

Educational Planning and Simulation Models

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Abstract

A well envisioned plan is a first step towards the successful implementation of projects and programs in any sector and education sector has no exception. The planning process is comprised of three stages (i) Strategic Planning; (ii) Tactical Planning; and (iii) Operational Planning. Availability of timely and accurate data is a pre-requisite for each stage of planning process. Planning in education sector requires diverse set of data, which includes demographic information, educational statistics, budget allocation, human resources etc. In addition to data, some tools are also required to prepare well envisioned and implementable planning documents. Simulation models can be used as tool, at first level of planning, for analyzing, exploring & projecting the future needs of the system. With the help of simulation model different options can be explored to overcome the past shortcomings and develop credible, sector-wide and costed plans by involving all the stakeholders.

Simulation for Equity in Education (SEE) model specifically designed to enhance knowledge by exploring the future needs, to help design policy and strategies and to estimate resource implications in education sector. This paper will focus on strategic planning process and how the simulation model can help to trace the future directions for improving the education system.

Keywords: Strategic planning in education sector; simulation model; SEE model

Introduction

The basic and fundamental requirement for successful implementation of projects and programs in any sector is to prepare well envisioned plans supported by evidences. Here evidences means availability of timely and accurate data. There is no denial of importance of data in planning process, however its significance increases while preparing projects and programs for social sector. Without knowing the fact where we do stand today, preparation of plans are considered as failed plans. Some baseline data must be considered for development of plans. So we can say that data is a pre-requisite for planning process.

The planning process is comprised of three stages: (i) strategic planning also refers as long term plans which describes the overall vision of an organization; (ii) tactical planning also known as medium term planning, at this stage the planners identify different projects and programs to

achieve the overall strategic plan of the organization; and (iii) operational planning or short term planning, at this stage of planning the planners identify day-to-day activities of the projects and programs prepared at tactical planning stage for their actual implementation.

In addition to availability of data some tools are also required for preparation of plans at all stages of planning process. For example, some organizations conduct SWOT analysis to identify their Strengths and Weaknesses as internal factor and to ascertain Opportunities and Threats as external factor while preparing their Strategic plans. Similarly, some organizations have developed simulation models to cater their future needs in strategic plans. Simulation models are normally used as tool for analyzing, exploring & projecting the future needs of the system. With the help of simulation model different options can be explored to overcome the past shortcomings and develop credible, sector-wide and costed plans by involving all the stakeholders. In Pakistan, the Planning Commission has developed different tools for preparation of tactical plans like PC-I. For operational planning, Program Evaluation and Review Technique (PERT) and Microsoft Project can be used as very effective tools throughout the project life cycle.

The education sector has no exception, it needs comprehensive data in all stages of planning process which include demographic information, educational statistics, budgetary allocations, human resources, etc. Different international organizations working in education sector have developed generic simulation models to analyze, explore, project future needs and develop credible strategic plans. UNSCO has developed a generic simulation model “Education Policy and Strategy Simulation (EPSSim)” with the view of contributing to the planning and programming of development actions of national education systems. Similarly, UNICEF and the World Bank jointly developed a simulation model “Simulation for Equity in Education (SEE)” intended to help countries identify cost-effective, pro-equity education strategies, and to serve as a global tool for developing evidence-based documentation of and advocacy for such strategies.

This paper intends to examine the SEE model to strengthen the strategic planning in education sector of the country. The SEE model can be used to compare possible progresses in school outcomes for different groups of excluded children as a result of different interventions applied introduced in the system, as well as the costs thereof. The SEE model is built on a life-cycle approach i.e. school entry, retention, repetition and learning are all simulated for different targeted groups of children. After determining the impact of different interventions applied during SEE modeling system and their financial implications, the planners decides to choose the best possible intervention(s) by including in their strategic plan. A huge database of evidence on effectiveness of interventions is added in the model which is crucial component to the working of system.

Planning Process

Planning is process to explore different options and opt the best one to achieve certain goals. According to Koontz & O'Donell planning is deciding in advance what to do, how to do and who is to do it. Zafar I. Malik refers planning, in a training manual, as a basic function of management and it is a process of setting goals, developing strategies, and outlining tasks and schedules to accomplish the goals. Louis A. Allen defines 'a plan is a trap laid to capture the future'. W.H. Newman states planning is deciding in advance what is to be done. By reviewing different definitions of planning it can be concluded that planning is primary function of management which defines vision, goals and targets of an organization, establishes an overall strategy for achieving these goals and hence develops a comprehensive set of plans to integrate and coordinate work within the organizations. The planning process is comprised of three stages from preparation of long term plans to short term plans. The long term plans also known as strategic plan sets the overall vision of an organization. Strategic planning is a process to establish priorities on future perspective and forces to make choices on what will be done and what will not be done? Strategic plan also gives a broad outline on where resources will get allocated?

The medium term plan also known as tactical plan is prepared to achieve the objectives of strategic plan of an organization. One or more objectives of strategic plan are intended to be achieved through a tactical plan, hence the tactical planning horizon is shorter than the strategic plan horizon. If the strategic plan is for five years, tactical plans might be for a period of one to three years, or even less, depending on kind of program or project.

Operational Plan also refers as short term plan is developed to implement medium term plan. The project or program is breakup into activities and sub-activities according to size of the project. The day-to-day activities are documented with allocation of resources like timeline, human, etc. The level of detail and formality of the Operational Plan depends on the size and complexity of the project or program. It ensures that the project or program can be successfully implemented by using resources efficiently and effectively, reducing the risks and preparing contingency plans. Different tools and techniques can be used for preparation of operational plan, for example Program Evaluation and Review Technique (PERT) is very effective technique to prepare, review and monitor the operational plan of the project. Microsoft Project is a very good tool to prepare operational plan.

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of data, which includes demographic information, educational statistics, budget allocation, human resources etc.

Strategic Planning

Strategic planning is a systematic planning process involving number of steps to identify the current situation (strengths, weaknesses, opportunities, and threats) of the sector or organization which includes the vision for the future, mission, operating values, needs, goals, prioritized actions and strategies, action plans, and monitoring plans. A strategy is an overall perspective of the sector, therefore, it is an overall planning that facilitates the good management of a process. Strategic planning takes the planners outside the day-to-day activities of the program or project. It provides a big picture of what the organization or sector is doing and where it is going with a clarity about what the organization actually wants to achieve and how to go about achieving it, rather than a plan of action for day-to-day operations.

Different set of data is required at this stage of planning process. In education sector, the analysis of baseline data is very important step to determine the future needs of the sector which includes existing infrastructure, available human resources, demographic information, etc. are required to build the future plans. On the basis of available resources the planners made projection to cater the needs of future. In traditional education projection methodologies, the planners did projections of data in single perspective based on some assumptions. Growth rate of previous few years applied on exiting data set to get projections of upcoming plan years. In order to determine the financial resources to fulfil the future needs, traditionally 7-10% inflation rate is applied. It has been observed that most of the development projects failed to complete on time due to lack of financial resources. In 2018-19, 40% of total development projects of education sector were failed to complete on time due to lack of financial resources and 10% of development projects completed without utilizing 100% financial resources. This shows that the traditional methodology used for projection of future needs is lacking fundamental components of projection. Different international organizations working in education sectors have developed simulation models to determine the future needs of education sector.

Simulation Models

Computer simulation has contributed a great deal to the preparation of coherent national educational policies and strategies and to the technical quality of educational development plans (UNESCO, 2009). Simulation models are developed and used to analyze, explore, projections and develop credible strategic plans. Similarly, different international organizations working in education sector have developed generic simulation models to improve the process of strategic planning in education sector. UNESCO has developed a generic simulation model “Education Policy and Strategy Simulation (EPSSim)” with the view of contributing to the planning and programming of development actions of national education systems. Similarly, UNICEF and the World Bank jointly developed a simulation model “Simulation for Equity in Education (SEE)”

intended to help countries identify cost-effective, pro-equity education strategies, and to serve as a global tool for developing evidence-based documentation of and advocacy for such strategies. Both tools are developed in MS Excel to estimate changes in educational outcomes over the time.

EPSSim model was designed by UNESCO in 2001 to support education sector planning and resource projections. It was designed particularly in the context of Education for All (EFA) moment. It takes input in the form of baseline data and target set for specific time period and gives output of resources required on annual basis. The resources include number of schools required, number of new teachers required, and financial resources required per annum. It has some limitations and is very close to traditional education projection methodologies. After completion of time period of EFA, the relevance of EPSSim model becomes less. In this paper we will explore SEE model in detail.

Simulation for Equity in Education (SEE) Model

Simulation for Equity in Education (SEE) Model was developed in 2012 jointly by UNICEF and the World Bank to identify cost-effective strategies for reaching children who are excluded from or underserved by education systems. It was intended to help countries identify cost-effective, pro-equity education strategies. The working of model is based on database of evidence on the effectiveness of interventions. The user can define an intervention package using a list of up to 30 interventions, and can target the interventions to particular risk groups. On the basis of interventions, the model computes the changes in school entry, retention, repetition and learning. The impacts of the interventions are determined by the context of the country itself as well as inherent effectiveness (based on database). It helps to define multiple intervention packages and compare the outcomes and costs. The structure of SEE model can be illustrated in the following diagram:

Diagram of structure of SEE Model

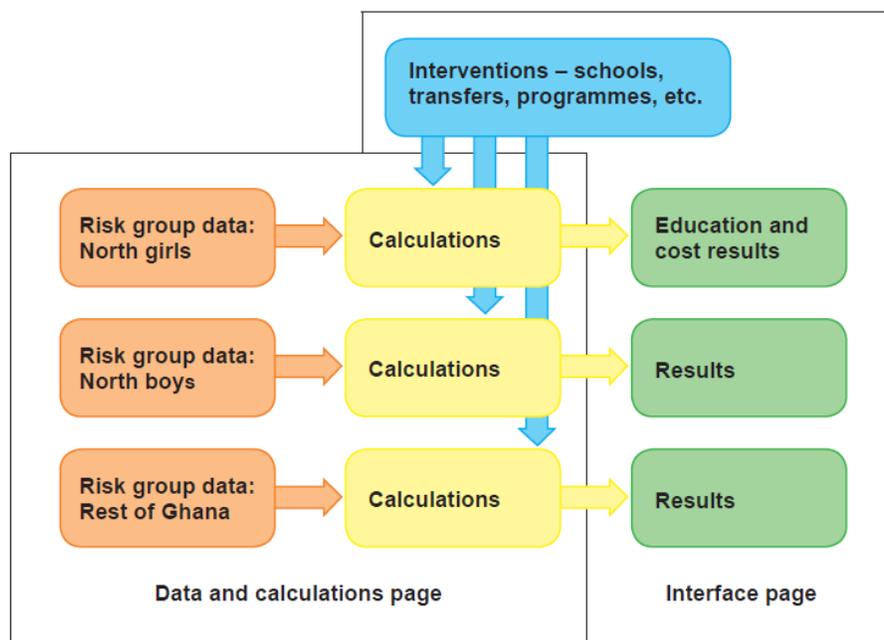


Figure from UNICEF and World Bank, 2013, Simulations for Equity in Education (SEE):
 Background, methodology and pilot results

The SEE model has a significant difference from traditional education projection methodologies in that (i) it can treat multiple risk groups in the population separately; and (ii) outcomes are determined by interventions.

The SEE model was piloted in Ghana in May 2012 with the support of Ghana Ministry of Education, the United Kingdom Department for International Development (DFID) and UNICEF Ghana. In this pilot project the values for effectiveness of intervention were estimated using the database on the effectiveness of interventions that includes more than 300 studies. As for any estimate, and in particular those computed by using other countries' data, some uncertainty remains (UNICEF & World Bank, 2013). To deal with this uncertainty, the SEE model allows users to complete a sensitivity analysis that estimates change of findings according to changes in input and assumption data. The initial pilot results reveals that *a pro-equity approach to education can be significantly more cost-effective than a non-targeted approach* ((UNICEF, 2013). The finding of pilot also shows that Kindergartens can have a greater overall impact if they are targeted to poor, marginalized children. Three kindergarten scenarios were compared with the same cost of US\$10 million but with successively more specified targeting: (i) Build and run 500 kindergartens, spread evenly throughout the country to districts without kindergartens; (ii) Build and run 500 kindergartens in the poorer, more remote northern area of the country to districts without kindergartens; and (iii) Build and run 500 kindergartens in the poorest villages within the northern regions. The model computed different outcomes based on the given scenario.

Ghana pilot concludes that the SEE model can treat multiple risk groups in the population separately and outcomes are determined by interventions, which is a significant departure from traditional education projection methodologies.

The second country selected to pilot the project was Pakistan in 2013, the province of Balochistan and Islamabad Capital Territory (ICT) were selected to initiate the pilot the SEE model in the country. Kick-off meetings and capacity building workshops for education managers of ICT and Balochistan with intend to include outcome of the model will be included in Balochistan Education Sector Plan. However, due to some reasons the project could not be completed.

Conclusion

In the light of above it is concluded that:

1. The SEE Model is very effective tool to improve decision making process in education sector of any country.
2. The planners and decision makers can build different scenario to find out different options and one of the best and cost effective option can be opted while preparing strategic plan of the sector.
3. Countries should conduct research studies in education sector and include the outcome of these studies in database on the effectiveness of interventions so that outcome of the model will be based on the local context of the country. As a result, the plans will be more realistic and cost effective.
4. There is need of some improvement in the interface of the model so that it can be used more easily by the end users.

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