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Roadmap for Education Development Post COVID-19

M. A. Zaki Ewiss

Department of Physics, Faculty of Science, Cairo University, Giza, Egypt.

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Corresponding author: M. A. Zaki Ewiss, Department of Physics, Faculty of Science, Cairo University, Giza, Egypt.
Email: mzewiss@cu.edu.eg

Abstract

In this paper, a roadmap is proposed and introduced to support educational policies, plans, strategies, and practices in developing countries. The operational research approaches are used to identify and assess all academic activities and processes such as educational policies, educational settlement and equipment, educational curricula & courses, teaching methods, capacity building, funding & budgeting, and educational evaluation. The systematical academic performances (access, equity, quality, relevance, efficiency) will be considered, including the gaps and expectations of various stakeholders on education and training policy, evaluating the policy's sufficiency and its implementation strategy feeling the current vision and the development perspectives of these countries. The proposed roadmap will serve as a tool or reference point for setting ambitious improvement goals. Building government education officials' capacity increases the potential for improvement in numerous ways, as it provides a systematic approach to quality improvement by identifying new ideas and innovative approaches.

Keywords

Roadmap, Educational Strategy, Educational Process, Operational Research, Quality Education

1. Introduction

Since December 2019, the world health organization (WHO) declaring a state of emergency due to the outbreak of COVID-19, all nations and peoples have been at risk of injury and death threats. In the wake of this sad news, all developed and developing countries have taken precautionary measures. These measures include the complete closure of all social activities. The citizens stayed at home, the prohibition of working in shops, restaurants, cinemas, theatres, and museums, and the ban of individuals from moving and having social contact. They suspended the movement of aircraft and trains between countries. These decisions have affected education systems after schools and universities' closure and educational programs through distance or online education systems. This decision was made to protect children, students, teachers, and all staff from the risk of contracting the deadly virus (Burgess & Sievertsen, 2020; UNESCO, 2020a; UNESCO, 2020b, UNDP, 2020; UNECA, 2020; United Nations, 2020; World Bank, 2020; Zaki Ewiss, 2020a-2020d)

Despite the end of the first wave of the pandemic in June 2020, some countries have resorted to reducing precautionary measures and reopening schools and universities to save their education systems and compensate for students' losses at all education levels without exception. Mutated strains of the virus soon emerged, and the WHO emergency response announced the spread of the second wave of coronavirus, which is expected to continue till the summer of 2021. The spread of Corona pandemic in its second wave led to schools and universities' closure in many countries worldwide. UNESCO has declared that the closure affected more than 1.6 billion students in 195 countries (UNESCO,

2020a). It has resulted in a decrease in student attendance. Also, the use of the distance or online education system has affected children and families, and the efficiency of the provision of study programs. Developing countries have suffered from this pandemic because of their education systems' fragility, insufficient environmental and school capacity, and inadequate support for teachers.

The world is looking out to develop vaccine manufacturing, medical solutions, and guidelines to re-control and reduce infections among people, especially children, and students (World Health Organization, 2020).

The interruption of educational programs and the reduction of academic performance due to the continued suspension of schooling and the closure of schools and universities have negatively affected the educational process's outcomes and generations' healthy upbringing that represent the country's social capital. This academic setback harms the sustainable development program sponsored by the United Nations, which will significantly impact developing countries' economies (UNECA, 2020; Zaki Ewiss, 2020a).

In this regard, many governments face an imbalance in their educational policy systems at all pre-university and higher education levels (World Bank, 2020). Not only because of the surprise resulting from the outbreak of the pandemic, but also because of the lack of integrated and sufficient strategic studies to develop education systems and meet challenges in all areas, including educational policies, educational settlement & equipment, educational management, Curricula & courses, teaching methods, the efficiency of teacher, budgets & financing and the evaluation process & the quality of education outcomes (Cummings & Williams, 2008; Zaki Ewiss, 2020b).

During this crisis, many countries were unwilling to deal with this educational setback due to the low level of teachers to deal with digital education technology, the low ability of students to self-study, and the lack of scientific topics in the mother languages of education (OECD, 2020; Zaki Ewiss, 2020b-2020d). Also, conflicting follow-up and evaluation systems, as a result, fictitious online teaching platforms offer unaffordable and costly curricula that are victims of governments and citizens. There is no doubt that the costs of alternative education systems are prohibitive and cannot be afforded by low-income citizens. Many parents need more time at home to ensure their children's education and well-being brings many problems. They may be forced to leave their jobs and therefore harm economic performance. Some countries have followed the strategy of interactive mitigation and classroom closure when determining the number of injuries among students while reducing the minimum absenteeism; this procedure does not necessarily ensure that classes continue.

It has become necessary for Governments to develop clear educational policies that address the previous phase's disadvantages before the epidemic outbreak. These policies are based on identifying all activities and processes in all the above-mentioned academic areas to achieve real educational renaissance to serve development programs and their people's well-being (Zaki Ewiss, 2020b; Kitamura, 2009; Kitamura, 2007).

In this work, we present a roadmap for education development, implementing operational research, and using innovative modeling approaches to continuously improve learning outcomes by increasing administrative efficiency, rationalizing loss, and minimizing errors to fill gaps that leave our education vulnerable to the possibility of current and future epidemics

2. Roadmap methodology

We propose a rationale roadmap to develop the level of maturity for developing the educational strategy (Zaki Ewiss, 2020c). It is represented in two different ways: the phased and the continuous method. Interim representation is the most commonly used representation to complete the development process and achieve the goals. Although the continuing picture is generally a more flexible option, and in many cases, the continuous model needs to be well chosen for research groups because many do not know where to begin to represent the roadmap (WILICHOWSKI & COBO, 2021). The interim representation can also be seen as a comprehensive roadmap for continuous repetition. This approach is suitable for States and institutions that wish to improve their educational activities' capacity systematically. The ranking of development priorities is determined by selecting process areas that belong to a particular maturity level, primarily through a historical analysis of educational institutions' process problems. Sometimes this approach is not the most beneficial, and organizations may have to manage projects that work reasonably well. Still, they may face many disadvantages in the quality of teaching outcomes and learning. This roadmap based on the following principals (Zaki Ewiss, 2018):

- The political will
- The political stability
- Governance and accountability
- Transparency
- The availability of fund

3. The Roadmap in the Education Improvement Project

This study's proposed roadmap is primarily for educational institutions in developing countries that wish to establish a model for improving their maturity for development (Zaki Ewiss, 2020b). The institution is determined to use continuous representation and therefore needs assistance in identifying educational processes that must be implemented first. The improvement project begins with the recognition by governments and institutions of the need and importance of developing the education system. These reasons must be clear, understandable and widely accepted by following the guidance given in this study during the project stages, which is described as the start-up phase. Figure 1 shows the main educational pillars of the education strategy. Each post has its domain area including, educational activities and practical processes. One should apply a selected operational research mathematical model to assess and analyze the education strategy's current situation, see Table 1 (Jill, 2015; Winston, 2004). Other analysis methods of the current situation include evaluating projects or processes, achieving customer, end-user satisfaction or causal analysis of defects, and standards or audits described as the diagnostic phase. Figure 2 shows the implementation steps of the operations research study. In Table 2, the definition and description of the operation research models are given.

After analyzing the current situation, the improvement project's objectives and the problems to be resolved must be clear, understandable, and widely accepted. At this stage, the organization needs to determine which representation to use as an option determined by economic, societal, and cultural factors.

The need for a comprehensive approach is a prerequisite to developing the system. A good study of the proposed model to improve the educational institutions' maturity level may take a long time to determine which options are made. According to its objectives and problems, we can choose a phased representation to address improvement goals. Below we will focus on four phases of implementing the proposed roadmap for all organizations with project management objectives or troublesome problems affecting development and improvement process.

a) Designing the roadmap: for institutions with objectives related to the development of the educational process.
b) Producing an integrated roadmap: For all organizations, the integrated roadmap ensures learning outcomes or problems in managing work efficiently. It can be applied when the primary challenge for development projects is to integrate software or learning process components into all hubs properly.
c) Roadmap processes: For all organizations with practical management or business problems.
d) Measure the roadmap: for all organizations with measurement or business management problems.

Each roadmap contains a limited set of four to eight functional areas, limiting the scope and initial improvement cycle and helping organizations to focus their improvement activity relationships.

The few critical areas of operation are likely to provide direct benefit to development selections. The educational institutions in each country have different goals of improvement and priorities to solve problems. Once the roadmap has been implemented, educational institutions will generally have sufficient experience to improve the education system and gain expertise to identify the next steps. In Figure 3, we present five processes to use the roadmap.

4. The structure of the proposed roadmap

Each roadmap has the same basic structure that consists of five elements as follows:

a) Defining the purpose of the roadmap and its purpose. This roadmap characterized by the typical improvement objectives addressed by the roadmap developed and the set of specific problems.
b) Identifying the potential beneficiaries of the roadmap. Some roadmaps apply to a particular type of institution, and if so, the types of relevant institutions must be clarified.
c) Presenting a series of practice areas for the roadmap, where each roadmap contains a limited number of educational process areas. The rationale is that the project's first step to improving the educational process should not be too big. Ensuring the quality of education outcomes is always one of the processes involved. Without this process, the organization cannot be sure that the process is already in use by the organization. Quality assurance may also help identify shortcomings in the definition, deployment, or implementation of the new or duplicate process.
d) Determining the motivation to choose areas of the educational process is the rationale for including or excluding other areas.
e) Identifying the next steps in the roadmap structure. Roadmaps contain specific practice areas. After the first improvement cycle, the organization can determine the path of future progress by identifying another roadmap or by placing an additional set of areas of the process. In the following, some possible next steps are suggested.

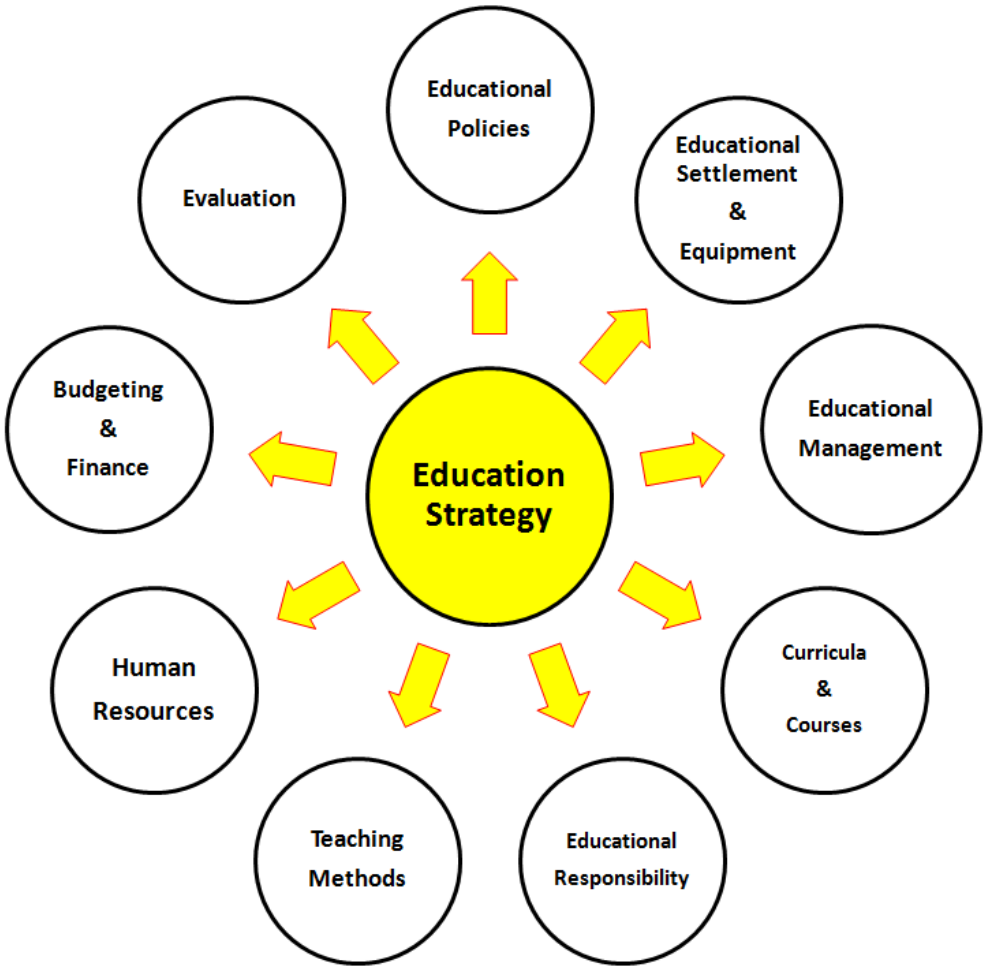

Figure 1. The pillars of the education strategy.

4.1 Roadmap for the proposed project

a) **Purpose:** The roadmap project aims to control development and improvement projects. The educational institutions choose a roadmap for the development project. It ensures that each project meets development objectives' requirements, estimating the time and effort in planning, development, improvement, and monitoring. The roadmap is intending for institutions facing problems such as poor planning and management of development projects. It does not have clear areas, requirements, limited participation of involved stakeholders, and failure to assess progress in the project outcomes (e.g., projects experiencing a backlog of issues and a continuous advance of the scope of operations, or budget overruns, or delays in completion dates for achieving final goals).

b) **Potential beneficiaries:** This roadmap is used by organizations whose work is generally implemented within development projects. The success of these enterprises depends heavily on their ability to control projects. Examples of these organizations are software design centers needed to implement projects for customers. An enterprise software department consists of projects such as the development of software tools for internal systems

c) **Project planning:** The areas of operation in the proposed roadmap help create and maintain plans that define project activities.

d) **Project Monitoring and Control:** The proposed roadmap helps understand the project's progress and achievement. The appropriate corrective action can be taken if the project's performance deviates significantly from the plan.

e) **Requirements Management:** Helps manage project output requirements and set objectives and identify con-

tradictions between those requirements, project plans, and business management. It requires creating configuration management to maintain the integrity of selected work outputs using the configuration definition, control, accounting, and audit.

f) **Ensuring the quality of outcomes:** The areas of operations help to provide teachers, staff, administrators, and administrators with an objective view of the educational processes that are defined, published, and related work outcomes.

4.2 The rationale for inserting or excluding operations areas

The five areas of operations mentioned for primary control of project execution help improve the organization's plan, control projects, and ensure that it focuses on specific requirements. It includes adding areas of the educational process and providing the quality of outputs to improve operations. This roadmap also overlaps part of the process of phased capacity maturity. When applying maturity software, integrated project management and risk management areas have not included in the roadmap. They are helpful only when implementing functional areas for project planning, monitoring, and control. The areas of measurement and analysis can be an excellent addition to the roadmap, improving the ability to measure expected outcomes, improving project delivery control.

Table 1. The activities and description of the operational research model

Activity	Description
Operation	The activities carried out in an organization.
Research	The process of observation and testing characterized by the scientific method. The situation, problem statement, model construction, validation, experimentation, candidate solutions.
Mode	An abstract representation of reality.
Systems Approach	Include expectations of the decision-making process during the analysis phase. Factors of quantity and quality are taken into consideration.
Optimal Solution	The best solution provided in the model.
Team	A group of people who find solutions for the problem using different skills.
Operations Research Techniques	A collection of mathematical and logical methods.

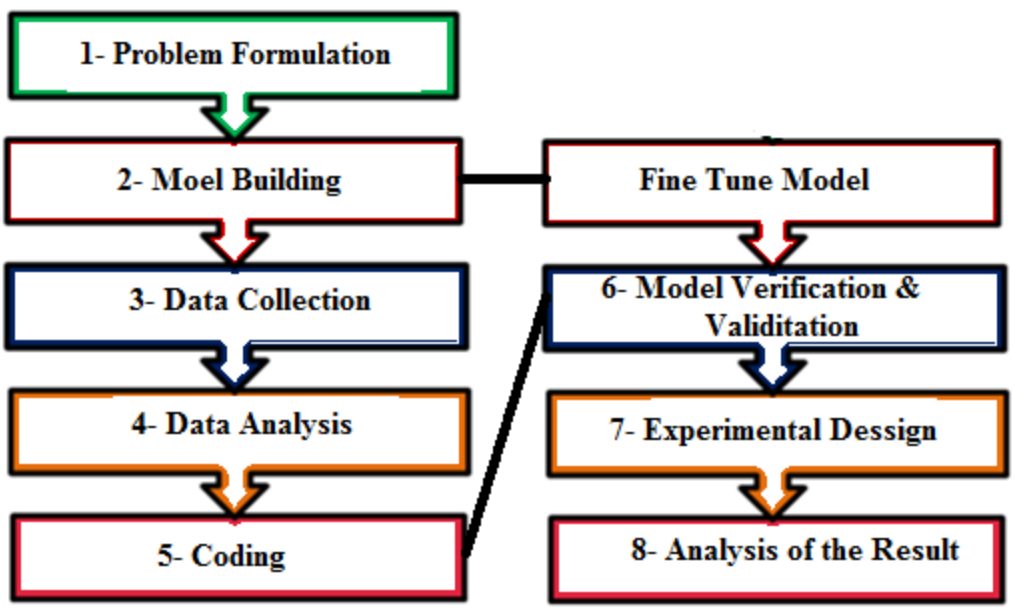

Figure 2. The implementation steps of the operation research study.

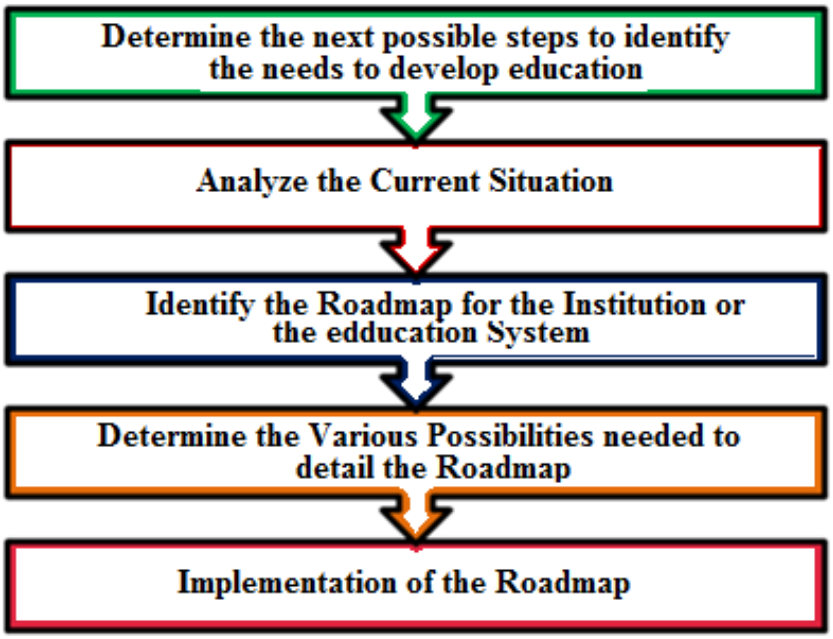

Figure 3. How to use the roadmap.

4.3 To determine the next possible steps

After completing the roadmap, the organization may choose to apply another roadmap, depending on its problems and objectives. No roadmap is inherently preferable to any other plan after its implementation. The next possible step is to implement areas of measurement and analysis. In implementing the development process areas, the organization improves its control over projects and reaches a higher maturity level. It is also possible to raise the project control level to a higher level by implementing integrated project management and risk management.

Table 2. The definition and description of the operations research models

S. No.	Function	Definition and Description
1	Linear programming	It consists of a single objective function, representing a set of constraints that circumscribe the decision variables.
2	Network flow programming	It is a particular case of the more general linear program.
3	Integer programming	It is concerned with optimization problems in which some of the school variables are required to take on discrete values.
4	Nonlinear programming	It is a nonlinear characteristic of the school objective function or constraints.
5	Dynamic programming	It is a different method that describes a process in terms of states, decisions, transitions, and returns.
6	Stochastic programming	It is a model, generally neglecting the effects of uncertainty and assumes that the results of decisions are predictable and deterministic.
7	Combinatorial optimization	It is a type of optimization problem and computes measures of effectiveness.
8	Stochastic processes	These processes describe the current situation in which the education system can be found.
9	Discrete-time Markov chains	It is a probability matrix describing each of the educational activities in the one-time interval.
10	Continuous-Time Markov Chains	It is a process that satisfies the Markovian property.
11	Queuing	It is a model that has probabilistic arrival and service patterns.
12	Simulation	It is a technique for estimating statistical measures of complex systems.

5. Roadmap design

a) **Purpose:** Producing a practical roadmap develops learning and learning outcomes that meet society's needs and improve education quality. States and institutions that choose to establish a roadmap usually wish to improve their education quality, reduce problems associated with mismanagement, increase mismanagement and maximize errors in educational process inputs, inefficient or inadequate designs, or ineffective applications to satisfy the benefits. This roadmap is intended for institutions facing problems such as society's dissatisfaction with educational outcomes, many flaws in development projects too late in the project's life cycle, and failure to achieve the desired goals.

b) **Potential beneficiaries:** They can use the roadmap to develop education in countries or institutions that want to overcome spending problems and lack real-quality teaching and learning outcomes. It is done by identifying organizations' success that uses a clear roadmap by achieving quality goals.

c) **Practical areas to achieve goals and solve problems:** Following practical areas must be implemented to solve the above issues fulfilling the community requirements to analyze and stabilize the community requirements.

d) **Management requirements:** Requirements management is linked to project outcomes and components of the educational process and identifies contradictions between conditions, project plans, and business outcomes.

e) **Technical solutions:** help in identifying, designing, developing, and also implementing solutions for requirements. They include designs and applications for learning outputs and components as needed.

f) **Configuration Management:** Helps establish and maintain the integrity of selected work outputs using the configuration definition and control by following accounting and auditing procedures.

g) **Verification:** Helps ensure that specific requirements meet work outcomes.

h) **The process of ensuring the quality of education:** The areas of operations in the roadmap help to provide teachers, staff, and administrators with an objective view of the processes that are defined, deployed, and related work outcomes.

5.1 The rationale for including or excluding the area of operations

As mentioned earlier, the practice areas help effectively develop outcomes and improve teaching and learning quality. It helps organizations acquire and manage requirements, protect and safety of business outcomes, and ensure that results meet all needs. It also includes the addition of areas of the educational process and quality assurance using improved techniques. At this stage, the data validation process areas are initially excluded because of their focus on building the right outputs. However, the verification process areas are initially more critical for successful outcomes development and are included in the roadmap drawn up accordingly.

5.2 Possible next steps

After completing the roadmap, States and educational institutions can implement one of the proposed roadmaps according to their problems and objectives.

6. Develop an integrated roadmap

a) **The purpose:** The integrative roadmap aims to control the integration process and ensure that the public system meets its requirements. Organizations do not usually develop the same components; instead, a network of acquired branches is compiled. Organizations typically want to choose an appropriate integrative roadmap that achieves the following:

- Control of the integration process.
- The sequence of integration, or the quality of education outcomes.
- Integrate individual components into a coherent system.
- Ensure that public order (assembly) achieves quality goals that suit the needs of the community.
- Right choice and qualification.

This roadmap is intended for organizations facing problems such as:

- Poor coordination.
- Cooperation between different departments.
- Lack of control over the integration process.
- Lack of an integrated vision which affect the outputs and the intended environment's needs.

b) **Potential beneficiaries:** Design an integrated roadmap for those organizations that do not perform basic development tasks (design, programming, institutional unit testing, etc.) for critical parts of the system but sub-output and

sub-components of other organizations.

- Determine the requirements for each operation.
- Identify the structure of the overall education system, including system interfaces, as the most crucial topic.
- Assemble the essential components.
- Ensure that the entire systems and functions are following the requirements.
- Follow-up the performance of program management on different development projects.
- Ensure that the acquired components are of sufficient quality before delivery.

c) **Practical areas:** The following practical areas must be implemented to achieve the goals and solve the above problems:

- **The roadmap processes' requirements:** help the areas of the roadmap areas to analyze customer and product requirements. The output components training management helps the areas of operations for the roadmap create and maintain the work outputs' integrity (such as the project's outputs) using the definition and control by following accounting and auditing procedures.
- **Technical solutions:** help the areas of operations of the roadmap in designing, developing, and implementing solutions for requirements. Solutions, designs, and applications include outputs and components of education, both individually and collectively, as needed.
- **Output integration:** helps the process areas of the roadmap to group outputs from crucial components and ensures that the outcomes are integrated and work properly.
- **Verification:** helps the areas of the roadmap's educational processes to validate proof that outcomes meet community needs.

6.1 The rationale for inserting or excluding process areas

The areas before the core processes control the integration process of the education system. It supports institutions in developing their education requirements, including:

- Merge outputs correctly.
- Management efficiency.
- Ensure that the outcomes meet the needs of the community.

It should be noted that the first and second objectives are most relevant to the roadmap. The third specific goal is an upgraded output component hub. Technical management process areas may be included, depending on what the project needs to evaluate and implement technical solutions before integration. Organizations must consist of the following processes:

- Ensure the quality of outputs for other risks.
- Ensure that the requirements are met to achieve the expected output sought from the project.

6.2 Possible next steps

Once the roadmap is completed, the organization can implement other roadmaps for a project or measurement process. Implementing a roadmap for output will not be the first option. This roadmap targets organizations with a greater internal focus on development, while an integrated roadmap targets organizations that need to focus more intensely on output integration. Organizations can also determine their improvement path after completing the integrated roadmap by selecting areas of operations that best meet their improvement objectives.

7. Roadmap operations

a) **Purpose:** The purpose of the roadmap processes is to develop the capability to identify, implement and improve a range of structured methodologies. It can create a basis for process analysis, operations execution, or other roadmaps. Organizations that choose roadmap operations usually want to achieve the following objectives:

- Identify and analyze current processes.
- Improve existing processes.
- Identify processes and link them to the needs and priorities of the organization.
- Consolidation of institutional processes.
- Identify a basic set of processes as the basis for continuous improvement.
- Develop a clear set of requirements for the quality system in the organization.
- Identify processes that comply with applicable regulations, such as ISO 9000.

This roadmap is intended for organizations with problems such as:

- Missing a clear understanding of development processes.
- Control of development processes.

- Difficulties in managing the educational process.
- Limited provision for operations under development.
- Teachers and administrators who do not work together well within the institution.
- Difficulties in identifying and improving problems in development processes.

b) **Potential beneficiaries:** The government or educational institutions use this roadmap, which uses complex processes due to its size, complexity, and projects. The success of organizations using roadmap processes is determined by the degree to which they control their operations. Examples of these institutions are:
- Software production centers and founders.
- Organizations that build complex systems or operate in a complex environment.
- Institutions that contribute to many different disciplines in the fields of development.
- Institutions that have the competencies and knowledge necessary to perform tasks are unclear.

c) **Areas of operations:** The following areas must be implemented to achieve the goals:
- **Focusing on organizational processes:** It helps the areas of the roadmap process to plan, implement, and deploy organizational process improvements based on a comprehensive understanding of its operations and assets' current strengths and weaknesses.
- **Definition of the organizational process:** Defining and maintaining a usable set of organizational process assets and standards of the corporate process helps the areas of the process in the roadmap to create and maintain a functional set of organizational process assets and standards.
- **Measurement and analysis:** Measurement and analysis help the areas of process in the roadmap develop and sustain the measurement capability used to support information management needs.
- **Causality analysis and decision-making:** The process's area in the roadmap helps identify the causes of defects and other problems and prevent them from occurring in the future.
- **The process and ensure the quality of education:** The process and ensuring the quality of education helps the process's areas in the roadmap to provide teachers, staff, and administrators with an objective view of the defined, published, and associated outputs.

7.1 The rationale for including or excluding areas of operations

As mentioned earlier, the process's areas provide a basis for identifying, implementing, and improving operations in the organization and identifying the causes of problems. Measuring the organization's achievements also provides a more profound understanding necessary to improve development and ensure improved process outputs. The decision analysis process areas will be an excellent addition to the roadmap as they enhance the assessment of processes and how decision-making is analyzed.

7.2 Possible next steps

The next step after completing the roadmap depends on the institution's assessment of the educational process's strengths and weaknesses. If decisions that require greater effectiveness, objectivity, and control over expenditures are taken, the institution can carry out decision analysis. The next step is to implement another roadmap. There is no roadmap inherently on another. Organizations can determine their improvement path after implementing the roadmap by selecting areas that best achieve their improvement objectives. Furthermore, choosing specific operational areas to higher capacity levels is a good option for improving the roadmap areas.

8. Measuring the roadmap

a) **Purpose:** The purpose of measuring the roadmap is to identify and measure improvements based on quantitative information. The roadmap could create a quantitative basis for improving the process and involve institutions identifying improvements based on quantitative data. As follows:
- Quantification to improve performance,
- Identify and select improvements based on quantitative information.
- The ability to show the results of process improvements quantitatively.
- Identify the most crucial performance indicators of the organization**.**

This roadmap is intended for organizations facing problems such as:
- Lack of quantitative information on management needed to understand performance in the organization.
- Identification and selection of improvement activities based on insufficient quantitative information.
- The management team's doubts about the contribution of improving the process to the organization's performance.

- The need to use quantitative data to show the added value of practical improvements. Excessive error in the measurement system is one of the main challenges to successfully applying the analyses described in the capability maturity model practices.

b) **Potential recipients:** This roadmap is used by organizations that want to start managing their quantitative improvements. Also be used in institutions where the management team questions the added value to improve the educational process. Furthermore, it may be a good option to implement the measurement roadmap in the context of a broader improvement initiative using the operational research mathematical model.

c) **Areas of operations:** The following areas of operations must be implemented to achieve the above goals and problem-solving:
- Measurement and analysis: Developing and sustaining the measurement capability used to support administrative informatics needs.
- Focus on organizational processes: Planning, implementing, and deploying organizational process improvements based on a comprehensive understanding of its operations and assets' current strengths and weaknesses.
- Decision-making analysis: Analysis of potential decision-making using a graph that evaluates identified alternatives following specific criteria.
- The process of ensuring the quality of education: provide teachers, staff, and administrators with an objective view of the processes that are defined, published, and related work outcomes.

8.1 The rationale for including or excluding the area of operations

As mentioned earlier of operation, the four areas provide a basis for identifying, implementing, and using a measurement and decision-making program and improving processes based on quantitative information, and demonstrating the quantitative benefits of process improvements. The areas of causal analysis and resolution could be an excellent addition to the proposed roadmap. Causal analysis and treatment help organizations choose improvements based not only on quantitative information but also on causal analysis of existing defects and problems.

8.2 Possible next steps

The next steps after the completion of the first roadmap are:
- How severe the results are.
- Determine the costs of failure or show the most significant needed variables.
- The decision to implement different roadmaps depends on the results and success of implementing the first roadmap.
- Improve analysis and improvement by implementing and addressing areas of causal analysis.

Organizations can also determine their improvement path after completing the measurement roadmap by selecting areas of operations that best achieve their improvement goals.

9. Roadmap Planning Steps

The roadmap planning consists of four steps as follows:

A. Implementation phases

1. Determining the stage (defining the objectives of the project and identifying the final internal and external beneficiaries)
- Identifying customers and requirements
- Setting out the problem, objectives, and benefits
- Selecting team
- Identifying resources
- Evaluating the critical organizational support
- Developing a plan and project milestones
- Developing a high-level operational plan

2. Measurement phase (current performance determination and problem identification)
- Identifying defects, opportunity, and the unit of metrics
- Developing a detailed practical map of areas suitable for development
- Developing a data collection plan
- Validating the measurement system

- Collecting data
- Determining the base line of the operational capability model

3. Analysis phase (analysis and identification of the root cause of system defects)

- Setting performance targets
- Determining the value-added in practical steps
- Identifying sources of variance
- Identifying the root cause

4. Improvement phase (improving the process by eliminating defects)

- Testing design performance
- Developing potential solutions
- Identifying operational variations of a possible system
- Assessing the failure situations for potential solutions
- Validating the potential improvement through empirical studies
- Correcting/reevaluating the potential solutions

5. Control phase (control of the performance of future operations)

- Identifying and validating the control system
- Setting standards and procedures
- Implementing the statistical operations monitoring
- Determining the capability of the operation
- Developing a plan for the transfer and delivery of outputs to stakeholders
- Checking the interest, save on costs, and grow profits
- Completing the project and finalizing the documents and final reports

The proposed models can be used to develop the education system by rationalizing the damage and reducing errors. It allows institutions to eliminate problems, obstacles and improve the teaching and learning process.

B. Beneficiaries in the education sector

The model focuses attention on the ultimate beneficiary of the teaching and learning process; in this regard, can you treat educational institutions as a technology manufacturing company? And apply the same rules? In this model, education inputs and outputs can be treated in the same way as we do with production plants, depending on customers' needs. But the educational people are:

- Students.
- Parents.
- Community.
- Graduates and future employees.
- Inter-institutional departments.

We must remember that we do not add value to the education system if we cannot meet these customers' needs. Instead, we create a waste of effort, time, and resources.

It is worth noting that the loss in the education sector is similar. Here are some examples of this missing:

- Mistargets.
- Unvalued tasks detract from the primary objectives of the educational institution.
- Carry out flawed educational projects.
- Unnecessary projects have little or no relevance.
- Not to take advantage of the talent.
- Failure to make the most of the skills and ideas of teachers, faculty, and young researchers.
- Spend mysterious times and lose effort in some tasks.
- Different or conflicting objectives and directives

In this study, we propose to use educational, operational research models significantly in the field of education development as follows:

1) Focusing on customers is one of the core themes of the model.
2) Studying the process research at all educational hubs and at various stages to understand clients' needs (internal and external).
3) Do not repeat the provision of educational services and carry out operations that have no added value.
4) Managing is data-driven.

5) Providing all information about the education sector.
6) The development of education requires attention to using, managing, and collecting data like any other government area, as strong management enables the excellent application of the proposed model.
7) The education sector always aims to improve continuously, to achieve the best results for students, teachers, and educational institutions themselves.
8) One of the key features is to focus on identifying key production processes and their problems so that improvements can be developed and problems solved without producing lost ones.
9) The tools mainly depend on active management based on strong team collaboration to achieve the most impressive results.
10) Motivating teachers and faculty members to achieve the best results.
11) Having an ill-considered mentality only leads to excuses, mistakes, and waste.
12) The quest for perfection.
13) Continuous improvement is the bar we should strive for it.
14) Developing a culture of continuous improvement in society.
15) Using minimum resources (people, materials, and capital) to find solutions to education issues.
16) Increasing speed in performance and reduce the incidence of errors.
17) Focusing on improving the quality of education outcomes.
18) Working to remove anything in the process that does not add value.
19) Eliminating various forms of lost activities or steps that are not added.

C. Cause-and-effect analysis

The plan is used:

1) To identify and explore the possible causes of a problem and its root.
2) During brainstorming exercises.
3) It may range and include human resources, machinery, methods, materials, etc.

D. Visual management

This tool is a powerful tool because it helps a person understand priorities and communicate by selecting the performance metrics.

10. Conclusion

In this paper, we proposed a roadmap for education development in developing countries. Its outcomes aim to improve the quality education and use its data to track progress towards Sustainable Development Goal 4 (SDG 4) (UNESCO, 2015; UNESCO, 2018). In conclusion, the proposed education modeling roadmap can be considered a tool that provides Governments and donors with information that helps strengthen countries' capacity to plan and manage their education systems for a better future. The roadmap for the reopening of schools and universities contains six vital elements as follows:

- Continuous assessment of health risks following the rules and guidelines of national and international health organizations.
- Reviewing the feasibility of completing study programs remotely or online.
- Collecting data and educational research on education strategies at all levels.
- Studying the implications of closing schools and universities, especially the outcomes of quality education.
- Adhering to educational, ethical rules and supporting equality among students.
- Establish binding social controls and respecting all rights for all groups of teachers, students, administrators, parents and others.

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