be prepared for students (i.e Grades 9 and 10 or lower classes in consultation with project coordinator), teachers, and school administration. The sample will be divided into boys and girls to capture the gender dynamics in access to technology.

ii) Focus Group Discussion (FGD):

We propose FGDs to be administered on the stakeholders who can influence the sustainability of the education system. The stakeholders will be decided based on desk review. We, however, propose the followings sets of representatives from the five CAREC member countries for FGD:

a) Members from the ministries of education and Members from district education authorities (Two from each country)

b) School principals from public and private schools for local perspective (Two from each country)

d) Civil society members and parents whose kids are in school (Three from each country)

The insights from the quantitative data analysis will be discussed in these FGDs (virtual dialogue) and the opinion and support will be gathered for final policy suggestions.

iii) Policy Dialogue

Considering the crucial role of STI and how it contributes effectively to the increase of scientific knowledge and technological innovation, poverty mitigation and promotion of growth and accelerated economic development, it is important to have a policy dialogue to support the transfer and deployment of cost-effective technologies that address key development challenges facing CAREC Region. During this Policy Dialogues, best practices from other countries in terms of blended learning through flipped classrooms would be explore and discuss. This involves learning about the best practices and lessons learn from other countries, programmes and/or other initiatives. The Policy Dialogue would also help in identifying appropriate technological solutions for blended learning, coordinate, integrate and collaborate with interested parties at national, regional, and international levels for an optimal use of available technological solutions.

The Policy Dialogue is expected to assess the needs, determine the gaps, and enact relevant policies and engage different public and private sector stakeholders in CAREC Region to discuss policy and programmatic interventions that may lead to a pipeline of practical STI technological solutions on blended learning to be deployed including national technology and regional transfer/deployment initiatives. Furthermore, the Policy Dialogue will also support the implementation of the identified policy priorities, while ensuring a sound basis for the next step in terms of developing and implementing programs for technology deployment for the achievement of national development objectives on blended learning. The suitability of the various tools and innovative approaches for blended learning may also be determined to support the CAREC member countries based on their needs and priorities.

6. Key Deliverable & Milestones:

1) Project Report incorporating the following:

-Desktop Research findings,

- Survey Questionnaire

- Quantitative Survey Analysis
- Qualitative findings
- Policy Suggestions and Recommendations
- Proposal for a blended/flipped classroom program for the CAREC region

2) Conducting a virtual dialogue with at least 4 CAREC/IsDB member countries to:

- Share findings of the report
- Validate suggestions and recommendations
- Seek support on the proposed regional program

3) Finalize Report based on feedback from virtual dialogue

4) Participate in followup activities arranged by CI for dissemination of study's output