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The paths of education reform[i]

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Abstract

The 21st century has witnessed many global challenges, ranging from climate change and galloping globalization to global terrorism. Furthermore, the onset of the Fourth Industrial Revolution has further exacerbated economic competition between nations in the world. Old skills will become obsolete very fast. Young people will be denied a future if they do not possess skills required by job markets. Education reforms have been undertaken primarily in response to the need to prepare young people to cope with global challenges. This paper explores the evolution of four dimensions of education management reforms (administrative, academic, financial, and human resource management) that should result in enhancing the quality of good national and global citizens. The paper concludes that developed and/or developing country should enhance their reform performance according to the prescribed dimensions.

Keywords: Educational reform, management reform, school-based management, community, teachers, students, performance, 21st century skills

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1. Introduction

The world is now at the dawn of the Fourth Industrial Revolution, which is shaped by globalization and unfolding technological transformations. The confluence of emerging technology breakthroughs has triggered this revolution, covering wide-ranging fields such as artificial intelligence, robotics, the Internet of things, autonomous vehicles, 3D printing, nanotechnology, biotechnology, material science, energy storage and quantum computing. This new revolution will have a big impact on how the new generation will be educated to prepare them for future job markets (Schwab, 2016). According to research from the World Economic Forum, 35% of the skills necessary to get a job today will be different ten years from now. The Fourth Industrial Revolution will mean that, over the next ten years, a third of the skills the economy needs will change due to automation. A child today will have to change jobs at least seven times over the course of their lives – and five of those jobs do not exist yet exist. It is therefore impossible to predict which "hard skills" children in today's classrooms will need for their future jobs. A survey of 900 companies confirmed that soft skills are the most relevant for the future. These skills include teamwork, knowledge of digital tools, an understanding of rules and regulations, responsibility, and commitment. The jobs that even artificial intelligence can't replace will be those that require strong human character traits. Workers will need a positive attitude to re-learn and adapt to new situations as old skills become obsolete (Thomson, 2016). Therefore, the rapidly changing technologies and economic and political landscapes of the world require that education and skills policies should take center stage. Education and skills will have a significant impact on individuals' and societies' capacity to adapt to changes and to take advantage of the opportunities brought about by globalization (Woessmann, 2011).

Education has therefore become an important factor in access to, and exploitation of, available science and technology, and has been considered as part of the solution to global challenges. An educated population provides the type of labor force necessary for industrial development and is the anchor of a harmonious society and a sustainable world. Cognitive skills and non-cognitive skills are important for productivity and social outcomes. Thus, policy discussion revolves around the quality of education. However, skill mismatch has emerged in Cambodia since 2008, because of rapidly changing social and economic landscapes, while education institutions are too slow to catch up with the changes. A successful strategy requires implementation of systemic education reform to deal with complex entities and to solve multiple problems simultaneously. Reform should take place at the school

level. There is a trend in many countries toward increasing autonomy and devolving responsibility to the school level, by encouraging responsiveness to local needs. The objectives of school reform are to raise performance through the implementation of School-Based Management. Therefore, developing countries should embark on education reform to improve school and teacher characteristics, as well as child and family characteristics.

In this regard, education quality and not just access to education should be at the heart of education policies. Education must equip students with both cognitive and non-cognitive skills, so that they will be able to face an uncertain future and cope with global challenges. Therefore, education reforms should be implemented by both developed and developing countries to achieve Sustainable Development Goals (SDGs) and notable lifelong learning, with strong emphasis on 21st century skills. Improving critical thinking and problem-solving skills of students is essential and will enable students to adapt better to rapidly changing technologies and labor markets. In response to the above educational challenges, the Cambodian Ministry of Education, Youth and Sport (MoEYS) has embarked on an education reform program by adopting the Medium-Term Review of the Education Strategic Plan 2014-2018 with projections until 2020, which outlines a 21st century educational agenda (MoEYS, 2016).

Figure 1: Landscapes of Educational Reform

Administrative and General Management	*Academic Management*	*Education Finance Management*	*Personal Management*
• Education policy and strategic planning • School-based management • Community in school management	• Education curriculum and textbook Management • Learning and teaching process • Student assessment and school inspection	• Education finance allocation • Financial autonomy and accountability at school • Education budget audits	• Pre-service training • In-service training • Teacher performance assessment

Source: Author

In view of the above, the most pressing issue for MoEYS is to embark on an in-depth reform program that will contribute to significantly increasing the number of youth and adults with strong literacy, numeracy, and soft-skills combined with technical and vocational skills, for gainful employment and entrepreneurship. The in-depth reform in the coming agenda may take into account administrative and general management, academic management, education finance management, and personal management (as in Figure 1).

These four dimensions are examined rigorously from literature and author experiences.

2. Administrative and general management reform

Education management systems are complex. UNESCO (1989) identified three major classifications of educational management theories in professional literature and suggested four criterion-based models: efficiency-based administration, effectiveness-based administration, responsiveness-based administration, and relevance-based administration. Let us look at each of these theories below:

(i) *Efficiency-based administration* is derived from the classical school of administration and is induced from the practice of school executives who behave according to the views of general, scientific and bureaucratic management, based on the criterion of economic efficiency. The objective of educational administration is to secure the means suitable for attaining production goals and a high degree of productivity.

(ii) *Effectiveness-based administration* is related to the psychosocial school of administration and is derived from the evaluation of the practical experience of school executives who adopt the principles of the behavioral approach to administration.

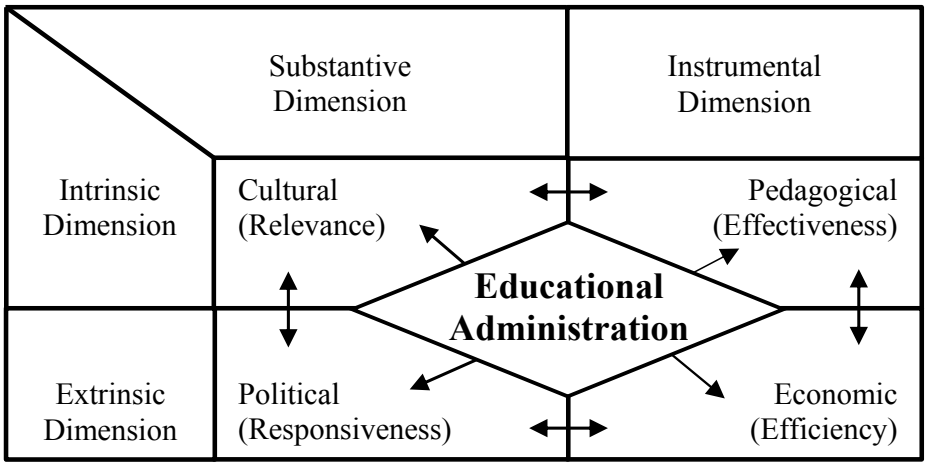
(iii) *Responsiveness-based administration* is based on management theories and is analytically induced from different practical experiences in public and educational administration. The protagonists of these contemporary movements consider any organization as an open and adaptive system.

(iv) *Relevance-based administration* is derived from recent and current interactionist formulations founded upon phenomenology, existentialism, the dialectical method, critical theory, and the human action approach.

The education system is multi-layered at both horizontal and vertical levels. At the horizontal level, UNESCO (1989) synthesized and classified educational management models into a multi-dimensional paradigm, which is composed of four interacting dimensions: the economic, pedagogical, political, and cultural. Improving educational outcomes requires reforming the four education management system components simultaneously (Figure 1).

The educational administration as proposed by UNESCO (1989) can be defused to three levels of management including education policy and strategic planning, school-based management, and community involvement in school management.

Figure 2: A Multidimensional Paradigm of Education Management



Source: UNESCO, 1989.

2.1. Education policy and strategic plans

Education systems are contested terrains (Verdugo, 2014). Education systems are served or conceptualized for different ends in the historical, political, cultural and social context in which they are positioned. Many scholars support the contested nature of education systems. Verdugo (2014) highlights that history, culture and governance regime sets the context for education reform and policy. Taylor (1997) emphasizes that education policy and reform have a political nature in which the policies result from competing struggles between actors and concepts in which the absence in the policies is due to the exclusion of some actors and the concepts in the policy process. For these reasons, educational reform may not be considered as a homogenous process. However, the homogenous character is not absolute.

In the 21st century, characterized by a fast changing globalized era, on the one hand, education system serve a global knowledge economy or economic development of the nation. On the other hand, global actors such as UNESCO, WB, and ADB etc. have been increasingly involved in global education agendas. This has resulted in homogeneity in education policy. This homogeneity is displayed by the emergence of big policies for a small world or the emergence of global education policies. These phenomena require new values and understanding of education and a new paradigm of education policy and reform. Patrick Shields (in Anson, 1994) argues that pedagogically, politically, and practically, schools and communities must be brought together as school reform moves into the 21st century. Public policy must include families and communities more directly in the education of all students.

In the new area of industrialization, education policy and reform are employed for industrial development requiring the workforce to be well trained to meet the needs of the economy. To this end, educational policy and reform aim to provide appropriate responses to these varying needs at different phases of economic development. Educational change should be based on comprehensive knowledge and well-researched understanding of education issues rather than based on political and ideological preference to optimize the success of the education reform. The failure of most education reform in the world is due to political interference and ideological adherence (Levin, 2010).

As part of education reform, administrative and general management reform also requires the coordination between, on the one hand, the implementation of policies at the national level, such as the national education policy, the Education Strategic Plan (ESP), the Law on Education, related policies and administrative structures (e.g., divisions of education management at national provincial, district and school level) and, on the other hand, the implementation of policies at school level, such as school management and community involvement in school activities. Advocates for comprehensive education reform argue reform strategies built from diverse perspectives are necessary to support continuing participation of ideological adherents, as well as those who demand a predetermined organizational form or pedagogical design. This requires linking school and district level initiatives to national policy development.

2.2. School-based management

The education management system consists of education policy management (Ministry of Education), the teacher training system, and the school. Hoy and Miskel (2008) provided a synthesis of education management at school level. Schools are open social systems with five important elements or subsystems: the structural, the individual, the cultural, the political, and the pedagogical. Organizational behavior is a function of the interaction of these elements in the context of teaching and learning. The teaching-learning process is the technical core of the school social system. The environment is also a critical aspect of organizational life. It not only provides resources for the system but also provides additional constraints and opportunities. Effectiveness indicators can be derived for each phase of the open-systems cycle-inputs (human and financial resources), transformations (internal processes and structures), and outputs (performance outcomes).

Seeing the school as an open system implies a set of interaction elements that involves the acquisition of inputs from the outside, their transformation, and conversion into outputs for the environment. People, raw materials, information, and money are the typical inputs for schools. In the transformational process, these inputs are changed into something of value called outputs, which are then exported back into the environment. Outputs are usually products and services, but they may also include employee satisfaction and other by-products of the transformation process. Classrooms, books, computers, instructional materials, teachers, and students are critical inputs for schools.

Transformational criteria refer to the quantity, quality, and consistency of the internal processes and structures that transform the inputs into outcomes. Examples of transformation criteria are the structure and content of the curriculum, the health of the interpersonal climate, motivation levels of students and teachers, teacher and administrator leadership, quality and quantity of instruction, and quality-control procedures such as the number of tests given, evaluation of teaching, use of instructional technologies, and personnel evaluations. To maximize school effectiveness, the internal elements of teaching and learning, bureaucratic expectations, group culture, political expectations, and individual needs must work harmoniously together to produce the desired performance goals.

Priscilla Wohlstetter, Roxane Smyer and Susan Albers Mohrman (in Anson, 1994) identified four resources needed to make school-based management a powerful lever for reform. In addition to devolving power, knowledge and skills must be developed; information about the context and goals of an organization must be available; and rewards must be based on performance. They found that success was tied to more shared power among many participants, extensive training to take advantage of opportunities and a system of collaboration and information sharing.

Reform should take place at the school level. There is a trend in many countries toward increasing autonomy and devolving responsibility to the school level, by encouraging responsiveness to local needs. The objectives of school reform are to raise performance through the implementation of School-Based Management. Therefore, developing countries should embark on education reform to improve school and teacher characteristics, as well as child and family characteristics.

2.3. Community involvement in school management

According to Cheng (2001), there are three waves of education management reforms. Different countries, facing different historical, economic and

contextual conditions, are at different phases of reform. The following are the key paradigms and characteristics of the three waves of education management reforms in international contexts.

The first phase of education management reform emphasizes *internal effectiveness*, by enhancing internal school performance, especially the methods and processes of teaching and learning. This top-down approach aims to ameliorate school arrangements and education practices in order to reach the goals and objectives at the school or the system level. The target is to increase teacher and student performance to some pre-defined standard.

The second phase of education management reform focuses on *interface effectiveness* in order to realize education quality, stakeholders' satisfaction, and market competitiveness. The interface between the school and the community requires quality assurance, school monitoring, parental and community involvement in governance, school charters, and performance-based funding.

The third phase of education management reform concerns future effectiveness in order to respond to the new education functions in the 21st century and to ensure relevance to learning, teaching, and schooling within the context of 'triplization,' i.e., globalization, localization, and individualization. Education globalization offers opportunities for Internet-based learning, video-conferencing, and international collaboration in learning and teaching. Localization in education includes community support and parental involvement, school-based management, and community-related curriculum. Individualized education programs and individualized learning targets and methods motivate students and teachers to be self-learning, self-actualizing, and self-initiating (Cheng, 2001).

Other characteristics of education management reform in Singapore emphasize competition among schools. Schools are forced to improve their programs and parents can make choices based on ranking. Secondary schools have been ranked based on three criteria: (i) composite measures of students' overall results in the annual General Certificate of Education (Ordinary) Level examination; (ii) students' examination performance with their examination scores upon entry to their respective schools (after O Level); (iii) weighted indices of school performance on the National Physical Fitness Test and the percentage of overweight students in school.

Education reform in developing countries covers a wide range of issues, many of which are not just educational in nature. During the last two decades, education reforms have shifted from ideology-based changes toward a paradigm shift. While reviewing factors that determine how many

years children are enrolled in school, and how much they learn while they are in school, Glewwe (2014) classified such factors into two broad groups: (1) school and teacher characteristics; and (2) child and family characteristics.

Policies that change the incentives received by students and parents are demand-side policies that support schooling. Conditional cash-transfer programs have become more common in developing countries (World Bank, 2009). There are four types of incentive programs commonly used in development programs: (1) Conditional cash-transfer programs, which provide parents monthly payments conditional on their children attending school regularly; (2) payments to students based on their academic performance, such as exam scores; (3) school-voucher programs that provide funds that parents can use to enroll their children in schools; and (4) 'food-for-education' programs that provide children with meals at school or supply their families with foods to be consumed at home. A third policy category focuses on supply-side schooling issues and seeks to make the supply of educational services (e.g., teaching, library services, management, etc.) more responsive to the demand for education. Often, these policies take a very school-based management approach to addressing supply-side issues

3. Academic management reform

It requires the coordination between the national curriculum standards, examinations, and learning assessment at the national level and teaching and learning, school inspection, and student achievement at the school level. For reforms to succeed, teachers need special time to learn, to teach, to innovate, to learn new skills and ideas, to carry out administrative work, and to solve problems (Joseph Cambone in Anson, 1994). He stressed that reforms should not interfere with a teacher's time for teaching. Moreover, teachers should integrate reform into their individual teaching context. Collaboration is needed to promote interaction, support, and intellectual growth. Teacher professional development encourages evolving individual perspectives on change (Judith Warren Little in Anson, 1994).

Jane David (in Anson, 1994) proposes to effectively harness the power of technology to promote school reform. Technology itself is not the answer to questions of reform but can be a powerful part of the answer. ICT must be accessible, functional, and supported by proper training.

3.1. Education curriculum and textbook

Systemic reform is a comprehensive change program designed to modify schools in an integrated, coordinated, and coherent fashion to achieve clearly

stated educational outcomes (Fuhrman, Elmore, and Massell, 1993, cited in Hoy and Miskel, 2008). The basic priority of systemic reform is to define ambitious curriculum content and achievement standards in core academic subjects and to tightly couple the goals with an assessment program. The alignment of curriculum content and achievement standards with assessment procedures creates an accountability system for monitoring the efficiency and effectiveness of K-12 schools.

After the onset of the Asian Financial Crisis in 1997, major education management reform initiatives were launched to foster creativity and innovation in students. The first one was '*Thinking Schools, Learning Nations*'. The education reform strategies included: (i) teaching of critical and creative thinking skills; (ii) the reduction of subject content; (iii) the revision of assessment modes; and (iv) a greater emphasis on processes instead of on outcomes when appraising schools. The second initiative was the '*Masterplan for Information Technology in Education*' to promote information technology in teaching and learning in all schools. This initiative aims to establish whole-school networking and to provide computers to students and teachers (Tan and Gopinathan, 2000).

Hong Kong embarked on the first wave of education management reform during the 1970s by using a top-down approach and increasing resource inputs, aimed at improving language teaching and learning, teacher quality, and curriculum development, as well as teaching and learning conditions. However, the impacts of the first wave of reform were limited, because the reform ignored school processes and school-based needs (Cheng, 2001). To address these deficiencies, Hong Kong initiated in 1997 a second wave of education management reforms, characterized by: (i) school-based management approach (schools are not homogenous; schools are the unit of improvement); (ii) bottom-up reform (school principals and teachers are at the forefront of education management reform in terms of education practices and quality improvement); (iii) quality assurance and accountability (schools have the autonomy and flexibility to use public resources to implement activities within a framework of accountability); (iv) awareness of the need for research (the use of knowledge and research to support policy discussion and formulation and to improve education practice). At present, Hong Kong is embarking on the third wave of education management reform in response to technological, economic, social, political, cultural, and learning globalization. The aim of the reform is to support students to become citizens of multiple intelligence (CMI), i.e., within the Howard Gardner (1993) framework of seven human intelligences, including: (i) musical intelligence, (ii) bodily-kinesthetic intelligence, (iii)

logical-mathematical intelligence, (iv) linguistic intelligence, (v) spatial intelligence, (vi) interpersonal intelligence, and (vii) intra-personal intelligence.

A large body of research points to cognitive and non-cognitive skills as being important in the process of development, over general educational access. The assumption of such research is that education plays an important role in creating a skilled workforce and an educated population is more productive because education forms modern values, attitudes and behavior for a modern industrialized economy. Hanushek and Woessmann (2008), however, argue that expansion of education attainment has not guaranteed improved economic conditions. They maintain that cognitive abilities of the population – rather than mere education attainment – are powerfully related to individual earnings, to the distribution of income, and to economic growth. More and more policy discussion, therefore, focuses on education quality. Cognitive skills are considered as 'hard skills' of cognitive ability in areas such as literacy and numeracy, which are measured by academic tests (Gutman and Schoon, 2013). Thus, cognitive skills are associated with intelligence and the ability of problem solving (Falch et al., 2012). Indeed, the aims of education are to develop a well-rounded person and an engaged human being. Overall, acquiring cognitive skills is also the main objective of education. Most assessments of school reforms underline the gains from reforms as measured by the ability of students to perform well on standardized achievement tests (Heckman and Rubinstein, 2001).

Education plays an important role in creating a skilled workforce. An educated population is more productive because education forms modern values, attitudes and behavior for a modern industrialized economy. Hanushek and Woessmann (2008) argue that expansion of education attainment has not guaranteed improved economic conditions. More and more policy discussion focus on the 'quality' of education: (i) Cognitive skills are considered as 'hard skills' of cognitive ability in areas such as literacy and numeracy; (ii) Non-cognitive skills are also important for productivity and social outcomes; and (iii) Learning is a lifetime affair. Learning starts in infancy long before formal education begins and continues throughout life.

3.2. Learning and teaching process

Wideen (1994) identified the context of educational change, which is based on five areas – curriculum reform, school improvement, school effectiveness, teacher research, and teacher development. Curriculum reform involves better use of curriculum materials. School improvement reforms consider a school to be the unit of change. Therefore, such reforms aim to

solve the problems and the internal conditions that the school is facing. The school effectiveness approach focuses on student achievement. The teacher research approach requires the teacher to conduct research to improve teaching. The teacher development approach focuses on the teacher as the innovator and change agent. In all these approaches, the teacher remains central to the process of school reform.

However, several recent studies show that non-cognitive skills are also important for productivity and social outcomes. Drawing on a body of recent scholarship regarding education and training, Heckman (1999) pointed to the fundamental misconceptions about the way socially useful skills embodied in persons are produced. Numerous instances can be cited of high-IQ people who failed to achieve success in life because they lacked self-discipline and low-IQ people who succeeded by persistence, reliability and self-discipline (Heckman and Rubinstein, 2001; and Heckman et al. 2013). Jencks (1979) found that personal traits such as leadership, industriousness and perseverance had substantial impact on individual earnings and educational attainment when holding family characteristics and cognitive skills constant.

Citing recent research in psychology and cognition, Heckman (2000) stressed the importance of skill formation during the early pre-school years when human ability and motivation are shaped by families and non-institutional environments. Skills formed during early infant and preschool years can translate into success or failure in school and in post-school learning. For that reason, families and environment play a crucial role in skill formation at an early stage. Much of the effectiveness of early-childhood interventions can contribute to the development of non-cognitive skills and create motivation later on in life (Heckman, 2000). Learning continues after school. This is known as learning by doing and workplace education. Post-school learning accounts for as much as one-third to one-half of all skill formation in the modern economy (Heckman, Lochner & Taber, 1998).

Effective education reforms require dealing with different components of the education system, such as (1) school and teacher characteristics; and (2) child and family characteristics. Government policies can have direct (and indirect) impacts on school and teacher characteristics. Policies aimed at changing teacher and school characteristics are those that focus on the supply side of schooling. Glewwe, Hanushek, Humpage and Ravina (2014) examined a total of 79 studies related to the impacts of a broad range of variables on student learning as measured by test scores. There are over 30 school and teacher characteristics that can have impacts on student test scores. They can be classified into three broad types: (1) school

infrastructure and pedagogical supplies; (2) teacher (and principal) characteristics; and (3) school organization.

The studies reviewed by Glewwe and his colleagues found that school infrastructure and pedagogical materials have positive effects on test scores. Most of the studies (36) provide strong evidence that textbooks and similar materials (workbooks, exercise books) increase student learning. The next most commonly estimated impacts are those of basic furniture (desks, tables, and chairs) and of computers and electronic games. Adequate amounts of desks, tables, and chairs raise student test scores. However, the results for computers are less clear. This suggests caution when using scarce funds for purchasing computers and related products. Electricity also has a positive effect on student learning, as electric lighting helps students read, see the blackboard and fans keep the classroom cool. Blackboards and visual aids also have similarly positive effects.

Teacher (principal) characteristics are crucial in determining students' learning outcomes, as there is strong evidence that with the same funding, some schools are of high quality, while others are of low quality with the variance accounted for by differences in principals' competence levels. Glewwe et al., (2014) reviewed research during the last two decades related to the causal impact on students' years of schooling and learning by such factors as basic school and teacher characteristics (e.g., a teacher's level of education, experience, knowledge, gender, in-service training and teaching degree, as well as pedagogical methods used), which corroborated these findings.

School organization includes class size (student-teacher ratio), teacher absenteeism, the frequency of assigned homework, school meals, multi-grade teaching, hours in the school day, tutoring, salaried teachers, contract teachers, expenditure/pupil, cost of attendance, total school enrolment, group work, the frequency of teacher-provided examples, and student attendance.

Improving learning outcomes in developing countries requires the implementation of policies aimed at improving child and family characteristics. Although child and family characteristics are often difficult to change through government policies, some policies aimed at improving child health can have important effects. Thus, Glewwe (2014) classified these policies into three broad types: policies that alter student characteristics before they begin primary school; policies that are designed to alter student and parent behavior; and policies that attempt to change the way that schools are operated in terms of both the management structure and incentives received by teachers and school administrators.

Child characteristics in the first years of life can most easily be changed through early childhood education (ECE) and child health and nutrition programs. There is strong evidence that preschools can have positive effects on children's education and on their income-earning outcomes in the long run. As many children in developing countries suffer from malnutrition and poor health, children's learning outcomes depend on their health and nutritional status. Alderman and Bleakley (2014) reviewed the impact of poor health on education outcomes in developing countries and identified malnutrition and parasitic infections as key dimensions that have potential not only to increase years of schooling but also to increase learning per year of school. Public interventions to improve child health lead not only to increased economic efficiency by addressing externalities but also reduce inequality, as they target poor households. Learning is a continuous process for individual students; similarly, social development is based on the experience and understanding students can achieve during their schooling (Barron et al., 2015).

3.3. Student assessment and school inspection

Moreover, Paulston (1976) compares education reforms to Kuhn's paradigm shift or the shift in conceptual world-views. As a paradigm shift, education reforms bring new conceptual frameworks, introduce new educational aims and views on how people learn, and require the adoption of new teaching and assessment approaches and materials, etc. (Irez and Han, 2011).

Hang-Chuon (2015) proposes the following key elements of systemic education reform: (i) teacher policy reform, (ii) school inspection; (iii) learning assessment; (iv) curriculum review; and (v) improvement of school infrastructures.

4. Financial management reform

Education Financial Management Reform involves more resource allocation to the education sector, while making sure that school budgets and additional resources are well managed at the school level. A government may choose to restructure its expenditures to reallocate resources from higher education to lower levels of education (Tiongson, 2005). Financing reform may also include a transfer of budgetary resources directly from the National Treasury to schools or to improve financial procedures and governance to require better learning outcomes (Hang-Chuon, 2016).

The process of education management reform is complex and dynamic. There are many factors that influence educational change. Change will only take place when more factors support the implementation of

education management reform. Fullan (2007) argues that influencing factors often have a different impact in different settings of change. Fullan makes the argument for coordinating top-down and bottom-up strategies to create a more comprehensive and coherent model for effective change to take place.

Coordination between top-down and bottom-up reforms requires the following actions. Firstly, at the national level, education management reform measures should focus on providing financial support and encouragement, as well as exerting external pressure on, and support for, schools to implement reform programs. External support such as in-service training programs to improve teaching methods support new teachers and provide mentoring for those in need. Secondly, at the school level, school organization, such as a positive school climate, and teachers who are supporting each other by exchanging ideas and experiences through a learning community will facilitate reform programs.

Fullan (2007) elaborated on conditions required for whole system education reforms to occur successfully. In this respect, he believes that reform should put educators and students at the center. Reform should take place in the classroom for improvements in learning to take place. Thus, Fullan (2007) argues that the day-to-day culture of school systems is the critical element that propels and sustains reform. Therefore, intrinsic motivation, instructional improvement, teamwork, and all-ness are the anchors of school reform. According to Fullan, successful educational reform requires an established rapport between top-down/bottom-up strategies. This needs to happen locally between district and schools and provincially between government and school boards. The forces of change are complex, but a recommended approach is to explore combined strategies, learn from them, and work towards refining and strengthening abilities to work together.

Finally, reforms need to consider that there are four critical elements of change: people, practices, processes, and policies. People must engage change in a context of useful practices and enable policy support that allows all the actors to work together (Suzanne Stiegelbauer in Anson, 1994).

4.1. Education finance allocation

Fägerlind and Saha (1989) stated that education resource allocation reform results in ‘a fundamental alteration in national education policies. This in turn causes major changes in some or all of the following: (i) increases in the national allocation of resources to the field of education; (ii) increases in the allocation of resources within the existing education system to other levels of the system; (iii) the percentage of students completing different levels of the

education system; (iv) the percentage of students from different social strata or the percentage of female students that complete different levels of the education system; and (v) the aims of curricula and content.

There has been impressive progress in expanding total exposure to schooling (enrolment, retention, grades completed) in nearly every developing country. But in many developing countries, learning levels remain low and there is no evidence of the same type of rapid uniform progress. In some countries, the situation has worsened. However, in other countries, such as Vietnam, learning outcomes are at or above OECD levels (Pritchett, 2015). The Education Commission (2016) considers that by 2030, more than half a generation of young people will be denied a future because they will not have the skills needed for the changing job market. The Commission considers that 'for any improvement in the design and delivery of education to succeed, they must be underpinned by a system that is built to deliver results'. Therefore, systemic educational management reform is crucial for developing countries to ensure high and sustained economic growth. Strong result-driven systems are those, which ensure coherence across goals, policies, and spending as well as a clear route from policy to implementation and effective governance and accountability.

Education is a complex system embedded in a political, cultural, and economic context. The political, cultural, and economic dimensions of education are inter-dependent and influence each other. Therefore, education is systemic in nature. Some previous studies reveal that the key to successful education reform is to embark on systemic reform, which deals with complex entities to resolve multiple elements and problems simultaneously (Anson, 1994; Fullan, 2007; Education Commission, 2016). Recent research has also shown that increasing investment in educational inputs does not necessarily lead to improvement, because education performance depends on systems management (Pritchitt, 2015). If the education systems are weak, adding more resources will not lead to quality improvement. Pritchitt (2015) provides the following explanation:

- Indonesia doubled teacher salaries and a rigorous evaluation shows exactly zero impact on learning.
- India increased federal spending by tenfold and overall per pupil expenditure tripled and yet a decade of ASER assessments (and other sources) show that learning is worsening.
- A rigorous evaluation of reducing class sizes in Kenya by hiring contract teachers showed learning improvements when implemented by an NGO – but the exact same program had zero impact when implemented by the MOE.

- Additional textbooks in any subject may have zero impact unless they were accompanied by changes in teacher incentives.
- The Commission found that 'for any improvement in the design and delivery of education to succeed, they must be underpinned by a system that is built to deliver results'.

4.2. Financial autonomy and accountability at school

Anson (1994) proposed a systemic school management reform framework that includes many aspects of education services, such as implementation of assessments, teachers' professional development, School-Based Management (SBM), the use of technology etc. Fuhrman (1994) regards the concept of systemic reform as covering curriculum framework, student assessment, instructional materials, teacher licensing and staff development. Tiongson (2005) considers that education reforms concern policy changes to expenditure structure, financing schemes, and management. Ouellette (2000) defines systemic reforms to include: content standards, performance standards, student assessments, accountability systems, teacher preparation, professional teacher development, governance structures, and public support. Fullan (2007) is of the view that successful implementation of systemic reform requires clarity of goals of the reform, institutional capacity, financial and technical support to teachers, principals and other stakeholders, as well as a sound monitoring and evaluation mechanism.

Many definitions of systemic education management reforms refer to school-based decision-making or School-Based Management (SBM). SBM is the decentralization of authority from the government to the school level. Responsibility for, and decision-making authority over, school operations is transferred to local agents. Such agents can be a combination of principals, teachers, parents, sometimes students, and other school community members. SBM reforms also aim to empower principals and teachers and strengthen their professional motivation, thereby enhancing their sense of ownership of the schools where they work. SBM aims to improve accountability by: (i) granting schools autonomy to make decisions in order to improve the compact between those who oversee service provision and those who deliver it; and (ii) inviting parents to participate in the decision-making process in order to increase their voice in the delivery of services (Bruns et al., 2011).

Bruns et al. (2011) provide a comprehensive analysis of education service delivery from the perspective of the principal-agent problem. Ministries of Education are the agents of the citizenry, while parents and students can be considered as principals, who try to demand education

quality. The users of education services hold the state accountable. At the same time, the state also holds service providers (schools and teachers) accountable for their performance. The World Development Report 2004 describes a framework for a three-cornered relationship between citizens, politicians, and service providers. The service provision and accountability relationships among these actors are complex. There are many groups of actors involved. The incentives and accountability relationships that work for one group may be different from those that work for other groups (World Bank, 2003). Thus, SBM can be considered as a form of bottom-up systemic education management reform.

There is a trend in many countries to increase autonomy, decentralize responsibility, and encourage responsiveness to local needs in order to improve performance (Bruns et al., 2011). However, from time to time, the market for education suffers from market failures. This requires the government to intervene and rectify the problems. In order to improve education services, many countries have adopted a set of three accountability reform strategies (Bruns et al., 2011):

- Information for accountability: This refers to the generation and dissemination of information about school rights and responsibilities, inputs, outputs, and outcomes;
- School-based management: This refers to the decentralization of school-level decision making – autonomy – to school-level agents;
- Teacher incentives: This refers to policies that link pay or tenure directly to performance.

Tan and Gopinathan (2000) provide a synthesized review of a series of education management reforms in Singapore. Since the mid-1980s Singapore has implemented a series of education management reform programs, aimed at enhancing national economic competitiveness in the global economy. Education management reforms in Singapore focus on increased school autonomy and interschool competition. Initially, the Ministry of Education granted eight (or five percent of 163) secondary schools autonomy and flexibility in recruitment, deployment and reward of staff, finance, management, and curriculum. However, these independent schools were criticized for their elitist nature and for charging high fees. This then led to the creation in the 1990s of 18 autonomous schools, which charge more affordable fees, but enjoy less operating autonomy.

4.3. Education budget audits

The budget audit aims at improving the governance in MoEYS and it helps to accomplish the objectives and missions of the technical departments and

provincial/district offices of education. The results of the financial audit enhance systemic and disciplined attitudes to evaluate and improve the efficiency and effectiveness of the intervention strategies. The audits will advise on the risk management and mitigation plan and levels of control and governance process. MoEYS is concerned about the effectiveness of the service delivery to school level, especially schools in disadvantaged locations.

The increase of teacher salaries and the school improvement fund in the last few years enabled the schools to build capacity to manage and respond to the results based on the school development plan. The issues in school budget management are deeply rooted in the school management cultures in the past decades of plan-oriented measures and lack of flexibility since the budget has been prescribed by the upper level for schools to spend. Schools are categorized by their level, such as pre-school, primary school, lower secondary school, and upper-secondary school with various levels of management even if they are located in the same compound. This creates fragmentation of management and causing staffing inputs for the budget management at different schools. Capacity assessment of the schools is needed as each school has its own uniqueness and leadership and management styles based on staff and locations.

The future strategic directions should enable the schools some level of autonomy of budget execution in line with the actual needs and emerging responses to classroom and teacher performance needs for improved teaching and learning at school level. Increase of the education budget per student is necessary to improve the school environment and management. It has proven ineffective when the budget has been earmarked for some particular activities that sometimes schools found unnecessary, but they have to spend as it was given rather than requested to fulfil the needs.

5. Human resource management reform

It requires the coordination between professional teacher training at the national level with human resource development at the school level. The ultimate objective is to ensure improvement in student skills. Systemic reform requires not just supporting infrastructure, but also capacity building at all levels, especially at school levels (Levin, 2010). It also requires coordination with all stakeholders. Comprehensive, systemic reform requires reconfiguring both human and material resources; thus, it must embrace deeper visions, bolder proposals, and sustained innovations (Kurth-Schai and Green, 2008). The Education Commission (2016) confirmed that education reforms must put educators and students at the center of reform programs. Reform measures should foster intrinsic motivation and capacity

enhancement of all stakeholders. Fullan (2007) considers that the success or failure of educational change is the result of a dynamic process involving interacting variables over time, and he suggests that successful reforms require coordination between top-down and bottom-up reforms.

5.1. Pre-service training

Pre-service training is critically important to prepare our student-teachers to be ready to build competencies for pupils for 21st century developments. The relevancy of subjects such as mathematics must be assured, meaning that we cannot teach mathematics in an abstract way for the coming decades but provide context of how a certain mathematics problem could be used in the real world. In other words, students are taught the concept of mathematics and how it could be used to solve different problems in their daily life and/or work. OECD (2012) argued that teachers must be adept at using different methods and/or change their approaches to optimize the learning. It also posited a question: 'What teacher preparation programs are needed to prepare graduates who are ready to teach in a 21st century classroom?'

World Bank (2014) posited a framework known as the SABER-teacher policy goal. The framework is mainly to improve education delivery associated with teachers. One of the elements in the framework is preparing teachers with useful training and experience at Teacher Training Center (TTC). The author argued that the teacher trainer must 1) enhance the content mastery and student-center pedagogy, 2) incorporate teacher standards in their curriculum, and 3) employ interactive teaching methods. It is suggested that the TTC must provide a complete set of role models in teaching to student-teachers so that they can replicate the models when they become teachers at school.

The tendency of having a bachelor degree (or equivalent) to enter the teaching force is now considered a priority in Cambodia. This practice has been adopted by developed countries such Korea, Japan, and Thailand. Then, it is very important that the TTC must be well prepared to train those new graduates to become an excellent force and mainly ensure that they can be a 21st century teaching force. OECD (2012, p.52) recommended that teacher trainers must be well equipped with INNOVATION inspired by 1) research and evaluation, 2) entrepreneurial development, 3) other teachers and principals, and 4) students, parents, and communities.

5.2. In-service training

From the scratch education platform going back to the 1980s, the quality of education in Cambodia is still at a most challenging stage. On the one hand, the teaching force is still a mixture of different levels of qualifications (Ayres, 2000) while we are striving for a knowledge-based economy which requires highly-qualified teachers to teach the younger generation. It is necessary that the government takes full account of existing teachers and provide them the services of continuous professional development (CPD) also known as in-service training. While professional development paradigms have changed considerably in recent years, since the 1980s, the Cambodia CPD system still uses one-size-fits-all workshops, offered in contexts removed from schools and students, and focused on various topics that often are not relevant to teaching and student learning. These traditional approaches do not change teacher's behavior or student learning outcomes. It is crucial therefore to change the way the teachers are provided the professional development to optimize teacher performance and student learning.

It is consensually accepted that adult learning takes place if they find a meaningful goal for what they are doing, when the learning focuses on problem solving rather than the content, when they have a feeling of belonging, and when they have a choice. For being meaningful, professional development must allow teachers to act decisively and constructively in order to direct their professional development. Professional development policy and programs need to ensure the conditons and enable the enviroment for teacher professional learning as a team or as an individual. As the teaching takes place in the school, principle's role in teacher professional development is indispensable. The school principals need to provide the school spaces and supportive organizational routines, including teacher social networks, in school for the teachers' learning.

Drawn from this changed conceptualization, developed countries such as Finland, Hungary, and Scotland provide CPD to their teaching forces under a compulsory format for three days, 120 hours, and 35 hours respectively. For some countries like Singapore, teachers are entitled to payment vouchers to choose the available courses which meet the demands of education reform. The formation process of teacher professional development needs to engage teachers and school directors. Teacher Professional Development can be exercised by the top-down management or a bottom-up approach. Teacher professional development needs to be carefully designed including the mechanism of providing accreditation to educational institutions. World Bank (2015) found that Provincial TTCs

performed better than Regional TTCs. Then, it is a question of how to accredit and upgrade the current institutions and register new educational institutions for CPD centers. In some countries, such as Australia, they provide virtual training to educators so that it is more convenient for them to take courses at their own pace.

Effective teaching professional learning must link to incentives or a reward system to advance or promote teaching and learning of the teachers. The TCP is a career orientation system for teachers and school leaders and administrators. TCP should provide clear career pathways in different streams, which allow teachers to choose and advance their careers. TCP improves salary structure-related career progression to attain professional skills. Therefore, TCP encourages educational staff in professional development and advancement.

5.3. Teacher performance assessment

Cambodia's education system needs to take its critical next step: fairly and accurately measuring teacher performance. Successful reforms in teacher pay, career advancement, professional development, retention, and other human capital systems that lead to better student outcomes depend on it.

In 2001, Singapore's Ministry of Education (MOE) overhauled its existing teacher evaluation system and replaced it with a more comprehensive approach, which it called the Enhanced Performance Management System. The new system represented a major shift from focusing teacher evaluation on observable characteristics, such as subject matter expertise, classroom management, and instructional skills, to emphasizing the underlying characteristics, or "competencies," that lead to exceptional performance.

Ministry officials responsible for hiring and school leaders responsible for leading teachers use the competency model in conjunction with the achievement of performance goals at each stage of employment to:

- Hire and train aspiring teachers;
- Set annual competency achievement targets;
- Evaluate competency levels throughout the year;
- Match each teacher to a career path; and
- Determine annual bonuses.

6. Conclusion

From the above review, we can conclude that systemic education management reform covers activities that concern all aspects of education

management reform, such as administrative and general management reform, academic management reform, financial management reform and human resource management reform (MoEYS, 2017). In short, a systemic education reform requires a strong systemic link between education policies at the ministerial level to teacher training institutions and ultimately to schools and classrooms.

Ideally, education reform should mainly take place at the school level. There is a trend in many countries toward increasing autonomy, devolving responsibility, and encouraging responsiveness to local needs, all with the objectives of raising performance levels through the implementation of School-Based Management. Therefore, developing countries should seriously consider embarking on education reform to improve school and teacher characteristics, as well as child and family characteristics.

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