Improving Educational Management in Developing Countries Using an Operational Research Approach

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Abstract

Educational management requires equal rigour and meticulousness as any other management obligation. Efficiently administered education, training, and growth strategies can provide developing nations with proficient individuals with the knowledge and expertise necessary to fulfil various governmental goals and aspirations. This research paper aims to a) present an enhanced practice model for educational management procedures and b) cultivate a learning culture to improve educational results. This statement purports to furnish a framework of audit criteria for future research endeavours within this field. In recent years, various countries have demonstrated substantial efforts to align their learning and development strategies with their respective societal requirements. Low-income nations have yet to exhibit the efficacy and cost-efficiency of their educational investments in learning and developmental outcomes and their contributions to the overall education system outcomes. Identifying crucial determinants that significantly enhance educational outcomes, specifically in increased literacy, numeracy, and critical thinking, amongst children experiencing extreme poverty prevails as a fundamental pursuit. The factors to be considered encompass assisting student enrollment and retention and enhancing the accessibility to educational institutions. Also, facilitating the standard of education dispensed within schools and revamping the efficacious institutional funding and management strategies to reduce adequate incentives directed towards advancing the abovementioned factors. The innovative educational capability management model through delineated contours is introduced and discussed. This model is based on the operational research approach. In developing countries, the Ministry of Education controls policy decision-making processes and administrative & financial responsibilities.

Keywords: Educational Management, School Administration, Educational Policy, Capability Maturity Model, Operational Research

Introduction

The management notion relates to coordinating institutional activities to successfully and economically accomplish their goals with the resources. These resources consist of financial, natural, and human capital. In the 20th century, management science emerged as a field of study connected to social sciences and organisational studies. This science applies human public relations by allocating authority effectively and identifying responsibilities in problem-solving, making wise judgements, managing change, developing business philosophy, and presenting ideas, laws, and business principles, including organisational procedures and practices.

The capacity to create formal institutions that mandate achieving goals and performing administrative duties has also been connected to management. Social, educational, and healthcare institutions, as well as the police, military, and succession planning, are examples. A team of people or a single person, such as the teacher in charge of the classroom, handles the administrative tasks. We draw attention to the fact that just like the other ministries' government structures, educational management affairs can designate governors, senior officials, and school committees to create sub-departments. Managers must perform their jobs effectively and be trained in management science, ongoing decision-making, planning, and problem-solving. The managing director has five crucial duties: arranging, commanding, coordinating, and controlling. Future action plans are included to ensure that human and physical resources carry out tasks and perform their jobs efficiently and effectively. Conversely, the success of administrative work depends on the interaction and collaboration with personnel and the processing, analysis, and information needed to make the right judgements [1-17].

Educational Management

The previous report discussed aspects of educational management in Egyptian pre-university education[17]. According to West and Wolfe [10], educational institutions use individuals, material resources, and scholarly administrative plans to compose, coordinate, and screen all informative teachers to carry out instructing errands effectively and proficiently. In this regard, all nations work to improve education programmes that develop all aspects of social, economic, and cultural advancement. These programmes include the following: 1) implementing the policy and achievement goals, 2) planning, organising, and coordinating, 3) regulating human resources, 4) issuing the right decisions, and 5) achieving the goals and objectives of the institution. This arrangement had connected to the energetic capacity to pring almost social alter to protect social personality and national having a place. Proficient administration to realise the adequacy and effectiveness of instructive education requires a) developing institutional strategies, b) qualifying the educational leadership, c) Identifying the tasks and responsibilities of the education managers in all educational stages, d) Making the proper choices to handle data, communicate, unravel issues, and make an effective team, and e) arranging for all programmes, scholarly evaluations, developing educational programmes and surveying understudy execution, and setting up a budget and making the finest utilise of monetary assets. In this framework, the previous report discussed aspects of educational management in Egyptian pre-university education [17]. The educational management functions are summarised and shown in Figure 1.

The Development of Educational Management

Management science gave birth to the field of research and practice known as educational management. It initially applied to business and industry. The use of industrial management techniques in educational settings has increased dramatically. The growth of this subject as an academic field has been constrained, and it generates substitute models based on student observations and experience. By the twenty-first century, the primary ideas had either been developed in the context of Education or modified from industrial models to suit the unique needs of educational institutions. From a new field based on concepts created in other environments, educational management has expanded into research and theories. Urban schools have replaced small rural elementary schools as the predominant type of educational institution. It also concerns various school issues, each calling for a unique strategy. It reflects the different theoretical facets of social sciences and Education.
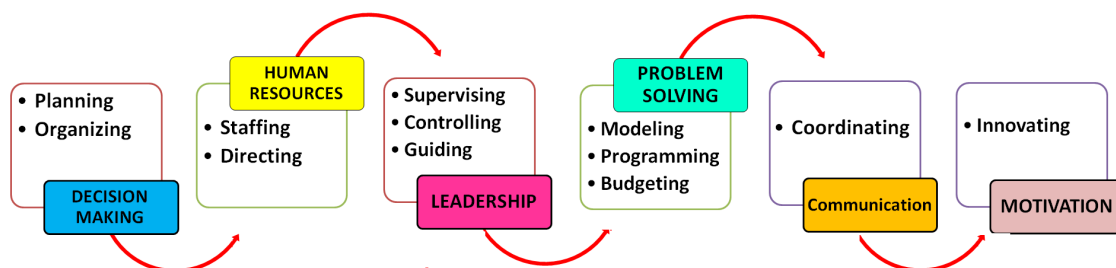
Figure 1: The functions of the educational management
(The figure is recalled from Ref.[17])

A specific activity known as educational management organises all aspects of the educational programme, including its human and material resources, to achieve an effective and positive end. Academic institutions operate in a dynamic environment that supports ongoing plans and improvement implementation. Administrators, teachers, and employees must receive training to improve administrative proficiency. Educational management tasks require stakeholder follow-up, persistent observation, problem-solving, and problem identification. Academic management looks after the staff and human resources, establishes the educational institution's vision and mission, promotes teamwork and goal-setting, and assures the effectiveness of the job. It is important to note that educational management is concerned with its personnel's effectiveness, commitment, and goal-setting.

Its primary responsibilities include monitoring fieldwork completion, ensuring planned plan application and fulfilment, and offering advice to enhance working procedures. Identifying strengths and flaws and developing other options for ongoing improvement also increases the work's effectiveness. All facets of an institution are covered by educational management, including planning procedures, targeting, making the best use of available resources to avoid wastage, duplication of effort, unhealthy behaviours, and systematic implementation of plans. Education planning is done at the central level in developing nations by the Ministry of Education, the province, and the school levels. Budget preparation is one of the key components to the administration and success of the company. It requires estimating revenue and expenses, maybe accounting for emergencies as necessary. Education planning is done at the central level in developing nations by the Ministry of Education, the province, and the school levels. Budget preparation is one of the key components to the administration and success of the company. It requires estimating revenue and expenses, maybe accounting for emergencies as necessary.

The centralisation system oversees institutional control about the availability of physical resources, infrastructure, and human resources of stakeholders.to ensure efficiency, productivity, effectiveness, and benefit in the teaching and learning environment.

The main functions of the education department include:
- Preparing the curriculum for different educational stages according to its various capacities.
- Scheduling the academic calendar,
- Designing joint courses,
- Organising schoolwork,
- Constructing and completing the school infrastructure,
- Organising and conducting examinations,
- Guiding educational institutions,
- Managing community outreach programs,
- Providing auxiliary services such as student nutrition, school uniforms, books, medical examinations, etc.

The effectiveness and quality of management are reflected in its capacity to utilise and focus people and material resources on meeting set goals. The following are the most crucial elements:
- Strong leadership that can communicate with followers to foster responsiveness and respect for authority figures,
- Organisation and sound direction, and
- decision-making.

Educational Management in Developing Countries

Developing countries have various activities and processes, from planning to budgeting. The formal government executes the fundamental administrative procedures within the confines of the educational system. Following its policies, aims, methods, and educational philosophies, the Ministry of Education is concerned with scholarly work at the national level. The Ministry of Education, which represents the policy and is adopted at the regional or provincial level, describes the administrative processes achieved for educational objectives and execution of the educational approach. The regions take on middle-level management responsibilities for educational activities at the educational district level and put the senior leadership policy into practice. It often gives the academic Department of Education some financial and administrative authority that aids in completing the task and implementing operations. The executive powers must oversee the local schools and create local regulations. Education is the interaction between the school and the community and its association with its ideas, plans, and data for senior management and procedural work areas.

Centralisation Versus Decentralisation of Education Management

The self-determination approach of the government is a vital step in making a modern instructive framework, which is the procedure for making the family and ensuring that the kids can take an interest in their development. The service of Instruction habitually serves as the sole specialist beneath which all instructive teaching and operations are subjected. Notwithstanding their conclusion or interesting circumstances, nearby specialists and sub-departments are included in the implementation handle this way.

In our previous report [17], the duties of the Ministry of Education under a centralised regime are given and discussed. The primary responsibilities include Choosing the educational policies, issuing the government laws, training academic supervisors and teachers, and improving their knowledge and expertise through specially designed rehabilitation and training programmes. Also, Employing adult education programmes to eradicate illiteracy and stop its causes, conducting educational studies and research to improve the educational process while taking into consideration global modern practises and trends that don't contradict societal values, heritage, and traditions, putting into practice initiatives that lay the groundwork and guidelines for the teaching and learning process at all public education levels, Completing the thorough cooperation with all public and private educational institutions involved with technical and public Education to combine academic and educational efforts and accomplish higher educational goals; technically, according to national education legislation. As well as providing the necessary teachers, curriculum, facilities, school supplies, and educational technology for the educational process, Collaborating with other governmental agencies, organisations, and members of civil society to advance science and culture to further the advancement of humankind, completing any additional tasks imposed by the nation's political leadership.

It is worth noting that there is a global trend towards decentralisation in Education; studies have shown that the more decentralised or less centralised the industry and educational decision-making, the more rigid the system of academic authority becomes, leading to the creation of innovation. Countries that have been quick to decentralise the education system have made great strides in improving educational outcomes and quality. Figure 2 illustrates the main structure of the decentralised educational management system.

The Evolution of Educational Administration

To tackle global problems and join the knowledge society, developing education in developing nations became necessary and rational at the beginning of the twenty-first century. It was required to move towards decentralisation in education with the chance for the community to play a bigger role and engage in educational management.

A new structure with the following traits emerged in several nations:
- Decentralisation facilitates task completion and accelerates decision-making,
- Extending and activating delegates, achieving seamless communication in all directions between various departments, sectors, and management levels,
- Increasing communication between departments and individuals by exchanging ideas and perspectives.
- Applying the principle of accountability and clarifying the boundaries, roles, responsibilities, and follow-up processes

A Reaffirmation of Educational Vision

The reaffirmation of educational vision requires an alter of attitude, allowing the advancement of objectives, approaches, and programs supporting the concept. Moreover, the Arranging Commission's 'Vision 2030' contends that such a mentality commits to modern societal goals. The instructive framework must give quality education to children and youth to figure out their potential and contribute to the advancement of society and the country. They ought to make a sense of nationhood, the concepts of resistance, social equity, popular government, territorial nearby culture, and history. Below, we present the future-oriented

proposals for education development at all stages. These suggestions are based on using tools from statistical modelling and operations research. The capability maturity model and operations research scenarios [16] will cover the following topics:

- Reviving the current educational system to meet the social, political, and spiritual demands of individuals and society,
- Fostering a sense of nationalism and solidarity, as well as the desire to establish a welfare state for the people,
- Promoting national unity via mutual respect for one another's beliefs, culture, and ethnicity,
- Providing and ensuring equal educational opportunities for all citizens and giving minorities access to adequate cultural and religious development facilities to contribute effectively to the overall national effort.
- Establishing social and cultural harmony through the deliberate use of the educational process.
- Developing a self-reliant individual, capable of analytical and original thinking, a responsible member of society, and a global citizen.
- Nurturing the individual's total personality is dynamic, creative, and capable of facing the truth as it emerges from the objective study of reality.
- Educating people who are dedicated to democratic and moral principles, conscious of basic human rights, receptive to new ideas, responsible for their actions,
- Engaging in beneficial social activities, increasing the quality of Instruction offered in government-owned institutions by establishing standards for academic inputs, processes, and outputs, and institutionalising the process of monitoring and evaluation from the lowest to the highest levels,
- Enabling the fulfilment of the commitments to achieve the action education for all Goals.
- Widening the access to Education for all and improving the quality of Education, particularly in its relevance to the economy's needs.
- Equalising access to Education by providing special facilities for girls and boys, underprivileged/marginalised groups, disabled children, and adults.
- Eradicating illiteracy within the shortest possible time through universalising quality elementary education coupled with institutionalised adult literacy programs,
- Enabling an individual to earn livelihood honestly through skills contributing to the national economy and making informed life choices.
- Emphasising diversification from general to tertiary Education transforms the educational system from supply-oriented to demand-oriented.
- Preparing the students for the work world,
- Encouraging research in higher education institutions will contribute to the country's accelerated economic growth.

Capability Maturity Model Application

In Educational Management, It is claimed that a process model with enough flexibility to direct learning development is required to improve educational performance in developing nations. Promoting appropriate educational technology resources independent of technical platforms, organisational structures, and pedagogical frameworks is essential. To guide advances in their work while maintaining flexibility in implementation, technology, and business models, software engineers have long realised the limitations of traditional ad hoc practices. The Capability Maturity Model (CMM), a framework for driving process

improvements in an organisation's software development processes, has become a widely accepted standard [5].

A. Capability Maturity Model Overview

The Capability Maturity Model addressed problems resulting from enterprises' incapacity to control the software development process. They couldn't see the advantages of more advanced techniques and equipment since they were always stuck in firefighting mode. The capacity Maturity Model is a five-level framework for assessing the maturity of software development processes at educational institutions and outlining the essential procedures or actions needed to improve the efficiency or capacity of those processes [5].
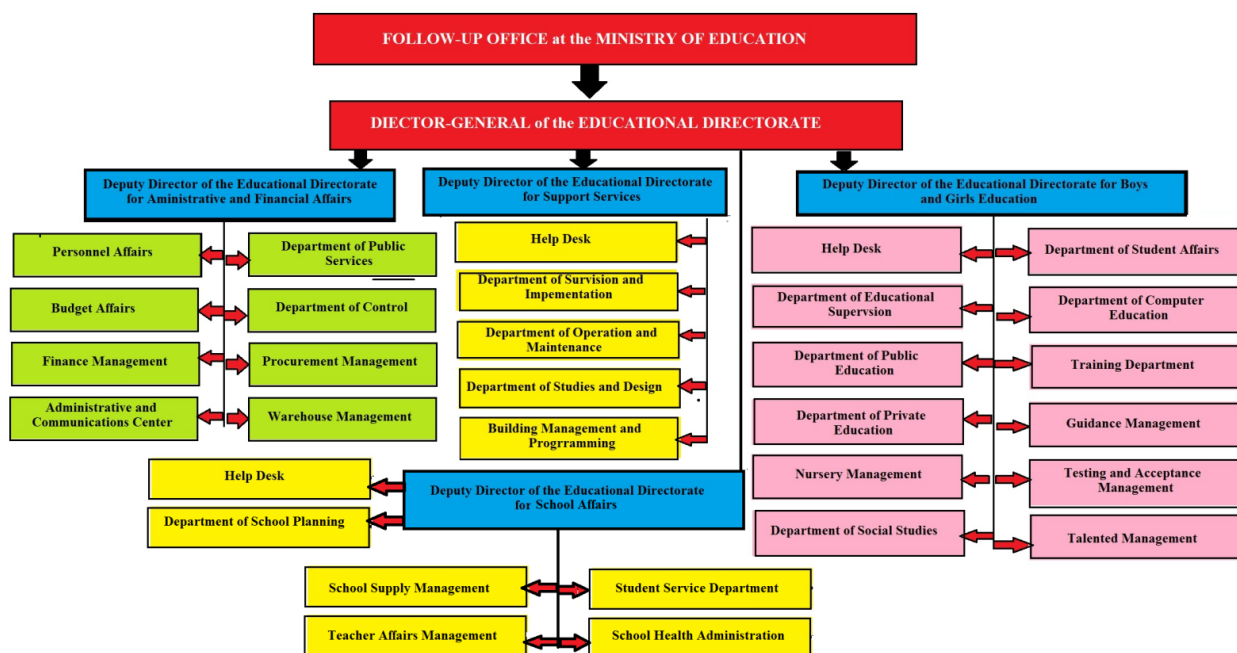
Figure 2: The decentralised educational management structure

1. The capacity Maturity Model is a five-level framework for assessing the maturity of software development processes in educational institutions and outlining the essential procedures or actions necessary to improve the efficiency or capacity of such processes. The model's five tiers can be summarised as follows: 1) Initial (The software development process is sometimes described as ad hoc and even chaotic. 2) Repeatable (Basic project management processes are established to track cost, schedule, and functionality, and the necessary process discipline is in place to repeat previous successes on projects with similar applications), Few processes are defined, and success depends on individual effort and heroism, 3) Defined (The software process is documented, standardised, and incorporated into a standard software process for both management and engineering operations, 4) Managed (Detailed data on the quality of the software development process and the final product is gathered, 5) Optimised (Continuous process improvement is possible by quantitative input from the process and through piloting novel ideas and technologies). Both the software process and products are quantitatively understood and managed. The model offers a roadmap for enhancing an organisation's software development processes [5].

2. The framework provides several waypoints for changing from an ad hoc method of software development to one that is more integrated and always improving. The model also offers a standard by which an organisation may assess its capacity plan and gauge potential future advancements. Additionally, it enables an organisation to determine how well it performs compared to other businesses in the same sector.

3. It helps a company identify and prioritise changes that should be made to its current procedures. The model's recognition of the crucial main process areas required for the advancement of software development, as outlined by present industry experts, is its last advantage. This model provides an ongoing list of key practices and provides the software engineering industry with an everyday basis for discussing and disseminating good practices.

B. Determination of the Education Strategy Processes

Education development in developing countries faces many obstacles; it is necessary to disassemble the strategic educational plan into its components from the core and the subsidiary processes. The core of the education strategy consists of ten pillars, namely: 1) Educational Policy, 2) Educational Management, 3) Educational Economy (Budget), 4) School/University Construction and Equipment, 5) Educational Curricula (Programmes and courses), 6) Educational Teaching Methods, 7) Educational responsibilities, 8) Educational Human Resources, 9) Evaluation, 10) Media and Educational Development Intensive work should be performed to classify the key educational areas (KEA), including all activities and processes. In a previous report [17], these education pillars have five thousand processes. A tree model was suggested to present the pillar's processes.
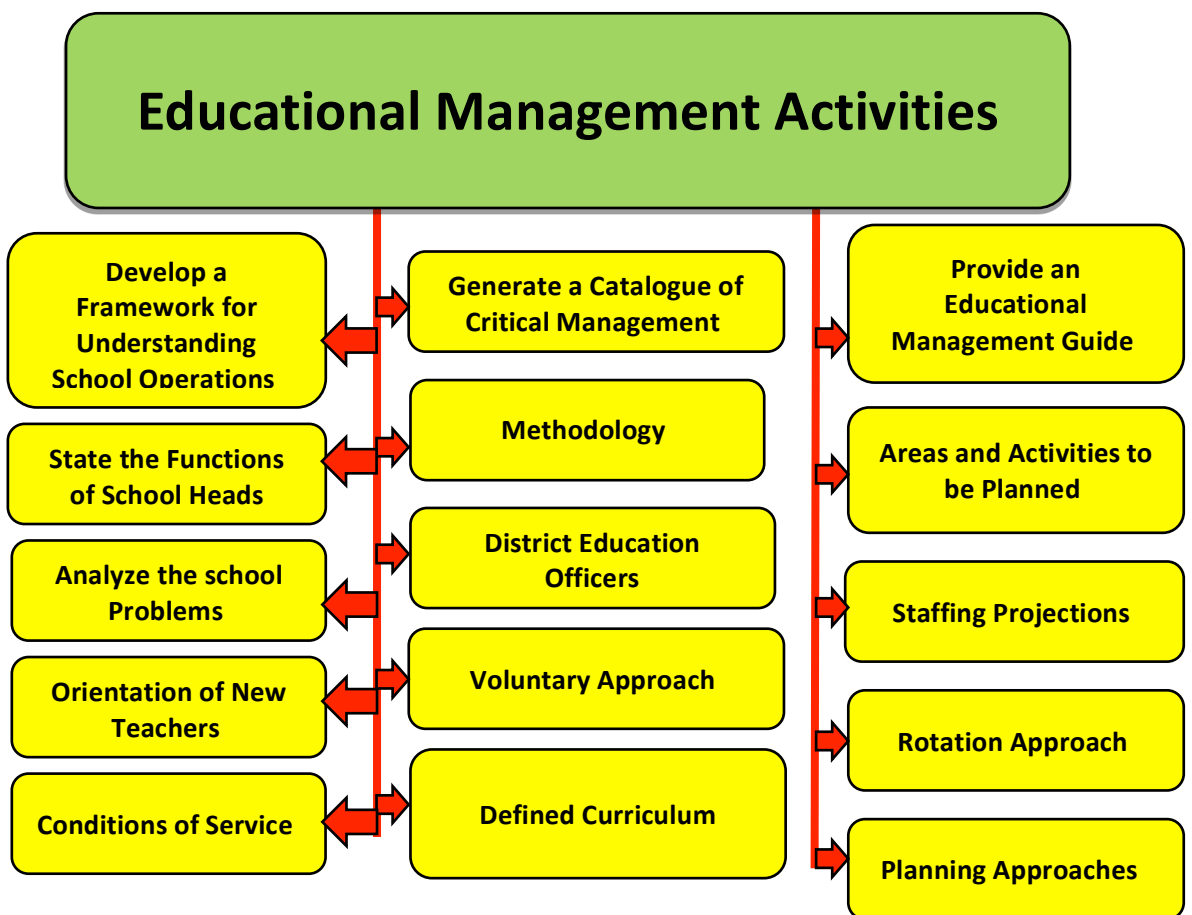
C. Assessment and Measurement Issues

Unfortunately, there is a lack of assessment data in many developing countries. Significant effort-intensive quantitative data about education in these countries was found. As mentioned above, this data was collected by UNESCO, UIS, and International Bank. It is based mainly on the information provided by the official governmental agencies, the Ministries of Education, and each country's statistics institute. These data cover only 5% of the identified processes in all educational pillars. Accordingly, the performance of the academic core structure, including the components of all activities and processes, is missing. The Education modelling (EDUMOD-EGYPT) guide was introduced in a previous report to improve education management, reduce educational waste, and diminish input errors [16]. The execution of this model is based on the selected appropriate mathematical models of the operations research. The design of this model requires valid and reliable data, with clearly analytical measures that can drive all policy changes and considerations. Referring to the EDUMOD-Egypt model described in Ref.[16], Figures 3-8 show the methods of solving problems in education, selected educational management activities, processes, guides, strategies, and plans, respectively.
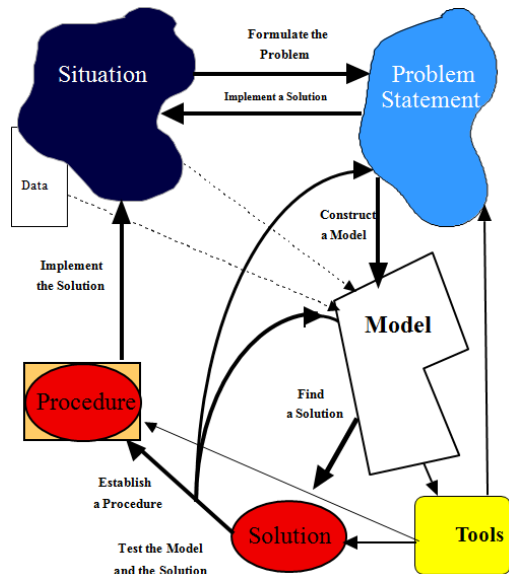
Figure 3: Method of solving a problem in Education using the Operational Research Approach

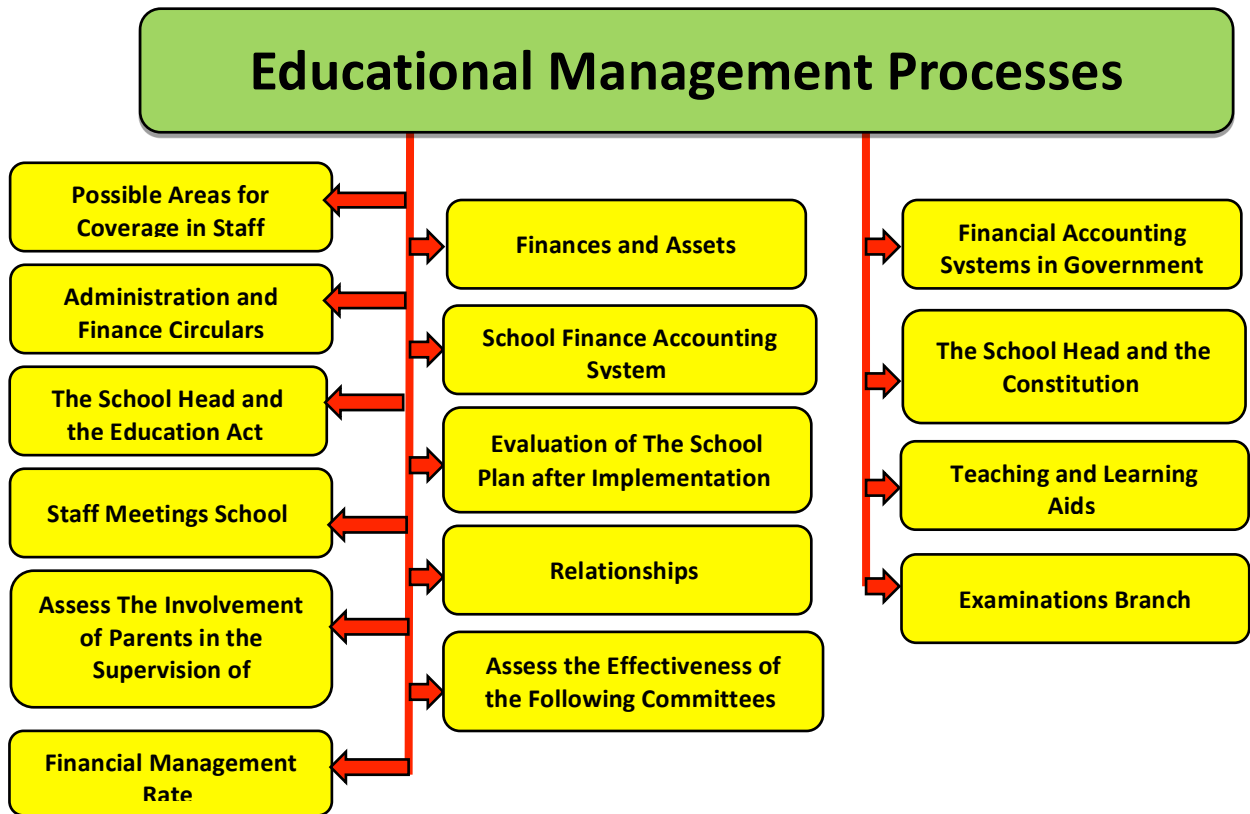**Figure 4: Educational Management Activities**

Educational Management Processes

Possible Areas for Coverage in Staff

Administration and Finance Circulars

The School Head and the Education Act

Staff Meetings School

Assess The Involvement of Parents in the Supervision of

Financial Management Rate

Finances and Assets

School Finance Accounting System

Evaluation of The School Plan after Implementation

Relationships

Assess the Effectiveness of the Following Committees

Financial Accounting Systems in Government

The School Head and the Constitution

Teaching and Learning Aids

Examinations Branch

Figure 5: Educational Management Processes

Provide an Educational Management Guide

Planning

Curriculum

Supervisio

Monitorin

General

Financial

The School

Communication

Staffing

Guidance
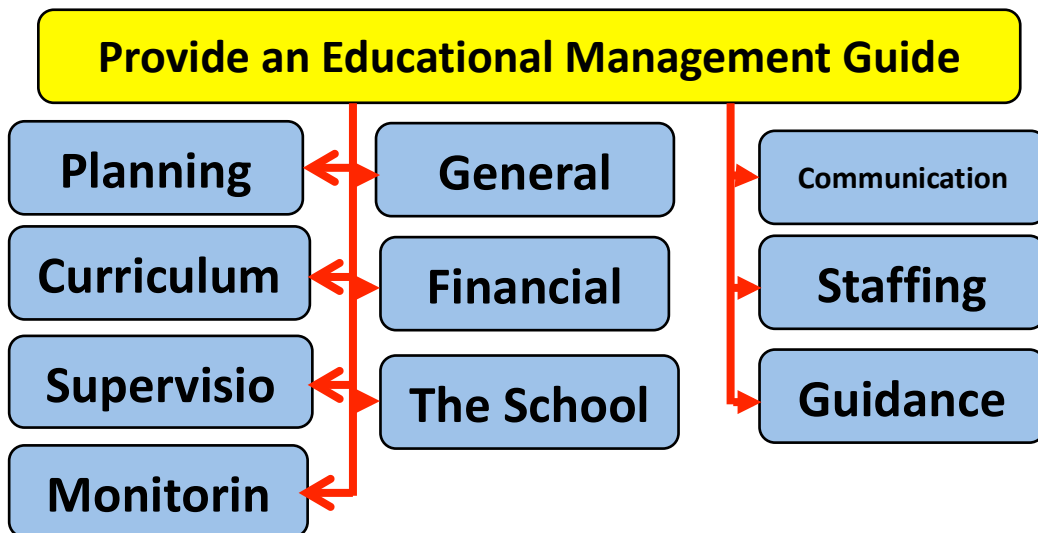
Figure 6: Educational Management Guide

Methodology

- Establish the School Performance at certain Period
- Designing the Means of Achieving Educational Goals at School Level
- Design Mechanisms to Minimize and Prevent Anticipated Problems in Advance
- Chart Ways and Means whereby Functions and Deliberations at School Level
- Provide the Planned Basis and Criteria for Evaluating School Activities
- Identify and Assess School Development

Figure 7: Educational Management Methods

Areas and Activities to be Planned

- The Head and the Law
- Staffing Matters
- School Development Project Plans
- Supervision Plans
- Financial Management Plan
- Monitoring and Evaluation
- Planning Procedures
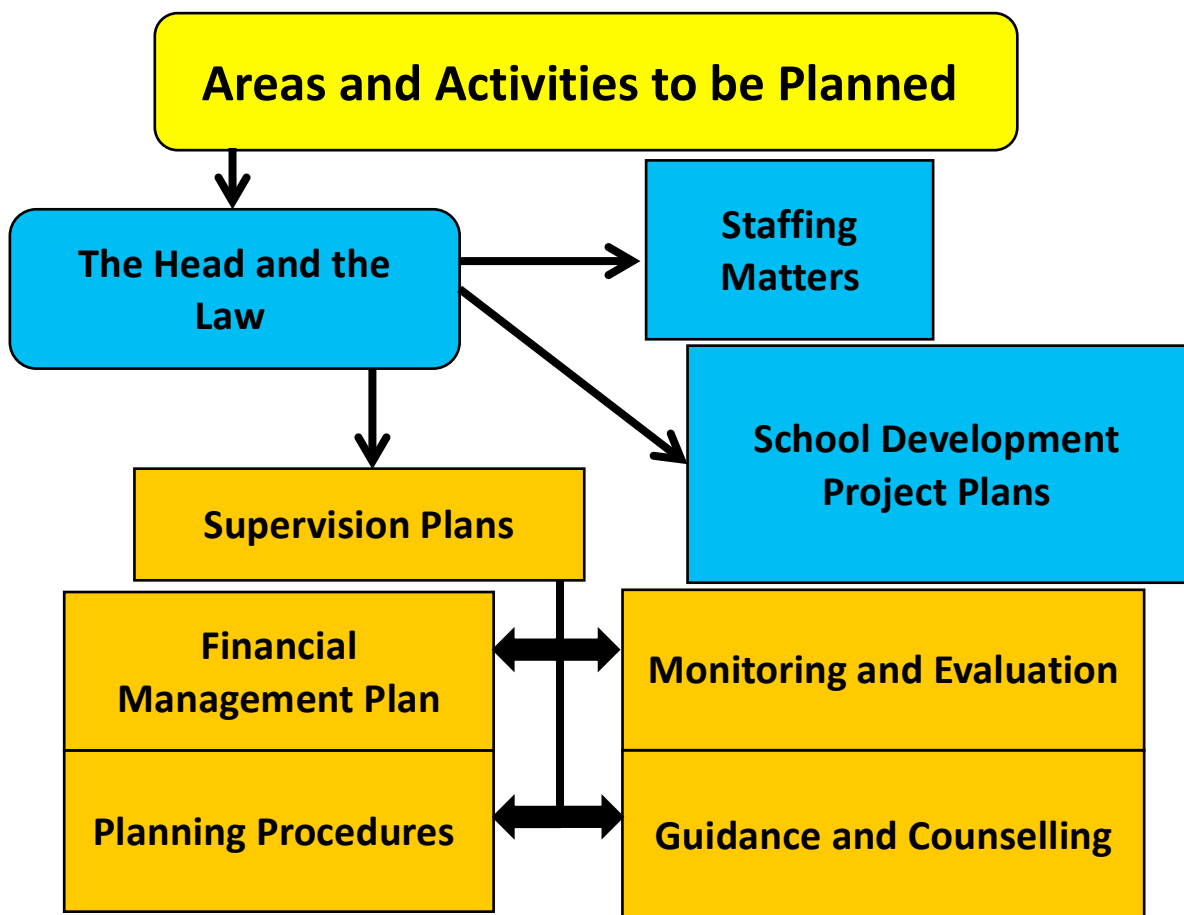- Guidance and Counselling

Figure 8: Areas and Activities to be Planned

Conclusion

From the discourse, we conclude that the official specialists directing the Division of Education's issues are in futile circles in developing nations. They cannot alter the current authoritative structures to keep pace with the fast advancement in education all-inclusive. Existing education management is continuously encompassed by centralism and bureaucracy, driving to clashing choices and squandering of time, materials, and human assets. Lost open conclusion interest, guardians, instructors, and other instruction experts debilitate the competition's chances to address their root issues. Instruction supervisors may end up detainees of schedule, reflected within the design of thought, concealment of actualities, and need for straightforwardness.

Authorities give numerous reasons not to overcome unremitting issues, such as tall student-teacher proportions, need for back staff, need for budgetary assets, school buildings, disregard of foundation support, etc. The part of data innovation in learning overlooks the reality that these classic and exceedingly changed strategies are regularly at the heart of students' dismissal of Instruction. Too, the need to keep up with schools' administration and responsibility frameworks and amplifying the part of compelling oversight and assessment influences instruction and learning results basic to creating society's information. Education directors cannot take duty for the instruction system's disappointment in its current shape. The country must choose what instructive disciplines society needs in maintainable advancement through the national exchange. These disciplines are what understudies ought to learn. Specialists must create fitting educational programmes at each arrangement, decide the pace of learning, agree to age, and distinguish ways to control the learner's execution. It requires, at least at first, a noteworthy authoritative exertion. The Central Instruction supervisors are straightforwardly capable of this lamentable result of schools' inexplainable association, open Instruction, abilities securing, individual improvement, and understudy direction.

Additionally, overlooking basic concerns like individual independence, communication capacities, collaborative learning, information application, and the advancement of values relating to the centrality of a mental get a handle on human issues and circumstances is unsatisfactory. The authoritative work inside the system of applying the rules has no meaning without genuine follow-up, particularly in school upkeep, foundation completion, classroom security, and other instructive exercises. In its current shape, informative administration does not serve instructive destinations, consider programs, asset improvement, appraisals, and intelligence between understudies and instructors. Understudies learning and progress have been prevented through classrooms at all stages. These classes were not outlined for understudy investigations, inventive ventures, collaborative work, or co-teaching. Subsequently, the conventional instruction framework has become unsteady, and the specialist of instructive administration has ended up constrained. Breaking the ancient concept of cognitive control and the basic school framework column. It requires auditing present-day regulatory structures past teachers' capabilities, such as people. At long last, we request that the Ministers of Education in developing countries donate this vital subject with extraordinary accentuation. No sufficient instructors can make a contrast in organisational settings without qualified and empowering bosses working with vision, information, and commitment. Still, it's uncommon to discover top-level policymakers and instruction supervisors who speak this dialect. We require a greater picture to spur those at all levels of administration to meet the instructive desires of the 21st century. We will arrange more

benchmarks and measures for the informational administration framework shortly, helping system execution headways and continuing to explore its common applications.

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