# Education Excellence for the 21ˢᵗ Century - Lessons from Leading Countries in Asia

# Education Excellence for the Twenty First Century - Lessons from Leading Countries in Asia

## EDITORIAL TEAM

# PREFACE

On behalf of Colombo Plan Staff College, it gives me great pleasure to write the preface for this publication, "Education Excellence for the Twenty First Century -Lessons from Leading Countries in Asia", which is published by CPSC for the benefits of its member countries and for wider audiences around the world.

The book features outstanding educational achievements of six leading countries in Asia; namely, India, Japan, Republic of Korea, Nepal, Taiwan, and Thailand in the fields of technical and vocational education and training, secondary education, teacher education, and higher education among other aspects of educational trends and developments in these countries in the twenty-first century.

In addition to country-focused chapters written by well-known and highly regarded authors who are authorities in their fields of specialization in their respective countries, the book also features a chapter on higher education in the twenty first century which cuts across national boundaries and offers lessons for higher education institutions based on vast experiences of the author who has worked in many countries in Asia and North America.

The Colombo Plan Staff College is an inter-governmental organization established by member countries of Colombo Plan on 5 December 1973 to assist its member countries develop a pool of human resources. True to its 2023 Vision of being an "Intergovernmental TVET Leader for Sustainable Development", the College continues to pursue its mandate of being a clearinghouse of TVET information in the region. Considering the challenges of learning experienced worldwide, particularly during the Covid-19 pandemic, these types of publication aims to further enrich the existing knowledge on educational systems by compiling and presenting these good practices for a wider audience.

The College will celebrate its fiftieth anniversary in 2023 which marks an important milestone in the life of an organization. This publication is a fitting tribute to the achievements and contributions of the College to education and human resource development in Asia and the Pacific on the eve of its fiftieth anniversary . We hope that policy makers, educators, education planners, administrators, and scholars will benefit from experiences and lessons of leading Asian countries included in the publication.

As Director General , it is my honor to recognize the contributions of the authors to this publication. We hope that readers will gain knowledge, insight, and inspiration from this publication that they can apply to their own institutions, organizations, and systems so that together we can develop excellent education systems for the next generation in our own countries based on experiences and lessons of the countries included in this publication.


Prof. G.L.D. Wickramasinghe, Ph.D.
*Director General*
*Colombo Plan Staff College*

# FOREWORD

In the 21st century, education will be the most important weapon in the world: to eradicate poverty, to eliminate ignorance, to empower human spirit, to reduce injustice and inequity, to promote peace, international understanding and collaboration, to protect and preserve the earth for the next generations, to prepare enlightened citizens, to create wealth for nations, to shape the future of mankind, to improve the quality of lives for all so all of us can share progress, peace, and prosperity in our life time and can still leave lasting legacy and resources for the next generations.

In the 21st century, all countries must invest resources and efforts to make their education and learning system that will effectively educate and train their citizens to be fully equipped with knowledge, competencies, right kind of attitudes, vocational and life skills, and characters they will need in order to live a happy life and contribute to the progress of their community and country and to be productive citizens of the world community. The products of an excellent education and training system are well-educated and enlightened citizens : they are fully literate not only in terms of book learning and knowledge acquisition alone but are also very competent and wise users of new knowledge, technologies, and skills to improve themselves and their communities; they possess essential knowledge and skills needed to function effectively in the 21st century; they are creative; they are responsible for their thoughts and actions; they are open-minded; they are versatile; they think rationally and logically; they express themselves well and in a respectable manner befitting their status as educated individuals and members of the community and the society; they know what is right and what is wrong and behave themselves in accordance with the rules of law for peaceful living in a fast moving world; they continue to improve their knowledge and skills and quality of their life through lifelong learning initiatives; and last but not the least they are selfless and willing to share what they have acquired through their education with other human beings and less fortunate people around them to return to the society what they have gained from the opportunities they had with the support of the society.

In the 21st century, most countries recognize the urgent needs to improve the quality of their education system, increase accesses, promote inclusiveness, enhance relevance and effectiveness of the curriculum and programs of studies, and provide adequate and modern facilities and learning resources to their schools to help improve teaching and learning in classrooms. Some countries have done well while others still lag behind. Nevertheless, all countries have the same goal of providing the best education for their citizens.

Against this backdrop, this publication was born out of our common interest and realization that nations can learn from each other in order to improve their own education system. As an educator who has spent the past 30 years working at two international organizations- Colombo Plan Staff College for Technician Education and Asian Development Bank and subsequently as an independent consultant to support education development programs and projects in Asia and Pacific island nations.

The Editor-in-Chief is very privileged to obtain  cooperation and support from the current Director General of Colombo Plan Staff College for Technician Education, the co-editor of this publication, to publish this book with the aim of sharing knowledge, experiences, and lessons of six Asian countries, namely India, Japan, Nepal, Republic of China, Republic of Korea, and Thailand with policy makers, educators, administrators, and people who are interested in recent education developments in Asia. In addition to the six countries this publication also includes a chapter on aspects of international higher education which discusses the impact of the 21st century on higher education and how countries and higher education institutions will have to adapt themselves to the challenges of the 21st century. We hope that readers will gain insight on how these countries have gone through various stages of developments and transformation and learn from their experiences which will motivate them to introduce new ideas and practices in order to improve the quality of their education in whatever capacity they may be operating at present.

As the members of the editorial team which are composed of the professional staff of the Colombo Plan Staff College, we feel very honored and privileged to work with authors of the chapters since the idea for this book emerged and through the writing and production process. Our grateful appreciation to each and every one of them for their confidence in the project, their unwavering commitments, and steadfastness to prepare their manuscript for the book. They are truly professionals who deserve to be praised for their contributions which we are confident will be useful for the target readers of this publication.

The members of the editorial team conveys its special thanks to Mrs. Violeta Laraya, Former Assistant to the Director, CPSC, for her excellent support, contributions, and faith in the project especially during the initial phase of project formulation. With her editorial expertise, experiences, and professional commitments she helped edit initial drafts of many chapters before she had to withdraw from the project due to personal circumstances. It was an honor and a great pleasure for the team have had the opportunities of working closely with her over the past thirty years. Thank you most sincerely Madam Violy for your special friendships and invaluable support over the years.

We hope that readers will find the book useful and we welcome comments and suggestions which will be shared with authors and concerned policy makers, education planners, teacher educators, administrators, and people who are involved in providing the best education for their citizens.

Dr. Thamrongsak Moenjak
*Editor- in- Chief*
*Former Director, Colombo Plan Staff College for Technician Education, 1988-1991*

Dr. Ramhari Lamichhane
*Co - Editor*
*Former Director General, Colombo Plan Staff College for Technician Education, 2016-2021.*

# DEDICATION

We dedicate this book to the memory of the founding fathers of Colombo Plan Staff College for Technician Education (CPSC) who helped create an institution to promote technical and vocational education, technician education, and engineering education by signing a Memorandum of Understanding to establish CPSC during the 23rd Consultative Committee Meeting in Wellington, New Zealand, on 5 December 1973. Without their foresight and dedication, CPSC would not have become a reality and a leading regional organization that has earned reputation and respects it enjoys today. We also dedicate this publication to successive generations of ministers, ambassadors, and senior diplomats who represent their governments on the Governing Board of CPSC, in Manila, Philippines, education leaders, policy makers, educators, and teachers from the Colombo Plan region who have contributed to the growth and successes of CPSC in the past forty eight years. Last but not least we dedicate this book to vocational and technical teachers and educators in the Colombo Plan region and around the world for their efforts to produce technicians and skilled workforces for the development of their countries. Through their dedication and unwavering efforts, TVET, technician and engineering education has prospered and made unique contributions to their countries and the Colombo Plan region in the modern era.

May their legacy be with us for a century and more and our CPSC continues to prosper to make lasting contributions to TVET, technician, and engineering education for its member countries and the Colombo Plan region and for this special and important field of education in the years to come.

We hope readers of this publication will find inspirations to learn more about education developments and to do whatever they can to help their communities, societies, and nations improve their education system for their people so that they will become productive members of their society and countries and for the world to become a better place for all of us to live our lives in the 21st century.

**Editorial Team**

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# EDUCATION EXCELLENCE IN THE 21ST CENTURY – OPPORTUNITIES AND CHALLENGES

Dr. Thamrongsak Moenjak[1]

*"Education and learning raise aspirations, set values, and ultimately enrich lives. The country where I was born, the Republic of Korea, is a good example of how education can play these important roles. After the Korean War, the population was largely illiterate and deeply impoverished. The World Bank said that, without constant foreign aid, Korea would find it difficult to provide its people with more than the bare necessities of life. The World Bank considered even the lowest interest rate loans to the country too risky. Korea understood that education was the best way to pull itself out of economic misery, so it focused on overhauling schools and committed itself to educating every child—and educating them well. Coupled with smart, innovative government policies and a vibrant private sector, the focus on education paid off. Today, not only has Korea achieved universal literacy, but its students also perform at the highest levels in international learning assessments. It's a high-income country and a model of successful economic development."* [2]

*Jim Yong Kim, Former President (2012-2019)*
World Bank Group

## INTRODUCTION

All countries recognize the crucial role education plays to pull their people out of poverty, to increase the value of their human capital, and to become more competitive in the globalized world. Large amount of resources have been spent to expand education opportunities; to increase access to education especially among the poor, the disadvantaged, and girls; to reduce equity gap; to improve quality of education;

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[1] The author of this chapter expresses his profound gratitude to organizations, agencies, individuals, and sources of information whose names are included in the references. He also acknowledges his indebtedness to authors, contributors, and sources of information, data, and ideas which are too numerous to mention here for their contributions to the discussions presented in this chapter.

[2] World Bank. 2018. *World Development Report 2018: Learning to Realize Education's Promise.* Washington, DC : World Bank.

[3] The ten targets are: (1) Free primary and secondary education, (2) Equal access to quality pre-primary education, (3) equal access to affordable technical, vocational, and higher education (including tertiary education and university), (4) Increase the number of people with relevant skills for financial success, (5) Eliminate all discrimination in education, (6) Universal literacy and numeracy, (7) Education for sustainable development and global citizenships, (8) (4A) Build and upgrade inclusive and safe schools, (9) (4B) Expand higher education scholarships for developing countries, (10) (4C) Increase the supply of qualified teachers in developing countries by 2030.

and to be competitive in the global market. While some countries have been successful like in the case of Republic of Korea quoted above, others are not as lucky or effective and some are still struggling to achieve the goal of "ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all" as stated in the Sustainable Development Goal 4 (SDG 4)[3]. For many poor countries, SDG 4 is still a distant dream. In order to achieve the ten targets of SDG 4 by 2030 they need to do a lot more with support from the international community as they themselves lack the necessary resources and capabilities required to turn their dream into a reality.

# WHAT IS EDUCATION EXCELLENCE AND HOW CAN AN EDUCATION SYSTEM ACHIEVE EXCELLENCE IN THE 21ST CENTURY?

For the purpose of this publication and in the context of SDG 4 "education excellence can be defined as a comprehensive, open, flexible, accessible, and inclusive education and learning system which provides quality education and promotes lifelong learning opportunities for all in order to bring out the best qualities of human beings and prepare them as happy and productive citizens of a nation."

The above definition exemplifies an ideal education and learning system which is not easy to design, implement, and manage but is achievable with farsighted policy makers, determination, and strong political will of governments. In Asia many countries such as Japan, Singapore, China, Taiwan, and Republic of Korea have done an admirable job of transforming their education system towards achieving their goal of becoming developed countries. These countries are now leaders in various fields of scientific research, industrial development, and economic development with high quality education and learning system that prepares educated workforce for their economy. Each of these countries has its own history, tradition, culture, and political system which both promote and hinder their efforts to advance their education system to be highly regarded by other countries. What factors contribute to the successes of these countries have been widely discussed in various literature. This publication focuses on six countries; namely, India, Japan, Republic of Korea, Nepal, Taiwan, and Thailand, to share their experiences and lessons with readers. In addition, a chapter on international higher education adds another dimension which cuts across national boundaries to provide an international perspective on how higher education must transform itself in order to cope with the demand of the 2st century.

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[4]*Organisation for Economic Cooperation and Development website*

# KEY CONCEPTS AND FEATURES OF AN EXCELLENT EDUCATION SYSTEM

Following the definition of education excellence given above, we can elaborate on the key concepts and features of the system as follows:

## AN EXCELLENT EDUCATION AND LEARNING SYSTEM IS COMPREHENSIVE

It covers a whole range of educational levels and programs to provide opportunities for people to conveniently acquire knowledge, skills, competencies, and qualifications they need wherever they may live. In terms of levels of education it starts with pre-primary education and continues to higher education including colleges and university. In terms of programs it provides learning opportunities and resources in all areas of studies- general education, vocational and technical education in a wide range of programs of studies, specialized education and training, formal, non-formal, and informal education including distance education, online learning, and self- directed learning that suits the needs and requirements of individual leaners. In short, in a comprehensive education and learning system people have choices, opportunities, and access to acquire knowledge, skills, competencies, and qualifications to improve themselves and to enhance their life and career with no or, if any, little limitations. The comprehensive education system provides needed facilities, resources, and necessary support to help make learning convenient, enjoyable, and effective for learners any time anywhere as long as they want to learn and improve themselves.

## AN EXCELLENT EDUCATION AND LEARNING SYSTEM IS OPEN

An open education and learning system provides opportunities and resources to enable learners to choose the types of programs, time, locations, facilities, modes of learning, etc. that suit their unique situation, aspirations, and needs with little or no limitations or restrictions. It promotes lifelong learning for all age groups especially working people who need to upgrade their knowledge and skills to enhance their career or the quality of their lives. It supports and allows transfer of prior learning and experiences to help save time and money for learners. It facilitates transfer of credits or qualifications among different types of programs to save time, reduce costs, and enable learners to obtain the knowledge, skills, and qualifications within the shortest period possible.

## AN EXCELLENT EDUCATION AND LEARNING SYSTEM IS FLEXIBLE

A flexible education and learning system allows learners open entry and exit points to fit their needs and personal circumstances. It enables learners to transfer experiences and life skills to count as part of the requirements for completion or graduation from the programs of their choices. It allows learners to transfer their studies from one program to another or from one course of studies to another without unnecessary restrictions and requirements. It provides opportunities for learners to choose from a wide range of options available to them or to create and tailor their own programs to meet their specific needs and requirements. It values individual differences, needs, and aspirations and responds to these unique requirements within a broad framework of the system. A flexible education and learning system with necessary support for the learners is the key to the success of an ideal education system.

## AN EXCELLENT EDUCATION AND LEARNING SYSTEM IS EASILY ACCESSIBLE TO LEARNERS

In many countries access to quality education is still a problem especially among the poor, girls, ethnic groups, and disadvantaged people. Barriers to access to quality education include, among others, remote locations, distance, financial means, lack of schools, learning centers, and other types of learning facilities and resources. Governments especially those in developing countries try to deal with the issue by introducing mobile schools and libraries, building dormitories for students from remote areas, using ICT for distance learning and online learning, supplying or lending bicycles for poor students, awarding scholarships or subsidies to needy students, arranging free or subsidized school lunch program, providing free textbooks or introducing textbook rental schemes, and many other types of incentives to attract and retain students in schools. All these measures have their own merits and, if properly implemented and managed, could help increase enrolments, prevent drop out, and increase completion rates especially at primary and secondary levels. Still, for many countries access to quality education remains an issue that needs to be addressed systemically with special efforts and adequate financial resources to ensure that quality education is available and accessible to all.

## AN EXCELLENT EDUCATION AND LEARNING SYSTEM IS INCLUSIVE.

For an education and learning system to be inclusive it must provide learning opportunities for all especially those who are normally neglected by the society due to cultural biases, traditional beliefs, or political ideologies which prevent certain groups

or brackets of the society to avail of educational and learning opportunities. These include gender imbalance, prejudice against minorities and disadvantaged groups, etc. In most education development projects financed by multilateral development agencies inclusiveness is usually an important feature of the project design to ensure that gender and social aspects of the project receive due recognition and support to enhance inclusiveness of the education and learning system. Although the issue of inclusiveness may not be a serious problem in developed and many developing countries it still persists either intentionally or due to negligence or cultural biases in some countries and needs to be seriously addressed to ensure equity of educational opportunities for all.

# EDUCATION EXCELLENCE IN THE FRAMEWORK OF SDG 4

Many features of education excellence discussed above are consistent with the goal and scope of SDG 4 which sets the targets and indicators that should be achieved by 2030 as elaborated in the following sections.

## TARGET 4.1: FREE PRIMARY AND SECONDARY EDUCATION.

Free, equitable, and easily accessible quality primary and secondary education is the foundation for human capital development in most countries. However, this target is still a far cry in some parts of the world. While compulsory primary education is mostly free in all countries, secondary education in many countries still requires parents to pay school fees and related expenses which act as a barrier for those from low income families. In some countries available seats in secondary schools, especially among elite and more selective schools, are not sufficient to admit all students. Hence, access and equity is still an issue at secondary level. In order to address this issue, efforts must be made to improve quality of education at primary and secondary education across the board. Hence, improving the quality of education is still the main goal of most countries throughout the world. Quality can be defined and measured in a number of ways ranging from student learning achievements as measured by national standard assessment system, number of repeaters and dropouts at each grade level, completion rate at primary, lower secondary, and upper secondary levels, number or percentage of students who are admitted to prestigious schools, colleges, or universities, and students performance in international assessments in comparison with established standard or in comparison with other countries such as Program for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS), etc. Factors that contribute to high quality of education are many and varied ranging from well-trained and dedicated teachers; high quality textbooks in terms of contents, exercises, supplementary learning assignments; availability and

effective use of learning resources and facilities; use of ICT in classrooms; availability of books in a library; special programs to promote interest in reading materials- printed and non-printed- beyond the standard textbooks and exercise books; interesting and enlightening teaching and learning environment in classrooms; time spent on lessons and tasks by students under teacher supervision or on their own outside classes; cooperation of parents in following up and monitoring student progress in school; management capacity and leadership skills of head masters or principals; conducive learning environment in the schools; availability and effective use of learning materials and equipment; high expectations of teachers and parents; efforts of the schools and parents which motivate students to do their best to achieve the learning outcome for each subject and each grade level; support from parents to the students and the schools as appropriate; and effective, valid, and reliable examinations and overall assessment system for each subject, class, grade level and in the overall school system.

Closely related to the notion of quality education is the concept of relevance of education programs in terms of curriculum requirements, needs of learners, communities, societies, and employers, etc. In order to ensure relevance of education for their society some countries adopt what is typically called a national curriculum which prescribes the structure, format, number of core and elective subjects which schools must follow although some flexibility is allowed for each region, area, or locality to add or offer local curriculum and contents to supplement the general requirements and core subjects prescribed by the central or national government. Many countries allow school districts to develop and implement their own curriculum and study programs based on the prescribed national standards. Countries that adopt a national curriculum normally develop textbooks which are produced at the central level for adoption by schools although they may be allowed freedom to choose supplementary textbooks developed by private or commercial publishers. On the contrary, countries which allow freedom to school systems and school districts to develop their own curriculum based on the national standards permit the schools to prepare or choose textbooks from different sources or publishers for their schools and classrooms. Hence, the issue of relevance of education program is part and parcel of the concept of quality education which must include curriculum design and development at the central or ministerial level to ensure that the overall education system meets the goals and objectives of a country with respect to the desired outputs and outcome of their education system.

## TARGET 4.2: EQUAL ACCESS TO QUALITY PRE-PRIMARY EDUCATION.

Quality early childhood education including child care services, kindergarten, and other forms of pre-primary education is very crucial to help prepare young children to be ready for primary education and subsequent learning and development in later years. Hence, most countries do their best to provide nurseries and child care centers

at the community level, in factories, and in work place for children of working parents. SDG 4 Target 4.2 puts an emphasis on equal access to quality pre-primary education which is consistent with a policy of most countries. However, due mainly to limited resources, access to quality nurseries, child care centers, and kindergartens is still limited and high costs could be a prohibitive factor for many parents. Consequently, in some advanced countries many young married couples prefer not to have children which results in falling birth rate. Many countries including Taiwan, a country featured in this publication, have implemented progressive policies to motivate parents to have children and to provide incentives and support for them to enroll their children in child care centers and nurseries partly to help prepare children for formal schooling and partly to reduce financial burdens faced by young parents.

Benefits and impact of early childhood education on students' achievements are demonstrated through research findings cited by Organisation for Economic Cooperation and Development (OECD) which indicate that "Fifteen year old students who attended at least one year of pre-primary education perform better on the OECD PISA than those who did not, even accounting for their socioeconomic background. In a majority of OECD countries education now begins for most children well before they are five years old. Some 71% of three years old are enrolled in early childhood education across OECD countries. In OECD countries that are part of the European Union, 77% of three years old are enrolled."[4]

## TARGET 4.3: EQUAL ACCESS TO AFFORDABLE TECHNICAL, VOCATIONAL, HIGHER EDUCATION INCLUDING UNIVERSITY

For a large number of students technical and vocational education and training (TVET) is the preferred option or the only choice they have for their future career. Most countries also recognize the value and benefits of TVET to prepare skilled workforces for their economy and to help youth and adults acquire knowledge and skills, practical experiences, desirable attitudes and work habits that they will need for employment. Unfortunately, despite its value and benefits the TVET system in many countries still faces challenges and issues including : (i) poor image and unfavorable perception of TVET in the eyes of some parents and the general public, (ii) high investment and operation costs, (iii) poor quality of TVET programs and graduates, (iv) inadequate budgetary support, (v) lack of training equipment and materials, (vi) lack of qualified teachers with practical industrial experiences, (vii) outdated equipment, (viii) skills mismatch between TVET graduates and job requirements, (ix) lack of cooperation and support from employers to provide work place training for students and teachers, (x) lack of national skills standards to guide the development of TVET curriculum, learning materials, and assessment instruments, (xi) poor facilities including lack of specialized laboratories for practical training, (xii) poor management and weak

leadership skills of administrators, and (xiii) lack of employment or jobs to absorb TVET graduates at local or national levels. The scope, level of intensity, and breadth and depth of the issues and challenges vary from one country to another depending on the unique situation of each country.

Most countries realize the need to improve the quality and relevance of their TVET system and to make TVET accessible and affordable to a large segment of their population. Efforts to improve the TVET system include: (i) introduction of competency-based curriculum, modular learning, and competency based or criterion referenced tests to measure well-defined practical knowledge and skills, (ii) quality assurance, (iii) public-private partnership (PPP) to provide work place training or on the job training for students, (iv) national skills standards in various trades and occupations, (v) vocational counseling and job-placement services, (vi) industry placements for teachers, (vii) simulated training system to reduce costs, (viii) adoption of a dual training system, (ix) adoption of equivalency system to recognize prior skills and knowledge acquired through actual work experiences or other types of training as part of the graduation requirements, (x) project work in which students are involved in designing and building houses, workshops, furniture, etc. (xi) establishment of incubation or business centers to enable the students to gain practical experiences in providing services to customers at the school premises, (xii) adoption of a flexible learning system that allows students to work and study at the same time, (xiii) skills competition among students from various schools and colleges, (xiv) provision of a wide range of training programs in terms of duration (i.e. one day, a week, one month, one semester, one year programs, etc.) specializations, tailor made curriculum, or standardized programs, (xv) adoption of a National Vocational Qualification Framework for TVET, (xvi) entrepreneurship and business start- up training, and (xvii) regional and international cooperation and competition such as skills competitions organized by various countries, organizations, and institutions.

Overall, despite the challenges and issues discussed above, it is encouraging to note that emerging countries in various regions of the world recognize the benefits and contributions of TVET. They are willing to invest in their TVET system as it can play a key role in helping youth especially those from poor family background to obtain knowledge and skills they need for employment. Advanced countries such as Australia, Republic of Korea, European Union, Japan, etc. also help fund TVET projects in developing countries. In addition, multinational development agencies such as World Bank, Asian Development Bank, European Bank for Reconstruction and Development, and African Development Bank normally have TVET projects in their investment portfolio to support TVET and skills development in their member countries. It is hoped that the target of achieving equal access to affordable TVET for all who want to obtain technical knowledge and skills they need for employment will be achieved by 2030 with the commitments of countries in all parts of the world.

# EQUAL ACCESS TO AFFORDABLE HIGHER EDUCATION INCLUDING UNIVERSITY

Generally speaking higher education refers to education beyond secondary education. It includes tertiary education institutions which offer programs below degree level and can award certificates or diploma (normally 2-3 years of studies after high school) to graduates while typical universities offer degree programs at bachelor's degree and above. Most universities admit students straight from high schools. However, some universities also admit holders of higher certificate or diploma to continue their studies at the university for 2-3 more years to obtain a bachelor degree. This type of arrangement opens up opportunities for students to continue their studies at a university to obtain a degree which they may need to advance their professional career. In many countries universities have evolved from technical and vocational colleges or polytechnics to become full fledge higher education institutions which offer a whole range of diploma and degree programs to their students.

In the 21st century traditional universities which depend mainly on government budget support will face many challenges due to low birth rate, decrease in student enrollments especially in fields of studies which graduates find it hard to get a job, and competition among public universities and between public and private universities alike, etc. Hence, it's common for these universities to increase tuition fees and other related expenses to finance their operations. This practice puts a burden on parents and students who cannot afford to study at universities. Hence, access to university is still a problem among certain groups of people although they may be qualified to study at a university or at other types of higher education institutions.

In order to address this issue many countries including Thailand established Student Loan Fund facility to provide loans to qualified and eligible students to study at a university level. More recently Thailand also established an Equitable Education Fund scheme to provide scholarships and financial support to poor children to attend schools. These facilities are helpful to students from poor family background that lack financial means to study at schools, colleges, and universities. However, more financial resources are needed as well as measures to ensure transparency, equity, and repayments of loans by students who benefit from these funds.

One area that needs to be seriously considered by policy makers and governments is how to make higher education available, affordable, and accessible to a large number of people across social strata. Establishing new universities or expanding campuses or facilities of existing institutions may not be the right answer as more financial resources will be needed and the additional number of students may not justify high investment costs. An innovative approach is needed through better and more effective

utilization of the existing resources and facilities and the use of technologies to reach a large number of learners wherever they may be. Many countries have established or introduced open universities, university of the air, online learning degree programs, equivalency system, accreditation of work experiences and knowledge obtained in work place to be counted as a part of degree requirements, blended learning which combines class attendance and online learning, independent study and research in specialized areas relating to the work of the students, etc. These arrangements fit the concept of lifelong learning nicely. They can also help learners to study for a university degree through flexible learning programs and arrangements with minimum costs while they continue to earn a living.

## TARGET 4.4: INCREASE THE NUMBER OF PEOPLE WITH RELEVANT SKILLS FOR FINANCIAL SUCCESS.

Relevant skills include technical and vocational skills for employment, decent jobs, and entrepreneurships. Beyond work specific skills, emphasis must also be placed on developing high level cognitive/non-cognitive transferable skills such as problem solving, critical thinking, creativity, teamwork, communication skills, and conflict resolution.

People need to earn a living. They need employment, a decent job, or entrepreneurship skills to start and run a business commonly referred to as small and medium enterprises. For all these they need knowledge and skills required by employers or business enterprises. Technical and vocational skills can be acquired through technical and vocational training provided by training centers, schools, or colleges. Some of these skills can be mastered in a short period such as 30 hours of instruction and practical training. Other programs may take longer – one month, three months, six months, one year or up to three years of formal vocational and technical education offered by vocational and technical schools and colleges. In the context of education excellence discussed in this chapter skills training should be flexible in terms of duration and contents to suit the different needs of people who want to acquire skills for employment or to start a business of their own. The structure and curriculum of the programs should focus on the necessary skills for a specific job or trade at entry level and training should focus on specific technical skills including abilities to operate and maintain machines that are commonly used in production facilities. Once the trainees master basic skills for a job or a trade that will enable them to find employment they can be financially independent. However, a comprehensive and flexible skills training system will provide more opportunities for these people to acquire advanced skills or diversify and expand their skills set so that they can progress in their career or change jobs and occupations to meet the changing demand of labor markets and job opportunities. Non-formal education provided by both public and private institutions can also play an important role in providing skills training for adults who need to acquire technical

skills for employment. In addition to technical skills, students or trainees need to be taught related knowledge and skills that they need to gain employment including job seeking skills, job interviewing skills, and communication skills, etc. A well-designed curriculum should include these components or elements to enhance employability of graduates.

Beyond work specific skills students and adults alike must develop high level cognitive skills to be effective and successful in the 21st century. Several initiatives have been taken to develop a framework, contents, and methodologies to design and implement the so- called 21st century skills that should be taught in the school curriculum. One such scheme identifies three core skills set: (i) Learning and Innovation Skills - critical thinking and problem solving, collaboration, creativity and innovation, (2) Information, Media, and Technology Skills – information literacy, media literacy, ICT, and (3) Life and Career Skills- flexibility and adaptability, initiative and self- direction, social and cross cultural skills, and productivity and accountability[5]. Education and training programs need to include these 21st century skills in their curriculum and teaching learning activities to enhance the qualities of life of their trainees to be effective and successful in the 21st century[3].

## TARGET 4.5: ELIMINATE ALL DISCRIMINATION IN EDUCATION

By 2030 eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable including persons with disabilities, indigenous peoples, and children in vulnerable situations.

At the national or regional level discrimination may involve historical, political, cultural, and social aspects of a given country or society. Countries and societies have their own views, approaches, and, hopefully, solutions to alleviate, resolve, and eventually eliminate all forms of discrimination in education. However, at the school and classroom levels discrimination also exists in the form of prejudice, biases, preferences, and pure discrimination due to ignorance, personal values or idiosyncrasies, cultural practices, and neglect on the part of teachers, administrators, and among the students themselves. Teachers' prejudice and bias against individual students have a negative impact on students' self- perception and eventually their learning abilities, interests, and performance in schools. As practitioners at the school and classroom levels administrators, teachers, and school personnel should give due attention to this aspect of discrimination. Self- awareness and consciousness of individual teachers can help reduce this form of discrimination to help create a happy learning environment in the schools and classrooms. This social and cultural aspect of

[5]American Association of Colleges for Teacher Education & Partnership for 21st Century Skills in Educator Preparation, September 2010.

learning environment should be created and promoted by administrators and teachers to help eliminate all forms of discrimination, prejudices, and favoritism which are still common in  schools and classrooms even today.

## TARGET 4.6: UNIVERSAL LITERACY AND NUMERACY

By 2030 all young people and adults across the world should have achieved relevant and recognized proficiency levels in functional literacy and numeracy skills that are equivalent to levels achieved at successful completion of basic education.

UNESCO defines literacy as an "ability to identify, understand, interpret, create, communicate, and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential and to participate fully in their community and wider society"[6]. In a broader context, literacy can be further broken down into (i) information literacy – access and evaluate information and use and manage information, (ii) media literacy –analyze media and create media products, and (iii) ICT literacy –apply technology effectively.  The rationale for including these literacies in the 21st century skills is based on the premise that to be effective in the 21st century, citizens and workers must be able to exhibit a range of functional and critical thinking related to information, media, and technology. Hence, literacy and skills in the three areas should be included in the curriculum and programs in accordance with the goals of education for each level from primary up to secondary and post -secondary levels as appropriate.

Numeracy is knowledge and skills people need in order to understand and apply mathematical concepts, theories, principles, procedures, formula, and logic to effectively manage and solve mathematical demands of diverse situations. The skills include calculations, computations, projections, and drawing conclusions from available data and information to make informed judgment and decisions that affect their lives and work. Numeracy knowledge and skills range from basic to advanced levels involving various aspects of mathematics and its applications. Basic numeracy knowledge and skills consist of comprehending fundamental arithmetic like addition, subtraction, multiplication, and division. For most ordinary persons numeracy involves the ability to understand, to compare, to reason, and to apply simple numerical concepts in daily activities. More substantial and advanced numeracy knowledge and skills include number senses, operation sense, computation, measurement, geometry, probability, and statistics. For people who work in professional occupations or high level jobs that need advanced training and preparation these numeracy knowledge and skills are what they will need in their work and daily life.

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[6]UNESCO Institute for Statistics,  Quick Guide to Education Indicators for SDG 4, 2018, p.36.

# IMPORTANCE OF NUMERACY SKILLS IN LIFE AND WORK

In the 21st century numeracy knowledge and skills are increasingly critical to individuals in order to function well in today's complex societies. In addition to basic competence in working with numbers, numeracy skills employers seek include some knowledge of statistics, probability, mental computation strategies, some grasp of proportional reasoning or modeling relationships, and broad problem solving and communication skills about quantitative issues. Workable knowledge and skills related to mathematical concepts, principles, operations, interpretation, and conclusions are increasingly required to succeed in fulfilling roles as family members, workers, consumers, and members of communities.

Based on research findings educational attainment is strongly associated with numeracy knowledge and skills, with the larger gains in skills associated with upper secondary and tertiary education completion.

The precise set of mathematical knowledge and skills school graduates should possess in order to be adequately prepared for tertiary education, employment, and citizenship is usually determined by specialists and educators who have a role in determining the framework and contents of the curriculum for schools and educational institutions. In general, numeracy is a key to being able to interpret and manipulate mathematical problems in various contexts and situations including graphs, charts and statistical data. Consequently, in addition to job-specific numeracy skills, education policy must consider numeracy in broad civic, social and economic contexts.

Inequities in numeracy knowledge and skills likely have consequences in the labor market, as numeracy skills are related to the likelihood that an individual will have a job, the type of job he or she has, and the amount of money he or she earns at that job. The individual economic rewards for numeracy skills are higher in high knowledge and skill intensive occupations. Hence, it is very important for educators, curriculum development specialists, teachers, test items developers, and specialists in related disciplines to help learners acquire numeracy knowledge and skills that will prepare themselves well for further studies and for occupations that require high levels of numeracy knowledge and skills in the 21st century.

# ASSESSMENT OF NUMERACY BY OECD

Currently, Program for International Student Assessment (PISA) is recognized by a large number of countries which participate in the program as a yard stick to determine the

level of numeracy knowledge and skills of students and for comparison of results among the participating countries. According to a definition of the program, PISA mathematics performance measures the mathematical literacy of a 15 year old to formulate, employ, and interpret mathematics in a variety of contexts to describe, predict, and explain phenomena, recognizing the role that mathematics plays in the world. A mathematically literate student recognizes the role that mathematics plays in their daily life in order to make well-founded judgments and decisions needed by constructive, engaged, and reflective citizens. In the context of SDG 4, an excellent education system puts high priority and focus on literacy and numeracy which are fundamental and critical for the countries and their citizens to cope with the demands of life in the 21st century.

## TARGET 4.7: EDUCATION FOR SUSTAINABLE DEVELOPMENT AND GLOBAL CITIZENSHIP.

This target emphasizes knowledge and skills needed by citizens and countries to promote sustainable development. Specifically it states that by 2030 (countries need to) ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development. The school curriculum, learning system, and teaching learning programs must include these aspects of education in their programs and activities and implement built- in mechanisms to ensure that students recognize, appreciate, absorb, and practice the principles and ideals to promote sustainable development in their daily life, in their communities, and in the society as a whole.

## TARGET 4.8 (4-A): BUILD AND UPGRADE INCLUSIVE AND SAFE SCHOOLS

Build and upgrade education facilities that are child, disability, and gender sensitive and provide safe, non-violent, inclusive and effective learning environment for all.

The UNESCO Institute for Statistics[7], in its publication titled Quick Guide to Education Indicators for SDG 4 (Quick Guide), provides the following guidelines: schools should have (a) access to electricity, (b) internet for pedagogical purposes, (c) computer for pedagogical purposes, (d) adapted infrastructure and materials for students with disabilities, (e) basic drinking water, (f) single-sex basic sanitation facilities, and (g) basic hand-washing facilities (per the WASH indicator definition).

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[7]UNESCO, UNESCO Institute for Statistics, UN Sustainable Development Goals, Quick Guide to Education Indicators for SDG 4, 2018.

The actual situation especially in developing countries varies due partly to their financial situations, dedication of administrators, teachers, and the support of the communities. In some countries the condition of sanitation facilities is still very poor and needs to be addressed most urgently. Although these guidelines and indicators are generally accepted by the countries it depends on their readiness, commitments of the government, education authorities, and the abilities of schools to obtain needed technical and financial resources and support to provide the facilities let alone to meet the prescribed guidelines and the indicators. The government, education authorities, school administrators, and teachers should do their very best to meet these requirements as they have a direct impact on the student learning achievements.

## TARGET 4.9 (4-B): EXPAND HIGHER EDUCATION SCHOLARSHIPS FOR DEVELOPING COUNTRIES

The indicator states that by 2030 countries and the global community should substantially expand the number of scholarships available to developing countries, in particular least developed countries, small island developing states and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical engineering and scientific programs in developed countries and other developing countries. The Quick Guide uses the volume of official development assistance flows for scholarships for sector and types of studies to assess the achievement of this indicator which is beyond the scope of this chapter. Suffice it to say that scholarships either from sources within a particular country or from other countries (i.e. donors) are still necessary to facilitate the transfer of technology, skills, expertise, and to promote cooperation among nations especially in fields mentioned in the Quick Guide.

## TARGET 4.10 (4-C) INCREASE THE SUPPLY OF QUALIFIED TEACHERS IN DEVELOPING COUNTRIES – INTERNATIONAL COOPERATION FOR TEACHER TRAINING IN DEVELOPING COUNTRIES- LEAST DEVELOPED COUNTRIES AND SMALL ISLAND AND DEVELOPING STATES

The indicator mentions the following criteria in assessing the achievement: proportion of teachers in: (a) pre-primary education, (b) primary education, (c) lower secondary education, (d) upper secondary education who have received at least the minimum organized teacher training (e.g. pedagogical training), pre-service or in-service required for teaching at the relevant level in a given country by sex.

It is universally recognized that teachers play a very critical role to help children learn and grow to become good citizens and productive members of a family, a society, and

a country as a whole. Most countries realize that they have to produce highly qualified teachers for their schools. However, many countries still face issues relating poor quality of teacher training programs, shortage of qualified teachers in such subjects as sciences, mathematics, ICT, ratio of teachers – students per class, motivation and rewarding system for teachers, types of in-service teacher training programs that are closely related to their performance and student learning outcome, etc. In most education development projects financed by multilateral agencies and donor countries one major component is improvement of the quality of teachers and teacher training programs, provide access and opportunities to in-service teachers to receive training that will enable them to increase their knowledge and skills in pedagogy (e.g. new approaches to teaching such as active learning, student-centered teaching techniques, teachers as coach, etc.), new knowledge and contents of their disciplines and specializations, use of ICT, etc. Nevertheless, the successes of these programs depend on the attitude, abilities, willingness of teachers to apply what they have learned, motivation, and dedication to their responsibilities, duties, and their students. School management and classroom supervision together with effective leadership of principals or head masters play an important role to ensure that teachers are dedicated, willing, and able to perform their functions and duties to help their students achieve expected learning outcome and to become productive members of the community and society upon completing their education. Some exemplary programs and efforts of countries to produce qualified teachers and improve the quality of their performance in classrooms are discussed in relevant sections and chapters in this publication to enlighten readers especially policy makers, teacher educators and teachers themselves on efforts and successes of the programs for possible adaptation and replication in their countries.

# OPPORTUNITIES AND CHALLENGES

The next ten years (2020-2030) bring both opportunities and challenges for nations to move forward with a clear direction and with determination in order to achieve the SDG 4 targets and to provide high quality education for their citizens. Most countries do not start from zero although the starting point for each nation may differ. It depends on the existing condition and the readiness and commitments of the government especially educational leaders to introduce policies and implement programs, projects, and activities to achieve the targets. Instruments are available to assess the progress of works and to provide data and guidelines for countries to steer the efforts of various agencies and organizations. As a starting point, countries may appoint a specialized committee or commission to monitor the progress of SDG 4 targets and identify gaps and obstacles that may have a negative impact on the process and outcome. A mid –term evaluation of the progress of SDG4 (i.e. 2025) should be carried out and actions identified to guide the country in the remaining period (2026-2030) to ensure the achievements of SDG 4 targets with whatever resources and expertise required. Through dedication, commitments, and steadfastness of leaders,

policy makers, administrators, educators, teachers, and communities, the SDG 4 targets are not beyond the reach of a country by 2030.

# ROLES AND CONTRIBUTIONS OF INTERNATIONAL COMMUNITY

International community can play an important role to assist countries which still need support to introduce policies, programs, and projects that will enable them to achieve the SDG 4 targets. Most donors normally have their own agenda and priorities to support education development and human capital development in their target countries of operations mostly through bilateral cooperation programs. Multinational lending agencies such as World Bank, Asian Development Bank, African Development Bank, and European Bank for Reconstruction and Development also have their own priorities and agenda for education sector development in their developing member countries. Many programs, projects, and activities in a given country supported by these agencies and development partners normally compliment the works of each other through aid coordination by the government or through special arrangements. However, despite good intention and efforts their works may not effectively contribute to the overall development impact of the education system of a country as discrete programs and projects tend to narrowly focus on specific areas or levels which may not lead to the desired impact for the whole education system. Hence, by pooling resources and expertise of development partners to focus on helping a country address the most pressing problem which is very unique for the country, scarce resources can be pooled and effectively managed and utilized to avoid duplication of efforts and to stretch the resources for maximum benefits. The author had a rare privilege of working with eleven development partners to implement a sector wide approach education program, (Second Primary Education Development Program – PEDP II) to improve quality, access, and equity in primary education in Bangladesh from 2006-2012 with grants from nine development partners and loans from Asian Development Bank and World Bank totaling approximately $ 650 million which was the largest program for the education sector at the time[8]. PEDP II proved very successful in addressing chronic issues faced by the country including shortage of classrooms, shortage of qualified and well-trained teachers, lack of quality textbooks, poor quality of teaching and learning, lack of sanitation facilities, lack of teaching-learning equipment and materials, etc. At program completion, all of these issues were addressed with a high degree of successes. The benefits of pooling resources and expertise from development partners with the same mission in a particular country has made unique contributions and impact with the results that donors continued to work together in subsequent programs and projects to improve quality, access, relevance, and effectiveness of primary and secondary education in the country.

[8] *Asian Development Bank, Bangladesh: Second Primary Education Development Program, Completion Report, 2013.*

In addition to these multilateral agencies and donors which can provide financial and technical support on a large scale, there are also other specialized agencies which could assist governments of their member countries improve quality, increase access, enhance relevance and strengthen effectiveness of an education and learning system in specific areas. One such organization is Colombo Plan Staff College for Technician Education (CPSC) which is the publisher of this publication. CPSC, located in Manila, the Philippines, has a mandate to help its member countries develop and improve the quality of technical and vocational education and training system through various programs, projects, and activities proposed and/or requested by its member countries. Based on its mandate, expertise, and experiences of almost 50 years CPSC has a unique role to play to help its member countries achieve Target 4.3 with respect to equal access to affordable technical, vocational, and higher education including university. It can act as a lead agency and a catalyst to help countries transform their technical and vocational education system with financial support (loans and grants) from multilateral agencies and donor countries which will certainly benefit from a highly regarded regional organization to act as their partner in developing the TVET system that meets Target 4.3 of SDG 4.

## CHALLENGES

SDG 4, with its comprehensive approach, poses big challenges to countries to come up with policies, strategies, resources, and mechanisms needed to improve and expand their education system to meet the ambitious goal and targets. Although there are several challenges for those countries which still need to achieve the SDG 4 targets by 2030, this chapter focuses on only two major factors: international cooperation and support and leadership of the country.

## INTERNATIONAL COOPERATION AND SUPPORT

SDG 4 recognizes that many countries still have limited capacity and resources to achieve the targets by themselves. Hence, Target 4.9 (4-B) mentions that the global community should substantially expand the number of scholarships available to developing countries, in particular least developed countries, small island developing states and African countries. The scope of the proposed scholarships covers the whole range and types of education programs including higher education, vocational education and training, information and communications technology, technical engineering, and scientific programs for training in developed countries and other developing countries. The proposal is reasonable although it is still very general and needs a detailed plan which should be initiated by the countries themselves as

part of long term planning to develop human resources for their countries. As an example, Timor Lester, a small island country, has already developed a master plan to provide scholarships for various government agencies and educational institutions with indicative financial requirements and sources of funding either from their own budgets or from donors and multilateral agencies. This type of master plan can be used to seek funding support from interested bilateral donors and multilateral lending agencies as part of their proposals. Due to limited funding sources, planners must come up with creative options to maximize the benefits and impact of the program to reach the largest number of recipients possible. This includes special arrangements with educational institutions in developed and other developing countries to conduct parts of the programs in the recipient countries while trainees may spend a short period at the host institutions in order to be exposed to the latest developments and high standards of education and training in advanced countries. Government to government agreements on transferring of knowledge and technologies through special study programs will be most welcome by both sides based on the needs of the recipient countries. Providing scholarships and technical support to educational institutions and individuals in developing countries is also in the interest of donors or developed countries alike. Multilateral agencies can also take initiative to pool their resources and expertise to establish a fund to provide scholarships to their member countries in addition to the existing scholarship program that they may already have. UNDP, UNESCO, and UNICEF can also act as a catalyst to draw attention and support from these donors and multilateral agencies for specific countries and region that will help them develop their own human resources based on their master plan. Of course these tasks are not easy and take time and efforts to materialize, if ever, due to the unique nature of international cooperation and the interests as well as political considerations of countries involved. However, with efforts and dedication of policy makers, decision makers, initiatives, and willingness of the "champions" this can be achieved. We should remember that the United Nations, International Monetary Fund, World Bank, Asian Development Bank, and other similar international organizations and agencies did not exist before. But with farsightedness of leaders, willingness of participating countries, and dedication of individuals all these institutions became a reality and have made significant contributions to the world for more than half a century. With dedication, efforts, tireless leaders, and a push from all countries at the right time a Scholarship Fund for SDG 4 is not beyond the reach of the countries and the world community.

## LEADERSHIP CHALLENGE

Aside from international cooperation, in this author's view the biggest challenge is lack of dedicated and able leadership which is very crucial for the successes of all endeavors. There will always be obstacles for whatever human beings try to achieve.

Some countries, organizations, and agencies are successful while others fail even though they have what they need at their disposal to achieve the desired goals at their disposal. The key success factor is, to a great extent, leadership qualities of people who can gain respect, support, and cooperation of other people who are willing to work hard under the guidance and motivation of the leaders. SDG 4 is no exception. It needs committed, farsighted, and able leaders with a clear vision, dedication, and leadership qualities and skills to achieve the SDP 4 targets by 2030. It is the wishes of this author that this publication will provide inspirations and lessons shared by authors of the six chapters that will be useful for readers, decision makers, and leaders who may have a role to contribute to the successes of their education system even in a small way to make excellence education in the 21st century a reality. We need actions from leaders who can make things happen despite challenges, obstacles, and difficulties. We look forward to the honor of celebrating the achievements of SDG 4 with all countries in the next 10 years.

# EDUCATION EXCELLENCE BEYOND SDG 4

As this publication goes to press in mid-2020, many countries still have almost ten years to improve, expand, and strengthen their education and learning system to meet the SDG 4 targets in 2030. It is hoped that their leaders particularly educational leaders, educators, administrators, teachers, and community leaders will be able to pool their efforts and resources, some with assistance of international community, to achieve the targets and provide the best education for their citizens.

For developed and developing countries which have already achieved all or most of the SDG 4 targets, the main focus would be to further improve quality and relevance of their education and learning system that will help prepare enlightened citizens with the necessary knowledge and skills to function effectively in the 21st century. After all, most countries need educated citizens and workforces which possess knowledge, skills, competencies, good working habits, and right attitude and behaviors to respond to the requirements of the 21st century. Many countries are doing well and can provide lessons and examples of good policies and practices that are recognized around the world. For other less developed nations, it's up to their leaders and citizens to introduce new ideas, systems, mechanisms, and measures to achieve their goal of providing excellent education for all in order to become more competitive and successful in the global economy in the 21st century.

# CONCLUSION

Education Excellence in the 21st century in the context of SDG 4 should be the goal of most countries. The next ten years provide both opportunities and challenges for nations to achieve the SDG 4 targets and to continue to improve quality and relevance of their education and training system with the cooperation and support of the international community. Together we can make it happen for the overall benefits of mankind.

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Dr. Moenjak obtained his M.A. and Ph.D. from the Ohio State University, USA, where he was Teaching Associate and Research Associate at College of Education and at The Center for Vocational and Technical Education respectively. He also obtained a Master of Business Administration from Ateneo de Manila University in the Philippines. During his tenure at Colombo Plan Staff College he conducted in-country training programs in Malaysia, Fiji, and the Philippines. He was invited to present technical papers in Kuwait, Libya, and Republic of Korea. He served as a guest lecturer to teach courses on international human resource management, international management, international economic development in MBA and DBA programs at Asia Pacific International University based in Vancouver, Canada, from 1993-2001.

Dr. Moenjak was selected International Man of the Year 1992-1993 by International Biographical Center, Cambridge, England, in recognition of his services to Educational Development in Asia-Pacific and was listed in Who is Who in the World, 1992 and Who is Who in International Affairs, United Kingdom in 1993.

# EDUCATIONAL SYSTEM AND POLICIES IN KOREA: PLANNING FOR THE 21ST CENTURY

Prof. Chang Suk Min, Ph.D

*This chapter reviews experiences and initiatives of Republic of Korea in reforming its education system from a traditional to a knowledge-based system geared for the Fourth Industrial Revolution. It explores the policy changes, ideas, and concepts that were introduced by the Government to become a catalyst for Korea's economic and social development, with an emphasis on TVET and establishment of competency standards for the development of an education model geared towards the needs of the 21st century and the fourth industrial development era.*

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## INTRODUCTION

Since ancient times, Korea has emphasized the values of humanistic education with a focus on humanity, justice, politeness and wisdom which are all parts of a Confucian tradition. Although much of the educational contents of the education system have changed throughout the years the tradition of emphasizing humanistic education has been continuing up to the modern era. With this long tradition of Confucian educational values, Korea became a country that continued to place a high priority on this type of educational policies and value while it was slowly emerging as one of the least developed countries in the region up to the time it was liberated from Japanese colonial rule in 1945. Parents have maintained the highest enrollment rates not found in other developing countries by sending their children to school at all costs.

The government continued to pursue educational reform and development policies in response to the demands of the people. It is from the pursuit of these educational policies that Korea has achieved rapid economic development. In this paper, I will briefly review the development process of the Korean educational system regarding from the perspective of economic development and human resource development (HRD).

## HISTORY OF EDUCATIONAL REFORM

At the time of emancipation from Japanese colonial rule in 1945, economic development was almost impossible in Korea because of very scarce natural resources. More than 70% of the land was mountainous (uninhabited), and even the climate was unfavorable for agriculture. It was against this backdrop when the Korean War broke out in 1950 and turned the whole peninsula into ruins. The sense of defeat that the nation could not be rebuilt dominated the consciousness of the people. However, this was miraculously overcome through the modernization efforts and initiatives under Park Jeong Hee's revolutionary Government.

After the liberation, Korea has rapidly expanded its elementary and secondary education. Almost all the people wanted to send their children to school because of the urgent demand by the people who throughout most of their generation were deprived of educational opportunities under Japanese rule. As a result, many elementary schools were operated on two and three shift systems in order to accommodate the needs of all school-aged children. Thus, the level of literacy including education for out-of-school youth and adults rose within a short period of time. These educational policies have laid the foundations for the manufacturing industry centered on preparing skilled workers which further paved the way for a technological development centering on heavy and chemical industries.

The success of the literacy education program within a short period of time was largely due to the educational enthusiasm of Koreans and the superiority of the scientific Korean written language (Hangul), which is easy to read and write. South Korea succeeded in achieving universal literacy, and as a result, it has successfully supplied industrial workers in time for the development of light industry pursued by the five-year economic development plan that started in 1962. This well-educated and diligent Korean workforce was found to be highly productive and with given its low cost of labors, created a momentum for foreign companies to invest in Korea.

The success of the light industry development has become the foundation of Korea's full-scale manufacturing development. To support these industrial developments,

Korea has universalized secondary education and expanded secondary vocational education in particular. These educational policies have laid the foundations of the manufacturing industry centered on skilled workers and further paved the way for technological advancement centering on heavy and chemical industries.

Since the 1980s, progressive policies have been implemented to improve the quality of education following universalized tertiary education as a result of industrial and economic restructuring as advanced technology had increased the demand for higher education. Accordingly, higher education had to be expanded and diversified to meet industrial demands. This movement had also strengthened the expansion of and support for vocational colleges, while the government had put an emphasis on reform and support for tertiary education.

In the 2000's, knowledge-based industries and high-tech industries were expanded, which further strengthened educational policies that emphasized high technology and creativity education. This development has significantly strengthened engineering education and graduate school education and promoted government support policies that reinforced the research function of research institutes as well as universities. In addition, lifelong education policy was intensified to prepare the country and the people for the situation where technological innovations take place continuously.

For many developing countries, Korea's economic development is perceived as a miracle. Korea is the only country which has no natural resources, capital, technology, or management expertise, but has developed itself to become an industrialized country and the world's 10th largest economic power. The term "miracle" can be considered as a praise from foreigncountries for the rapid development of industries and economy of Korea. In the last few decades Korea has become the only country which provides official development assistance (ODA) for other developing countries. Korea has transformed itself from a previously poor country to become a donor now assisting more advanced countries. Although the word "Miracle" may be regarded as a praise for Korean rapid development, in my view Korea's development is neither a miracle from God, nor is it a gift. On the contrary, this achievement is largely a result of efforts and determination of all Koreans who overcame their difficulties coupled with government's progressive education policies especially in the past few decades.

Countries around the world have developed their economies employing a variety of leadership and development models, depending on the circumstances and special advantages that they possess. If we characterize Korea's development model at this point, it could be said that it is a model of an education-driven national development. Korea's only resource was its human resources, and therefore, Korea started light industry based on a successful HRD model initially with an emphasis on elementary and literacy education. Since then, Korea has continued to pursue industrial

development built upon a strong foundation on universal education to increase the level of technical manpower continuously. In this respect, perhaps Korea's development may be recognized as a model for national development wherein in which educational development leads to economic development, social development and democratic development, respectively in that sequence.

# POLICY ON NATIONAL COMPETENCY STANDARDS (NCS) POLICY

## POLICY BACKGROUND OF THE POLICY

The General Agreement on Tariffs and Trade (GATT) was abolished by the Uruguay negotiations and in its place, the World Trade Organization (WTO) was introduced in 1995. As a result, all trade transactions such as commodities, capital, information, and workforce have been liberalized, in principle, without restrictions on borders. In this way, the global labor market has been integrated into one, thereby liberating and facilitating the movement of the labor force among many countries.

In particular, EU's economic integration has been liberated which helped facilitate the movement of labor and employment among the European countries. To this end, the EU has been developing the European Qualification Framework (EQF) since 2008 to promote lifelong commitment through four years of R&D activities and to ensure labor migration across countries.

The EQF also allows individual learners, employers, and training providers to compare qualifications among individuals and between education and training institutions. The EQF integrates education and training qualifications into a comprehensive scheme of eight levels as a common framework for EU countries. It is recognized that the eight levels of qualifications or competencies can be acquired step by step through various channels including formal education and training programs, and field experiences.

The EQF has shifted the focus of competency assessment from the traditional evaluation practices of assessing learning contents of knowledge and duration of time spent on learning and acquiring knowledge and skills to the evaluation of learning outcomes that ensures performance. This is to cultivate the required practical skills of the labor sector market in education and training, and to evaluate them accordingly. As mentioned above, not only countries in the EU but also many other countries have developed and applied the National Qualification Framework (NQF) structure to promote the cultivation of a diverse workforce with various compatible fields in different ways at the same time.

The NQF intends to acknowledge and promote lifelong learning and all learning other types of learning outside the formal schooling system by further recognizing the value of qualifications, academic backgrounds, and careers as well as practical field training.

Before the introduction of the NQF, advanced countries such as the United States have clearly defined the scope and contents of jobs through the Job Analysis method since early 20th century and have been using job analysis results in selecting, arranging, utilizing, evaluating and training staffs. Accordingly, Korea has also introduced such a job analysis method in its training system. In this context, the government has proposed to create and apply National Competency Standards based on job analysis in the country. In general job analysis can be done through various methods and techniques in accordance with its objectives. Overall, job analysis technique serves as a means to help people understand the nature and contents of job tasks in a logical and effective manner.

Nevertheless, Korea has not been able to apply its job analysis system effectively and its utilization has been quite limited . Job analysis can be done through various methods and techniques depending on the desired objective although its main benefit is to help employers, educators, trainers, and trainees to understand the scope and contents of job tasks objectively. The results of job analysis can be applied to human resources management, qualification standards setting, educational and training programs, and curriculum development. So far while advanced nations have used this method of job analysis extensively, Korea has used it only to a limited extent. In this context, the government proposed to create and apply National Competency Standards based on job analysis.

Many developed countries have long been applying the Competency Based Training (CBT) method in their technical vocational education and training system. CBT method focuses on fostering the actual performance beyond what makes knowledge and functions more understandable. This vocational training system is based on job analysis and performance/competency criteria, and recognizes qualifications by determining the extent to which learning outcomes have met these performance criteria.

Korea has been experimenting with these initiatives since the early 2000s. These efforts are to entail training and certifying qualifications with knowledge, skills, attitudes, and other competencies required in the actual work sites. Nevertheless, these efforts have not been successfully achieved because they were not well- organized nor diffused systematically. As a result, the training and qualifications do not properly respond to the needs of the industrial sector properly. Moreover, due to a social attitude that is biased in favor of a liberal arts education, the technical certificate holders were not usually given due social recognition and status befitting their abilities and contributions. This

situation has resulted in a shortage of skilled manpower both in terms of quality and quantity while graduates of non-technical universities have multiplied to the point that they have difficulties finding jobs with private companies.

In this situation, the Government has decided to develop a competency-based (merit) society and subsequently declared that the National Competency Standards (NCS) and the National Qualification Framework (NQF) projects are at the core of its policies.

## PURPOSE OF INTRODUCING NCS AND NQF

The primary purpose of the NCS and NQF projects initiated by the Korean Government is to do away with the academic title-biased society, and then implement a fairer society based on competence. The NQF is a system for recognizing the equivalence or compatibility of qualifications in terms of competencies acquired among formal school education, vocational training, lifelong learning, adult learning, qualifications systems, and career systems. It is aimed at enabling all citizens to freely acquire and recognize their abilities and qualifications in various environments and channels. NCS is a means of fostering vocational education and training because it fosters, recognizes, and qualifies practical abilities based on job analysis. At the same time, NCS is utilized as the basic foundation of NQF. In this regard, the NCS and NQF projects promoted by the Korean government are considered to be feasible and will greatly contribute to the implementation of a competency-based society.

## OUTLINE OF NATIONAL COMPETENCY STANDARDS

The concept and characteristics of "national competency standards" are intended to systematize and standardize worker's' competencies including knowledge, skills and attitudes at the national level. These job competencies are operationally defined as observable and measurable performance standards, and at the same time, the degree to which performance is to be achieved and appropriate working conditions are defined. This has been done to supplement vocational education which has failed to nurture actual abilities through theory and concept- oriented education partly for the sake of the teacher's' convenience.

### DEVELOPMENT AREAS OF NATIONAL COMPETENCE STANDARDS

The Korean Government has conducted a job analysis of a wide range of careers and finally completed competency standards for 887 occupations according to Korea Employment Classification of Occupations (KECO).In all, KECO  has analyzed and classified all types of occupations into 24 major categories, 80 divisions, 228 sub-divisions and 887 + other occupations. The table below covers the contents of the 24 major categories as provided by the Korea Employment Classification System. These

are meant to establish the competency standards for all kinds of jobs that require the adoption of certifications in Korean industries.

| 24 Major Categories on the Korea Employment Qualification System | | | |
|------|------------------------------------------------|----|------------------------------|
| 01 | Management | 13 | Food Service |
| 02 | Management, Accounting, Clerical | 14 | Construction, Marine |
| 03 | Finance, Insurance | 15 | Machinery |
| 04 | Education, Natural Sciences, Social Sciences | 16 | Materials and ceramics |
| 05 | Public Security (including defense) | 17 | Chemistry |
| 06 | Health, Medicine | 18 | Textile, Clothing |
| 07 | Social Welfare, Religion | 19 | Electricity, electronics |
| 08 | Culture, Art, Design, Broadcasting | 20 | ICT |
| 09 | Driving, Transportation | 21 | Food Processing |
| 10 | Business, Sales | 22 | Printing, wood, furniture, arts |
| 11 | Guard, Cleaning | 23 | Environment, energy |
| 12 | Hairdressing, Hotel, Tours, Entertainment, Sports | 24 | Agriculture, forestry, fishery |

## ABILITY COMPONENTS OF NATIONAL COMPETENCY STANDARDS

Occupational competency consists of common basic vocational skills, technical common skills, required occupational skills, and optional skills as shown in the list below. Each competency component is also specified in each category.

1. Common basic vocational skills: The general ability to perform successfully in any industry or occupation, regardless of gender, kinds of business, and job status;
2. Common technical skills: Commonly required skills in all technical jobs.
3. Occupational-required skills: The skills required to perform the job of an occupation.
4. Optional occupational skills: Ability to be given flexibility or to be selectively requested depending on the scope of the business

*Figure 1: Occupational Competency Skills*

## LEVELS OF NATIONAL COMPETENCE STANDARDS

The occupational competency standards adopt 8 levels which are widely used in the world. This is because it is reasonable to make a balance with the level of academic ability as a whole, although it is not necessary to classify it into eight levels in some occupations.

*Table 1. Eight Competency Levels in Korea*

| Level | | Description |
|---|---|---|
| 8 | Knowledge/ Skill | Creating new theory using the highest degree of knowledge and theory into the relevant field |
| | Autonomy | Assigning the obligations and responsibilities for organization and the whole work process |
| 7 | Knowledge/ Skill | Not only using specialized knowledge and theory in a relevant field but also using related neighboring knowledge and theory |
| | Autonomy | Assigning the obligations and responsibility for others' consequences |
| 6 | Knowledge/ Skill | Accomplishing the tasks within one's own independent authorization |
| | Autonomy | Using knowledge and theory in the relevant field |

| | | |
|---|---|---|
| 5 | Knowledge/ Skill | Accomplishing the tasks within an overall authorization |
| | Autonomy | Using knowledge and theory narrowly in the relevant field |
| 4 | Knowledge/ Skill | Accomplishing the tasks within general authorization |
| | Autonomy | Using knowledge and theory narrowly into the relevant field |
| 3 | Knowledge/ Skill | Accomplishing the tasks within limited authorization |
| | Autonomy | Using basic knowledge and theory in the relevant field |
| 2 | Knowledge/ Skill | Accomplishing the tasks under the supervision and basic instructions |
| | Autonomy | Using basic knowledge in the relevant field |
| 1 | Knowledge/ Skill | Accomplishing the tasks under the thorough supervision and specific instructions |
| | Autonomy | Using basic knowledge, understanding words, the ability of calculation, etc. |

## APPLICATION OF NATIONAL COMPETENCY STANDARDS

The Korean government intends to maximize the efficiency of human resource development and utilization by linking work, education, training and qualifications through NCS. The following figure shows the basic usage of the national competency standards proposed by the Korean Government.

The national competency standards can be used by the qualification and testing institutions to develop testing standards and methods, thereby enhancing the validity and reliability of the certification. Education and training institutions can use the standards to develop vocational education courses and textbooks based on practical skills required in the work place.

In addition, companies can be assured of the quality, reliability, efficiency, and effectiveness of human resource management system including recruitment, deployment, training, evaluation, etc.

## ACTUAL STATUS OF APPLICATION IN THE INDUSTRIES

Companies are increasingly confronted with the reality that the turnover rate of the new employees is getting higher due to the incompatibility of job aptitude and practical

demand of job and work conditions. This is due partly to the existing recruitment practice which is based mainly on various academic qualifications and social titles rather than occupational competencies. By adopting the competency standards this problem can be alleviated and corrected if they are applied systematically.

In conventional practices various academic and social titles mayt be advantageous for standard employment selection process especially during examinations and interviews but are not really directly related to the applicant's work competencies and abilities after they are employed. For most people the efforts and expenses involved in obtaining academic qualifications and titles have resulted in unnecessary psychological and financial burdens on the applicants who want to gain employment with academic certificates and degrees. In this sense, if companies assess and select an employee based on occupational standards, they will be able to hire the most suitable employee for the job without giving unnecessary burdens to the applicants. However, there is also a criticism that the competency standards are recognized as another academic title and thus will further increase the burden to the job applicants. This increase on the burden to the applicants as a transitional phenomenon seems to come from the fact that many employees are not trained based on competency standards, and that companies are not able to utilize them properly in the recruitment process. If these problems are corrected, soon this side effect will be reduced. Many big companies have already made the necessary adjustments and are generally satisfied with the use of national competency standards to recruit appropriate employees for specialized jobs.

Nonetheless, many SMEs may still need employees who can work in various jobs and tasks rather than hiring them specifically for specialized assignments in a job, functions, or unit of work. In this respect, the competency standards cannot be applied universally for all types of occupations and jobs. Instead, concerned agencies and individuals should promote the merits of the competency standards and encourage their adoption and application based on the needs and readiness of companies which seek to improve efficiency, productivity, and satisfaction of their employees. Likewise, in order to maximize the benefits of the competency standards it is necessary to develop and provide not only job performance standards but also supplementary data and tools needed by companies for the HR management process and functions including recruitment of new employees so that the system can be widely used in enterprises.

## ACTUAL CONDITIONS OF THE APPLICATION OF COMPETENCY STANDARDS IN VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS

The government has exerted special efforts to apply competency standards (CS) in vocational education and training institutions across the country. So far the CS have

been developed for over 800 jobs and implemented in specialized high schools and vocational colleges for integration in their programs of studies. Specialized high schools (formerly vocational high school) are already applying a new curriculum and new learning modules based on the national competency standards in their course offerings.

In Korea in general the technical qualification system has been based on results of tests. Of course, if a vocational education and training course is completed at a school or training institute, students may be exempted from the test on theories.. The qualifications obtained through standard tests are usually based on theories and technical knowledge of subjects. This practice has been criticized because the standards themselves donot adequately reflect technological changes of the field. Besides, they are often limited to theoretical knowledge and related factors including some practical skills tests with the result that actual technical capacity and job skills of the qualification holders are often insufficient to perform their functions in the work place. At this point, the Korean government is re-organizing and implementing the certification standards system step by step based on the newly created national competency standards.

The Korean government has introduced a process evaluation approach in the new qualification framework that is more focused on creative skills learning process which is different from the previous practice. In addition, new vocational education and training courses based on the national competency standards have been implemented. Thenew qualifications framework was applied in 17 fields of studies in 2014 which included, among others, mechanical, electrical, electronic, cultural contents, information and communications, construction, materials, and chemistry, etc..

The new qualification framework is accompanied by the existing qualifications framework. Therefore, the integration of these two frameworks is recognized as a task to be resolved in the future. Establishing equity between the education and qualification system is also a challenge but the operations of two qualification frameworks may make it more difficult to develop an NQF based on a unified system in the future.

The process evaluation approach under the new qualification framework which is based on the industry- cooperative apprenticeship system may not be disseminated well if the number of companies which employ cooperative apprenticeship system do not increase and only take advantages in using apprentice's labor under the disguised name of training. From this point of view, it is still necessary to encourage more qualified and appropriate companies to participate in the program based on their own needs rather than on merely to increase in the number of companies based mainly on government incentives.

# VOCATIONAL EDUCATION POLICY IN KOREA

Vocational high schools were doing well in the 60s and 70s, with relatively high employment rates and high wages for graduates. However, since the 1980s higher education has expanded rapidly regardless of manpower demand as a result of political decisions made to respond primarily to the educational aspirations of people. Due to the universalization of higher education and a new trend of avoiding 3D jobs at the same time, vocational high schools were faced with a crisis of a sudden drop in admission numbers. In response to this situation, vocational high schools were allowed to prepare students for college entrance exams in terms of continuing education in order for the schools to survive. As a result, employment rate of vocational high school graduates fell to only 10%, and the enrollment rate of higher education institutions rose to 60% or more. As a consequence, it became more difficult for SMEs to recruit skilled workers locally and had to source them from overseas.
At the end of 2010

At the end of 2010, efforts were made to fundamentally reform the names and concepts of vocational high schools. This was a policy of transforming or reforming vocational high schools into specialized high schools, Meister high schools, and industry-cooperative apprenticeship schools. The scope and contents of the vocational high school reform policy are discussed below.

## SPECIALIZED HIGH SCHOOL POLICY

In Korea specialized High School is a form of high school operated in accordance with Article 91 of the Enforcement Ordinance of the Elementary and Secondary Education Act revised in March 1998. It aimed to re-organize the old high schools into schools that offer a specialized curriculum for the purpose of providing practical skills training. The schools operate in the form of specialized high schools and alternative schools in specific areas. Since 2012, all kinds of vocational high schools have been transformed into specialized high schools offering 5 specializations: technical, agricultural, commercial, fisheries & marine, and home economics.
These schools are intended to develop human resources in a specific field and are supported by the Government so that they can train excellent skilled workers through educational programs appropriate to the aptitudes and qualities of students. This strategy enables students to get good jobs after graduation, as it focuses on developing technical skills in special fields such as cartoon, animation, cooking, mobile phone equipment, tourism, interpretation, gold and silver jewelry, internet, multimedia, gardening, golf, craft, design, ceramics and horseback riding, etc. The specialized high schools normally have a small class size of fewer than 25 students to provide better technical training to talented students in each field.

The specialized high schools are given special assistance by the government which provides scholarships for the entrance fee and tuition for three years so that students can devote full attention to their studies. This support is considered necessary in order to prepare skilled workers needed by companies. In addition, excellent students are given opportunities to work and study overseas. The benefits for overseas training are given to graduates of specialized high schools who have more than 10 years of experiences as a master craftsman or have qualifications in higher skills of the required fields and are recommended by the CEO of the SME

The specialized high schools are also supported by the Government to enable employees to have better job prospects. The Government has set up a comprehensive system in which a fair employment is based on occupational competence rather than solely on academic titles. Thus, employment rate of school graduates in public institutions has grown to 20%. The Government, local governments, and public institutions are also expanded to recruit more graduate specialists from specialized high schools. Thus, students from specialized high schools are no longer disadvantaged for employment due to military service. The Government has established a new employment-centered school system that includes the establishment of employment supporting centers, customized training programs, employment fairs, and similar services and activities. It has also set up supporting system for specialized high schools under the Small and Medium Business Administration, Ministry of Employment & Labor, Ministry of Industry & Commerce, and other ministries.

To enhance the attractiveness of specialized high schools, the Government has also introduced a system that expands opportunities for continuing education for graduates while working. In addition, graduates from the specialized high school are eligible to get special admission to the university in order to pursue a 3- year career if they want to. Under this program graduates who have worked in industry for more than three years after graduation can continue their higher education.

 In addition, the following support system has also been established so that work and study can be concurrently pursued by workers at the workplace.

- In-house college: Current employees can improve their job skills at their workplace provided with full tuition support towards the achievement of their degree.
- Contract department: The employers support more than 50% of the tuition fee of the students when they commission a university to improve the job capabilities of their own employees.

- Expansion of scholarships for college students who have graduated from specialized high schools.

# MEISTER HIGH SCHOOL POLICY

A Meister high school is regulated as a high school customized by industrial demands in Article 90 of the Enforcement Ordinance of the Elementary and Secondary Education Act. Specifically, a Meister high school is stipulated to offer a customized curriculum linked directly to industrial demands for further development of vocational education (Ministry of Education website). The Meister high school concept was introduced in 2008 by benchmarking the German dual system, which is an industry-based training scheme. As of 2017, 47 Meister schools had been re-organized from specialized high schools, and the 5th batch of graduation has been achieved. These are special-purpose high schools that train young Meisters in connection with specialized industry demands in some national priority areas. The students have the privileges of receiving the best skills-oriented education at school, to be employed by good companies, to finish military service based on their best skills, and to have higher education opportunities at the workplace after graduation

The Meister High School adopts the model of "Job first, Study later". In this model, students are encouraged to get a job first after graduation, and then, to continue their higher education at the workplace, or attend a full time- based college later on. Meister High Schools have been awarded these special advantages and have recently increased employment rate of their graduates by 70-80% thanks to the reform efforts.

Here are some of the privileges given to Meister high school students:

- Exemption from tuition, entrance fees, school operation fees.
- Special scholarships are provided for to excellent students and students from low-income families.
- Provision of pleasant dormitories for students so they can devote their full attention to their education.
- Support for students to go abroad by linkage with overseas vocational training programs and national and local governments' globalization projects.

The following is the supporting system for promoting a career path of Meister High School students.

- Introducing the educational quality control system through systematic evaluation loop from entrance to graduation for better n employment prospects in enterprises.

- Each Meister High School concludes a recruitment agreement with its partner companies through cooperation encouraged by the Government.
- Employed graduates can postpone/defer military services for up to 4 years and finish their military service based on their best skills.
- Graduates who have more than three years of work experiences are guaranteed to acquire a post-employment degree in established systems such as special selection of industrial incumbents, contract department, in-house college, cyber-university, etc.

The special advantages of Meister High School management are as follows:

- Ensure autonomy of the school management by the principal who is qualified and selected through an open competition.
- Invitation of an industrial Meister as principal and teacher, and allowing for specialized training required by companies.
- Curriculum development and operations that respond to industrial demands are allowed for individual schools in order for them to train an excellent workforce,
- Provide foreign language training by inviting foreign teachers to teach students in order to prepare them for overseas training and employment.
- Class size is reduced to less than 20 students for better interactions between teachers and students and for a better practicum program.
- Provide practical training with the tools and equipment that are actually used in industries.

## KOREAN DUAL SYSTEM OPERATION POLICY

The dual system is an educational and training system that is implemented as part of a work-study parallel system (MoE, 2013). It was benchmarked from the German and Swiss dual system and modified to suit the needs and conditions in Korea. This Korean dual system aims to train students in school as well as in companies for 2-3 years in order to help them discover their aptitudes and career choices in advance through practical training based on the national competency standards (NCS). The dual schools are selected and operated among specialized high schools which have morebsuitable departments for cooperation with industries. Therefore, only the students of suitable departments within the school participate in the dual training process. Although the name of this model is 'school', but it actually means a format of training. The dual school normally cooperates with partner companies to provide balanced school based training and worksite training programs to the students. The selected students are trained at the industrial site by the company technicians for two years from the second grade to the third grade. The school provides theory and basic

education by the teachers. The dual system is characterized by its stronger emphasis on job site training compared to the existing courses of the Meister and specialized high schools.

The advantage of the dual system is that it benefits both businesses and schools. It is good that companies can train good skilled workers that they need for their operations, and the schools can help students get a job at the better-fitted companies after graduation. It is a training program based on the NCS to enable students to acquire skills and knowledge systematically in both the school and the company.

The students of the dual system are recruited and trained by employers. Therefore, their employment is usually guaranteed in advance. The students are also protected by the Labor Standards Law and other related laws as a learning worker in Korea. It is also possible for graduates to be employed as special soldiers in related technical fields and to be exempted from military service by working at military industries as industrial skilled workers.

## VOCATIONAL COLLEGE DEVELOPMENT POLICY

Since July 2013, the Korean government has established and implemented the following policies to foster vocational colleges (2-3 years of studies at higher education institutions ) towards the realization of a competency-based society and a knowledge-based industry and a creative economy.



Strengthen training system of core technicians by fostering 100 specialized colleges.

Expanding the function of vocational colleges through diversification of educational terms

Establishment of the graduate schools for the industrial technical masters training.

Cultivating lifelong learning- centered vocational colleges

Promoting overseas activities of college students by supporting the "globalization project"

*Figure 2: Goals of the Vocational College Development Policy*

The Ministry of Education (MoE) has established the "vocational college development policy package" to train 150,000 core professionals annually for the knowledge-based industry and creative economy. In response to the government's policy to focus on small and & mid-sized enterprises, MoE aimed to achieve the employment rate of vocational colleges of up to 80% and the national employment rate of up to 70% by

2017 depending upon the "college development policy package.". It emphasized that vocational colleges can contribute to fostering the happiness of the nation and the realization of a competency- based society.

The colleges were established first in the 1950s and obtained a social status as a vocational college in 1979 by law. Since then, it has trained 520,000 industrial workers and played a pivotal role in the modernization of Korea and the development of national industries. Nevertheless, vocational colleges have encountered many difficulties that they had to overcome due to the rapid changes in the industrial structure and technology over the last 30 years. Vocational colleges have also been suffering from the disadvantages of its training term (2-3 years) limitation, mismatches of manpower demand and supply, and an academically- oriented social climate.

The Korean government publicly declared that it has developed vocational colleges for the training of core technical manpower required in a knowledge- based industry and creative economy through the "vocational college development policy package" that includes the support of training courses by the National Competency Standards (NCS) and assistance to specialized colleges linked to regional industries, etc..

# IMPLICATIONS OF KOREAN EDUCATION FOR DEVELOPING COUNTRIES

Although Korea believes that education has contributed to the success of its economic growth as a result of its success and failure in its trial and error efforts, there are a few studies that have accurately analyzed what were the success factors of its educational policies. In particular, there are no studies that analyze the merits and success factors of vocational education in Korea from the perspective of developing countries.

From the viewpoint of developing countries where funds are scarce the big sized classes and school shift system adopted by Korea which have been downgraded as bean sprouts classrooms are accepted as better policy and merits. Further, the policies of the dictatorship era which at that time felt gloomy are considered to be ironically more appropriate for the existing conditions at the time. From this angle and as viewed by developing countries, it has been recognized that Korea's past needs to be re-analyzed and re-examined to provide further suggestions and lessons that could help developing countries to introduce educational policies that best serve the needs of their countries even with scarce resources.

Based on my experience in the past 30 years of working as a vocational education policy specialist in Korea, in ODA for developing countries especially in Asia, and in research on human resource development policies in Korea, I will try to infer the

success factors of the manpower training policy. However, these success factors are logically inferred based on my experience as a researcher and specialist so they will need to be verified through further empirical research. In this chapter I would like to enumerate on the success factors of the policy as follows:

## INTEGRATED IMPLEMENTATION OF EDUCATION AND ECONOMIC DEVELOPMENT POLICY

In Korea, human resource development and education policy was established and promoted as a part of the national development policy closely integrated with the economic development policy. The five-year economic development plan commenced in 1962 and continued until 1997. In this process, the Republic of Korea established an "Economic Planning Board,", which was chaired by the deputy prime minister who played a very crucial role to lead the Economic Planning Board which exerted strong leadership in developing, coordinating and promoting the economic and social development plan for each cycle. During this period and in accordance with the provisions in the economic and social development plan, the demand for the labor force needed for economic development was forecast every five years. Accordingly, the vocational technical education policy for manpower training was established and promoted. While the promotion and implementation of vocational education policy was carried out by the Ministry of Education and the vocational training policy by the Ministry of Laborbut the policies were always coordinated and evaluated by the Economic Planning Board. With this comprehensive and systematic approach Korea has been able to maintain the integrity of its policy implementation and achieve good results.

## PROMOTION OF MANPOWER DEVELOPMENT POLICY PRIOR TO ECONOMIC DEVELOPMENT

In order for the manpower development policy to contribute to economic growth, it is necessary to prioritize manpower development policies to be in line with the economic development stages. In order to cultivate manpower needed for economic development through vocational high schools, it takes at least 3 years to train  manpower needed by industries. However, if required manpower can be achieved through the two- year colleges or four- year colleges, it will be possible to supply it only after two or four years of training respectively. In this regard the vocational education policy should anticipate the direction of economic development and establish and actualize the training and manpower supply plan of the manpower to meet economic development goals.

Overall, it is recognized that Korea has pursued such a relatively successful policy in terms  of providing needed human resources for the economy. . In this respect, the development and implementation of educational policy in Korea has been carried out effectively to provide needed manpower especially technical skilled workers to meet the demand for economic development of the country.

Historically, Korea was liberated from Japanese rule after 35 years in 1945, but was subsequently divided into South Korea and North Korea. Soon after liberation the Korean War broke out and lasted for three years (1950-1953). In the 1950s, Korea was destroyed by war and became a country plagued with problems such as poverty and hunger. However, Korea was successful in providing literacy education for all of its people including adults even during the war in the early the 1950s. Moreover, it was able to enforce compulsory elementary education and enrolled almost all school-age children in schools.

The main reason why Korea was able to provide universal literacy education through school education and informal education in a comparatively short period was that it had a single culture and a single language as a basis for unity as a single nation and had an excellent scientific language, Hangul, which was easy to read and write. Because of the enthusiasm of the Korean people for education which is difficult to find in other countries, the participation rate was so high not only in school education but also in informal and even adult education. This zest for education by its people enabled Korea to succeed in its literacy education thrusts in only a short period of time. And based on this enthusiasm for education, informal education was carried out successfully through various channels and methods including village evening schools, rural enlightenment activities, and civic schools all at the same time. These efforts made a great contribution to a successful literacy education program within a short period of time.

Meanwhile, Korea had successfully prepared industrial reserve forces, which were necessary for a labor-intensive industry development, which started in the 1960s, through the literacy education campaign for the whole nation. Subsequently, light industry was initiated and accelerated in the 60s. This movement was made possible because of successful development of manpower supply based on universalized elementary and middle school education and the introduction of vocational middle schools  which took place in the 1950s.

Following successful development of light industry, Korea has promoted heavy and chemical industry development policies in the 1970s. Through the economic development adjustment period of the 1980s, diversification and balancing of industries were promoted. The IT industry jump-started the advanced economy in 1990s and in the 2000s, Korea moved into the knowledge based economy and high-tech industrial

society. In this process of economic development and transformation, Korea was able to supply technical manpower through universalized secondary education and expansion of vocational high schools in the 60s and 70s. In the 1980s, vocational colleges were expanded to train and supply technicians who were required later on. In the 1980s and 1990s, higher education was universalized, and engineering education and industry- academe cooperation were emphasized to train and supply high-tech manpower. Since the 1990s, the graduate school programs have been greatly expanded to supply quality high-tech manpower. Through these stages of transformation Korea has been able to succeed in developing needed manpower in line with the economic development stages through its educational policies in anticipation of its economic development stages as briefly discussed above.

## INTRODUCTION AND PROMOTION OF SHORT-TERM VOCATIONAL TRAINING SYSTEM

So far Korean economic development has been achieved at a very rapid pace while the demand for manpower has rapidly changed and diversified over the years. Under the circumstance, it was impossible to supply the required manpower by depending only on the schooling system which is fixed for 2, 3, 2 or 4 years of training. Therefore, Korea introduced a short-term vocational training system in the 60's and 70's to supplement the formal school educational system. The short term vocational training consisted of training programs ranging from 2-3 months to a maximum of 6 months. The vocational training system was operated by the Ministry of Labor which was able to provide positive manpower supply within a short period of time in response to the manpower demand of industries. These vocational training systems also contributed to social stability by accepting youths who were not interested in studying at high schools and colleges. This type of vocational training system was operated successfully in the '60s and '70s.

## PROMOTING RELIABLE AND CONSISTENT POLICY

The promotion of human resource and education policy in Korea has been judged to be successful in the era of former dictatorship rule of President Park Chung Hee rather than the democratization era. Ironically, it is recognized that the long-term consistency of the manpower-training policy was maintained because of the Park Chung-Hee dictatorship rule with a high level of people's trust resulting in high participation in the government policy . Since the policy was not changed frequently by public opinion or by the regime change, it was able to be consistently promoted until the educational policy for manpower development was imbedded and succeeded. A similar policy was not so successful after democratization because it was changed frequently due to

the regime change and influences of public opinion which often caused conflicts and confusion. In the era of dictatorship government, the human resources and education policy was consistent in the long-term and public's confidence in the policy was rather high. Any difficulties in the policy process were recognized and issues resolved and overcome rather than as being used as a pre-text for excuse or avoidance. In a number of cases, the policy was actively accepted, promoted, and made successful by the people because it was the people's trust that benefits and rewards would come along when they succeeded in implementing the policy.

On the contrary, since the democratization period, policy promotion was often abandoned as the regime changed as well as changes in social atmosphere due to changes in public opinion. Hence,, the driving force for sustainability of policy  has been lessened or lost and consequently many initiatives have failed.

## EFFECTS OF PRIVATE SCHOOL POLICY AND BIG SIZED CLASSES

Despite being a poor country with limited natural and financial resources, Korea has been able to universalize primary and secondary education and even higher education within a short period of time because of the success of promoting private school education through progressive policies. In Korea at present 20% of the existing middle schools, 40% of the high schools, and 85% of the universities are still private but these percentages were much higher in the past. The introduction of private schools was inevitable in the face of poor government financing of education. However, in spite of certain negative side effects, private education contributed greatly to the expansion of educational opportunities within a short period. In the case of vocational education i especially vocational high schoolsabout 50% is operated as private institutions and even formal vocational training was offered by a large number of private institutions including enterprises.

Within the limit of its financial resources, Korea was able to enroll all school-age population although this means that the size of the schools and the size of the classes had to be increased. Until the 1970s, the class sizes of most elementary schools reached 80 to 100 students, and many schools were operated on a two or three shift basis. In such situation with big class sizes and big size schools. it was difficult to maintain quality of education and for overall education to be effective. Consequently, competition for entrance to upper secondary school was fierce and it became a common practice to rely on private education to fill the gap. In this regard, the unit cost of public education in Korea was the lowest in the world although education results were higher than the world norm due largely to supplementary education activities provided by the private education sector.

In the case of Korea, it is considered by parents and students alike that attending schools will bring not only financial benefits but also more prestige in terms of

intellectual and personality development. Hence, children prefer to go to school rather than abandoning their education even with big- sized class in big schools. Under this circumstance students cannot expect to learn much from their teachers, but they have more opportunities to develop their intellectual abilities and humanism by their interaction with other children in the school. In this respect, it is believed that Korea has succeeded in supplying more high- quality manpower needed for economic development, even though it had to operate a big sized class which was called "bean sprouts class" in the past.

## EDUCATIONAL POLICY FOR CULTIVATING MANPOWER IN HARMONY WITH SOCIO-CULTURAL BACKGROUND

It is rather difficult to assume that Korea's economic growth has been achieved solely by the adoption of good manpower training policies. In order for Korea's overall development and economic growth to be successful as it is, many social and cultural factors also played an important role in providing solid foundations for the phenomena. It is generally believed that good education policy was the key factor that contributed to Korea's development . However, it must be recognized that Korea's economic growth was made possible through various socio-cultural factors including work ethics and dedication of the Korean people who were willing to work hard by integrating learning and work as part of their overall education without prejudice against manual and technical education and work. This value has contributed to wide spread adoption of the value of vocational education alongside general education. This also means  that vocational education policy should be harmonized with the general education policy based on prevailing socio-cultural conditions which are managed and controlled under a stable political leadership.

Korea's education system including manpower training system could provide a large amount of manpower through mass education suitable for the mass production system of the past industry. At present the country is moving toward emphasizing creative personality education in the era of creative knowledge economy of individualized production. In the era of development dictatorship, Korea was able to succeed in its human resource development policy and economic growth because of the interests and efforts of a stable political leader at that time were in harmony with social demands. Korea is demanding more advanced political leadership in the era of democratization. However, such political leadership is still undergoing trial and error and has not been matured. As a result, some conflicts and confusion have emerged in education and HRD policies stemming from the politics from time to time.

In each country there are sociocultural and historical factors that shape mindset and influence thoughts and beliefs of its people Hence, itt is necessary to understand

and reflect their characteristics and merits into the education and manpower policy development process. The political leadership should also be stable for consistent support of the policies. There is no doubt that successful experiences of Korea's past education development was due partly to a stable political leadership.

The success of Korea's mass production industry in the past was made possible by the vocational education and training policies that could supply massive technical manpower on time. However, it is also believed that the main factor for the success of educational policy for manpower development to promote economic and industrial growth was through harmonization with other socio-cultural factors. For example, the Confucian cultural tradition of Korea has made it possible for all people to study and work hard, thereby help improv their competencies and quality of education and performance. The Confucian cultural tradition has also helped the Korean people to acquire and internalize the attitude of respecting the older generation and superiors which spontaneously helped the huge industrial organization to maintain the hierarchical order for efficient operations and eventually for the country's economic development.

After the Korean war Korea had adopted compulsory military services for all its male citizens. This policy required all young men to serve as soldiers or junior military officers for two to three years in the army. In Korea, all adolescents have opportunities to cultivate their abilities to adapt to organizational life during the military services. It is quite normal that junior military officers later became leaders preferred by the companies because of their leadership skills acquired in the military.

In this way, Korea succeeded in promoting its economic growth through wise educational policy as well as by taking advantages of the socio-cultural factors including the military service system, Confucian culture, Korean written language, and political stability. This is evidence that a country's educational policy should be closely harmonized with other socio-cultural factors to ensure its successful implementation.

## POLICY PROPOSAL FOR 21ST CENTURY EDUCATIONAL DEVELOPMENT

So far, Korea has been developing its economy by closely replicating the industries and technologies of the developed countries. However, as Korea has grown into a competitive position with developed countries, Korea has faced a situation where it has to develop its own technology and develop its industry which started almost 20 years ago. In the meantime, Korea has adopted a policy to strengthen R & D investments, advanced engineering, and graduate education. Now, the country faces new challenges to develop and cultivate new technologies and industries in the era of

the Fourth Industrial Revolution. The following section explores impacts and needs of the new industrial revolution in the 21st century as well as strategies to guide the direction for a long-term development policy for vocational education in Korea.

## CHARACTERISTICS OF THE 4TH INDUSTRIAL REVOLUTION AND TREND OF TECHNOLOGY DEVELOPMENT

At the 2016 World Economic Forum, Professor Klaus Schwab pointed out that the fourth industrial revolution is characterized by technological advances that are fundamentally different from the previous three industrial revolutions. Advancements in cutting-edge technologies including Robotics, Artificial Intelligence, Big Data, Nano- technology, Biotechnology, Internet of Things, 3D printing technology, and autonomous transportation technology have enormous potential to connect millions of people to the Web, dramatically improve the efficiency of businesses and organizations, and regenerate the natural environment through better resource management practices.

The German industry represented by the technological convergence of the 4th industry 4.0 technology innovation demonstrates that the so-called smart factories which combine cutting-edge technologies such as cyber-physical system (CPS), internet of things, and cloud computing are actually operating while applying the automation and data exchange technology of the manufacturing industry. As such, the Fourth Industrial Revolution is characterized not only by cutting-edge technologies in each field, but also by connecting and integrating these advanced technologies and dramatically increasing productivity and added value.

The 1st industrial revolution was understood as the mechanization of the railway industry and the cotton spinning machine by the revolution of the steam engine from the 1760s to the 1900s. The 2nd industrial revolution was the use of electric power from the 1900s to the 1970s. It is understood that mass production and consumption society emerged through the revolution of automatic moving assembly technology, and the 3rd industrial revolution was understood as control technology and production automation using IT technology and electronic technology since 1970's.

The Fourth Industrial Revolution is to connect and integrate the advanced technologies recently developed on these technological innovations, and progress by utilizing digital communication, artificial intelligence and big data technology, and to apply them effectively and efficiently to create new types of products. It is recognized that it will dramatically increase productivity and added value.

# DISAPPEARANCE AND GENERATION TREND OF INDUSTRIES AND OCCUPATIONS IN THE 4TH INDUSTRIAL REVOLUTION ERA

A study conducted in the United States predicts that 35-50% of existing jobs will be eliminated by mechanization and automation in the near future. If automation is promoted by the development of artificial intelligence, robotics, internet of things, etc., productivity will become higher. This trend causes worries among education planners and policy makers that it will result in increased unemployment as automation will automatically replace the need for human labor force.

From history we learn that in the short term temporary unemployment always occurred in technological revolutionary occupations and mass unemployment occasionally occurred every time when a technological revolution happened. However, despite the fear of mass unemployment, we can also see a positive side of innovation. Some jobs such as typing have disappeared, as seen in the revolution and introduction of computer technology, but in the long term, related industries and derived technical fields have increased the total number and types of jobs. According to the results of previous researches, even if the job was temporarily lost due to technological revolution, the total number of jobs was not reduced but instead increased. There is a common belief among some people that unlike the past the result of the Fourth Industrial Revolution the number of jobs will be greatly reduced through adoption of mechanization, automation, and artificial intelligence.

In the long term, however, it is expected that this development will eventually generate more jobs. With the application of advanced technologies in many occupations including artificial intelligence, robotics, big data and cloud computing, workers can get higher wages with a shorter work period, increased productivity, and less repeated hard work. The result of this development is that workers will have enough money and more free time which will lead to the emergence of new social needs. In other words, the emerging social desires will help develop new industries such as health care industry, leisure, entertainment, tourism, culture, and arts. Jobs and job creation in these industries will be increased in stages as the economy grows.

The revolution of high technology will create new jobs by itself. However, unlike the era of mass production, these jobs are not expected to be made massively in the process of industrialization. Even if it requires a high level of intelligence, it can be replaced partly at least or totally by machines, robots, and computers if they can be made as routine work. Nonetheless, these high tech jobs are expected to require professional specialized training at higher education institutions. In the United States, studies of employment trends on work and jobs for the past three decades have shown that routine jobs, either intellectual or skilled, have been significantly reduced while the

level of employment in non-routine cognitive jobs is rapidly increasing, as well as non-routine manual jobs which will continue to increase. This indicates that jobs in the future will demand a high level of intellectual ability and creativity. Still, as a limitation of mechanization and automation, a certain percentage of jobs will still require human workers including the creative applications of skills and sensual responses.

There are many predictions that existing jobs will largely disappear in 10 years. However, if one looks closely at the situation, it is hard to accept this assertion at face value. Rather, most of the occupations will remain the same, but the technical means and methods of doing the job will change such as using cheaper, high-quality new materials, or using more productive and efficient cutting-edge technologies – will be improved.

Therefore, many of the jobs will not suddenly disappear or suddenly reappear except for a few jobs that are in great demand in response to the change in technologies. For example, the automobile manufacturing industry will remain intact, but the methods and materials for manufacturing cars are expected to be innovated. Therefore, manpower required for the automobile production process itself will be reduced relatively compared to the past because of the adoption of easier and simpler automatic production processes.

However, from a long-term and global perspective as more and more cheap and better quality cars are produced and production expands, employment opportunities for automobile-related jobs are expected to increase in total numbers.

In this sense, it seems wiser to explore and prepare for the introduction and incorporation of new technologies into the existing methods of doing jobs rather than on the concern of jobs disappearing.. Through this progressive thinking technological progress can be achieved and mass unemployment can be prevented. Even so, due to technological advances, a certain number of workers will be reduced and they should inevitably prepare to move to more relevant new jobs. At this point, the school will have to explore and be prepared for training of new workers with requisite skills in response to future job demands.

## OCCUPATIONAL SKILLS AND ATTITUDES REQUIRED BY THE FOURTH INDUSTRIAL REVOLUTION

As we have already seen, in order to acquire and apply advanced knowledge and skills in new technologies in the fourth industrial revolution era, not only higher intellectual and creative abilities but also emotional preparation and attitude are required. In the

past, even if a high-tech process was introduced, only some parts were mechanized and automated, while most of the other parts of the work were still carried out by human workers.

While most of the industrial production in the past was mass-produced by a large number of workers on a large scale, the Fourth Industrial Revolution will enable individualized production on a case-by-case basis. Although it is possible to produce goods without large factories and deliver the goods without warehouses, it is still necessary to cultivate a high intellectual capacity and creative abilities including problem solving ability, critical thinking, and judgmental ability in order to provide products and services that suit the unique individual needs.

In the fourth industrial revolution era, the integration, convergence, and fusion of technologies have become universal, so that emotional abilities and attitude including communication, empathy, cooperation, and human relationships and, negotiation should be developed to enable workers to work with people from other professions in various occupations. These qualities will be much more important than in the past.

The Fourth Industrial Revolution will require new abilities and types of attitudes from professionals and workers because of technological change and changes in production and service systems. This is why teaching and learning system must also change to prepare professionals and workers who are capable of adjusting and accommodating technological change. As the Fourth Industrial Revolution requires different types of skills and mindset, s education is recognized as a very important social variable that will affect the abilities and successes of individuals and countries to cope with rapid changes in the society due to technological progress as was the case in human history. Technological development in the fourth industrial development era will bring about radical changes in industrial production methods and technological systems which precipitate fundamental changes in the kinds of occupations and occupational practices in new industrial process. In order to cope with changes in the fourth industrial revolution era, fundamental reform and development of the educational and training system including vocational education is required. The new direction for these reform and development policies is summarized as follows

## INTRODUCTION /IMPLEMENTATION/ESTABLISHMENT OF SELF-DIRECTED LEARNING SYSTEMS TO REPLACE A TEACHER- LED EDUCATIONAL SYSTEM

In the new industrial age the self-directed learning system (Heutagogy) that enables learners to learn and solve problems by themselves will be very crucial for professionals and workers to successfully cope with rapid changes in the work place. Hence, the education system will be required to transform itself from a teacher centered approach

to a self- directed learning system to prepare a new generation of professionals and workers who could learn to acquire knowledge and skills to solve complex problems on their own.

In the era of the fourth industrial revolution in which technological innovations and changes become commonplace and the needs of consumers are diversified with increasing demands, job design and functions must change to embrace creativity in designing and providing goods and services through innovative uses of new technologies. Of course, it is neither possible nor desirable to learn about all new technologies to be used in a lifetime only through classrooms or school laboratories. A lifelong occupation requires that professionals and workers alike must devote themselves to the process of learning new technologies and applying them to new requirements and problems during one's lifetime. The Fourth Industrial Revolution is an age when job performance and abilities as well as attitude needed to solve problems and to carry out job tasks by self- learning is required. In this respect, "learning how to learn" wherein learners learn how to constantly improve their knowledge and skills in order to solve problems with effective applications of their knowledge of technologies will be very important to serve as a basis for carrying out lifelong learning activities on their own.

The new industrial era does not allow us to keep a job for a life time based on a limited range of knowledge and skills taught by teachers in schools or colleges. Hence, the acquisition of basic skills for lifelong learning and self- learning abilities and attitude will be much more important than the amount of knowledge acquired in schools. Teacher-centered one-sided education system in which teachers impart knowledge to students is no longer valid. From this point, it is necessary for the education system to fundamentally reform the teaching- learning process by focusing on a self-directed learning system in order to prepare learners to function effectively in the new industrial age.

## FOCUS ON MORE ON THE LEARNING PROCESS RATHER THAN ON LEARNING RESULTS

In order to prepare learners to cope with the changes in the new industrial era it is necessary to institutionalize a learning process-oriented system that develops creativity, thinking ability and inquisitive attitude in place of an indoctrination training system which focuses on acquisition of a large amount of formal knowledge in the forms of facts, information, and skills. The time has passed when one could apply learned knowledge and skills obtained in schools for a lifetime job without difficulties.

In the era of the Fourth Industrial Revolution in which we have to live a life and a career with increasingly challenging new tasks and problems, we need to develop creativity, critical thinking skills, and positive values and attitudes toward building our lives and careers. In this respect, it is neither possible nor necessary to teach all the necessary knowledge and skills we will need within a limited time in the school. Rather, it is a time to form a creative attitude and challenging mindset to discover and invent new knowledge and solve problems creatively . In order to achieve this goal school education should reduce time spent on learning contents of basic knowledge and skills and increase more time and opportunities to cultivate such creativity and inquisitive attitudes. Hence, the school education system should be reformed to focus more on the learning process in order for the students to acquire creativity and attitudes required by the fourth industrial revolution.

## INTEGRATING WORK AND LEARNING BY COMBINING THEORY AND PRACTICE AND LEARNING AND WORK

The practice of teaching theory and practice separately has continued up to now. In most cases theory is usually taught by a full-time teacher who usually graduated from a regular university and practical skills are taught by practical teachers trained and/or work at an industrial site or work place.

This custom actually originated from occupational practices of separating white and blue collar workers instead of standard practices in the work place in which skilled workers also need to know and apply theoretical knowledge in their jobs. Although vocational education aims to teach students how to work with both their hands and head, the general practice in vocational schools has been dominated by the distinction that learning takes place only in school and work is carried out only in the workplace. However, to make learning more interesting and relevant to the needs of students schools should also include workplace practices in the classrooms while companies should also serve as a learning organization to enable workers to learn new methods of working more effectively while doing work creatively in the workplace. This is very important for both schools and corporations to survive in the fourth industrial revolution in era which technological innovations take place continuously.

In schools, efforts to integrate theory and practical skills training for more realistic learning should be increased and the learning organization model for enterprises should be universalized for technological innovations and learning at the workplace.

# INTEGRATION OF GENERAL AND VOCATIONAL EDUCATION RATHER THAN MAINTAINING SEPARATE STREAMS FOR STUDENTS

The vocationalization of general education, that is, vocational applications of general subject-matter contents should be taught in all school programs together with a generalization of vocational education; that is, common basic vocational skills, knowledge and work attitudes should also be taught to all students.

Traditionally, subject-matter based education has focused on teaching theoretical knowledge system. However, unlike in the past which emphasized only on academic knowledge system, the socio-vocational applications of subject-matters need to be strengthened in elementary and secondary schools rather than focusing on the knowledge system itself to train subject-matter specialists. The functions of subject-matter education should be expanded to meet social and occupational needs of the students who need a diverse range of theoretical and practical knowledge to fulfill their aspirations in the fourth industrial revolution era.

In the modern democratic society where all the people should have a job basic vocational education is essential to all youths even if they will take up their studies at a university. At the same time social prejudice and misperception that vocational education is suitable only for lower class students should be rectified. In order to address this issue we need to integrate and teach common vocational basic skills that are essential for all regardless of their future occupations.

In order to eliminate prejudice and promote all round education for students vocational education and general education curriculum should be linked more closely so that the learner can freely move and pursue his/her preferrel courses. In this respect the vocational education system with its successful vocational high schools and the general education system which focuses mainly on general high schools should be fundamentally complemented and linked. By doing so, the educational opportunities for people to succeed as a more technically- oriented and productive workers will be greatly expanded. This approach will enable Korea to develop itself to become an advanced country in the near future.

# ESTABLISHMENT OF INDUSTRY-ACADEME COOPERATION SYSTEM ENHANCED AND SUPPORTED BY MUTUAL BENEFITS RATHER THAN FORCED COOPERATION BY LAW

By strengthening partnership between industry and academic institutions a cooperation system can be strengthened for mutual benefits through common

interests. In the fourth industrial revolution, era technology innovation research and education and industrial applications must be linked and integrated for the country to become competitive and successful in the globalized world.

Until now, industry-academe cooperation has been one of the unilateral requests by schools for companies to provide a place for practical training of their students. Enterprises are generally reluctant to cooperate in compliance with the law. To promote and strengthen cooperation for mutual benefits formal institutional arrangements should be instituted so that cooperation in research and education is voluntary and both parties feel that they can derive common interests and mutual benefits from the arrangements. Overall, there is a limit to the system that the state can force industries to comply by law.

In this regard, technological innovation and the R & D sector, educational and industrial sectors should establish a collaboration system for the pursuit of common interests and success, and vocational education schools and institutions should be prepared to adopt this approach accordingly.

## DIVERSIFICATION AND IINCREASED EFFICIENCY OF THE EDUCATIONAL DELIVERY SYSTEM FROM BEING SCHOOL AND TEACHER CENTERED

Beyond the school classroom and teacher-led lectures, education institutions must utilize advanced technologies to build effective and diverse delivery systems that are free from time and space constraints. Recent advanced technologies are enabling effective learning at any time, from anywhere. Massive open online courses (MOOC), which are already popular in developed countries, are s a notable example. Many other educational methods and delivery systems are being developed and tried. Lifelong education will inevitably become universal in the fourth industrial revolution era, in which technological innovation, production methods, and vocational skills are constantly changing. Therefore, it is imperative that educational delivery methods should also be diversified and be made more efficient by utilizing advanced technologies and media now available.

## RE-ORGANIZATION OF THE WHOLE SYSTEM OF EDUCATION FROM YOUTH EDUCATION TO LIFELONG EDUCATION

Until now, education has been the mainstream of children and youth education. However, in the age of lifelong education, schooling and vocational education should be strengthened especially in the areas of basic vocational skills and should be designed and operated as an integral part of continuing education.

Lifelong education should be considered as important or even more important than youth and school education. Hence, policy and financial support for lifelong education should be accorded high priorities in the fourth industrial era. In particular adult vocational education will be necessary to enable adult population to learn how to cope with rapid technological changes and to explore opportunities and options to improve their lives and career so they will become productive members who can contribute to the society while at the same time feeling that their lives are worthwhile because they can still learn and adjust to the changes without being a burden to their children and the communities.

School education should focus more on cultivating basic skills and fostering effective learning methods and learning habits to help learners identify and solve problems on their own. As a life span of applied technologies becomes shorter, it is neither possible nor desirable to predict or impart knowledge and skills to adopt or apply technologies required for the future only in the school setting. Therefore, school education should focus on building a foundation and infrastructure to prepare students for lifelong learning,Hence, policies and resources for school education will not de-limit students' abilities and opportunities from learning on their own throughout their lifetime.

## RE-ORGANIZATION AND STRENGTHENING OF HIGHER VOCATIONAL EDUCATION FROM ACADEMIC- ORIENTED TO TECHNOLOGICAL-ORIENTED HIGHER EDUCATION

In response to the fourth industrial revolution, tertiary vocational education should be re-oriented and strengthened to provide technological-based higher education for future leaders in applied sciences with a focus on design, development, and production of technological process and products. So far most higher education institutions have been perceived as places set up to teach academic theories for a small number of talented individuals. However, as industries have developed and the skills level has increased, a growing number of complex jobs have reached the stage of requiring completion of higher education for their workers. In the mass production era, it was possible for workers to raise productivity and earn higher wages through increased efficiency although their level of education and skills might not be very high. However, in the twenty first century the working world has developed to become a professional society in which tertiary education is universally demanded because technology level has been raised and production process and methods have advanceed from the standardized mass production technique to more specialized products to meet specific demands of more sophisticated consumers.

In the fourth industrial revolution era, ICT, AI, big data, robotics technology, IOT, Biotechnology, nanotechnology, autonomous transportation technology, and 3D printing technology will become more popular and an integral part of the industrialized

societies. Most of the jobs in these high-tech industries require college-level education and training. This is why higher vocational education is necessary and should be made universal. The future development of Korean industries and economy depends on these advanced technologies.

Based on the above scenario, Korea should re-organize its vocational education system in order to secure advanced technologies and to become a leader in the new industrial development. Universities which traditionally focus on academic and theoretical studies should be reoriented and strengthened in order to promote high tech industries. Similarly, vocational education universities that already teach advanced applied technologies should also be strengthened to become centers of excellence for design, development, and dissemination of applied high tech knowledge and production skills to promote and support high tech industries in the country.

In this respect, higher vocational education institutions should strengthen and reform their departments and the university structure through systematic review and analysis of the emergence of new skills and jobs required by new high-tech developments and industrial trends. In addition to tertiary education, vocational education system at various levels in modern and advanced technologies should be established and expanded in order to nurture the necessary technical manpower for new industries along with various research initiatives to promote the development and application of advanced technologies in the twenty first century..

## ESTABLISHMENT OF NEW VOCATIONAL EDUCATION RESEARCH SUPPORT SYSTEM

Prior to the fourth industrial revolution, technology was applied quite successfully to the static needs of industries for a relatively long period. Therefore, it was rather easy for the schools to catch up with the changes in technology in their teaching and learning. However, in the fourth industrial revolution era in which technical innovation and industrial production methods and job skills advance rapidly,it is very difficult for vocational education to be able to catch up with technological changes in the industrial field. In this regard, vocational education research institutes for advanced teaching and learning of new technologies are now urgently required more than ever before to design and develop curriculum contents and educational methods reflecting the constant industrial changes of the twenty first century. In the future, the role of the proposed vocational research institutes should be designed so that they can effectively support teaching and learning of advanced technical subjects in order to meet the actual demands of modern high tech industries above and beyond general policy research.

# RE-DESIGN OF MANUAL JOBS AND VOCATIONAL EDUCATION RESEARCH IN THE 4TH INDUSTRIAL REVOLUTION ERA

Research on vocational education and training methods including applications of technologies to make manual jobs more efficient, stimulating, and imaginative for the fourth industrial revolution era require new thinking. There is a limit as to how much automation can be promoted; hence, a certain number of skilled workers will still be required. This view is supported by evidence regarding the employment trends in the United States which shows that employment in the non-routine manual job sector has been steadily increasing.

There is nothing wrong with a misunderstanding in certain sectors that the fourth industrial revolution mainly focuses on high technologies as well as misinterpretation that eventually manual jobs will not be needed in the modern society. In reality manual and service jobs that have existed up to now will move up to more advanced levels through combination of cutting-edge technologies such as automation, mechanization, and ICT, to create new manual service occupations that respond more effectively to changing demands of the industries and society. In this respect, the national policy should not focus only on high technologies, but should also support research on negative impact of technologies on manual jobs to prevent them from unnecessary falling into a vulnerable state as well as identify and establish new strategies and methods to improve and strengthen the status of vocational education in the fourth industrial era.

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# JAPAN'S APPROACHES TOWARDS TEACHING TWENTY-FIRST-CENTURY COMPETENCIES IN SECONDARY AND HIGHER EDUCATION FOR DEVELOPING GLOBAL HUMAN RESOURCES

Keiichi Ogawa, PhD
Katsuki Sakaue, PhD

*This chapter reviews the Japanese government's efforts towards introducing teaching and learning 21CC in lower and upper secondary education in Japan with a particular focus on the challenges in implementing recent ambitious curriculum reform at junior high schools and high schools. It also reviews the government's major efforts to improve educational quality of higher education towards strengthening a globally competitive research base as well as developing human resources to enable the Japanese economy to maintain its competitive edge.*

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## BACKGROUND

Japan has been maintaining a good reputation of having a high academic standard. Although there have been some ups and downs, Japan has been constantly at or near the top of the rankings on large-scale international surveys such as PISA (Program for International Student Assessment) and TIMSS (Trends in International Mathematics and Science Study), which assess learning achievement of secondary school students (OECD 2011). There is no doubt that Japanese sustained excellence in basic education standard was the key driver of Japan's economic miracles in the 1950s–1970s and is still driving one of the most advanced industrial economies in the world.

However, it is also true that Japan's education system has been facing harsh criticism especially in the past two decades. Although the economy is currently sustaining its recovery trend, a world's fastest aging society has been gradually losing its vitality, which is also threatening the sustainability of its education system. In particular, there are rising concerns on the lack of system for fostering new skills and competencies that are essential for Japan to maintain its presence in the highly globalized international economy in the twenty first century (Godo 2010; OECD 2018). Against these backgrounds, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan has been making tremendous efforts to mainstream twenty-first-century competencies (21CC) in teaching and learning at schools in basic education system. Moreover, in line with these efforts, MEXT have been launching a series of initiatives which aim at internationalizing higher education institutions for developing global human resources for the twenty first century.

The chapter first describes the structure of secondary and higher education and overview of the development of these sub-sectors. It goes on to review the Japan's framework for defining 21CC as well as a history of recent curriculum reforms, followed by the review of the latest curriculum revision in 2017 and some best practices and key assessment efforts in implementing the new curriculum in secondary schools. It also reviews key government's initiatives for internationalizing universities and presents recent trends of student mobility as well as ranking of Japanese higher education institutions. A final section presents a summary of the review with possible implications for policy makers.

# CONTEXT OF SECONDARY AND HIGHER EDUCATION SUB-SECTOR IN JAPAN

The current education system in Japan is commonly referred as the 6-3-3-4 system. Compulsory education lasts for nine years, which consists of six years of primary education (Grade 1-6) for children aged 6 to 11 and three years of lower secondary education (Grade 7-9) for children between 12 to 15 years old. Upper secondary education (Grade 10-12) lasts for three years, for children aged 15 to 17, followed by four years of university. This basic framework was established when the Fundamental Law of Education (FLE) and the School Education Law were enacted in 1947 as one of the keystones in a series of reforms implemented after the defeat of Japan in World War II (JICA 2014, 23). Since then, the country has been maintaining the same education structure until these days.

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1  *The new type of school called compulsory education school (Gimukyoiku-gakko) with a unified primary and lower secondary education was introduced in 2016. Another unique type of school called secondary school (Chuto-kyoiku-gakko) with a unified lower and upper secondary education was introduced in 1998. Lower secondary education is also provided as part of the programs in these unique types of school*

Secondary education is almost universal in Japan. In 2017, the net enrollment rate for lower and upper secondary education was 99.96% and 98.8%, respectively (MEXT 2018b). Historically, the enrollment rate for compulsory education reached above 99% by 1950 during the postwar recovery period. Although the enrollment rate for upper secondary education was below 50% in 1950, it constantly increased, reaching 94.1% in 1980 (JICA 2014).

At the lower secondary level, students enroll in junior high schools (Chugakko) with the same national curriculum. However, at upper secondary level, there are different types of schools with different courses. The majority of students enroll in full day or part-time programs in high schools (Koto-gakko). Approximately 73% of high school students in these programs took general courses; 21.6% of them took specialized courses; and 5.4% of them took integrated courses in 2017 (MEXT 2018a). There are also some high school students who enroll in correspondence courses. In addition, upper secondary education is provided in specialized training colleges (Sensyu-gakko) as well as in the first three years of programs in technical colleges (Koto-senmon-gakko). Moreover, special needs schools (Tokubetsu-shiengakko) have divisions which provide lower and upper secondary education to students with relatively severe disabilities.

One non-negligible overall trend in Japanese education sector is a sharp drop in the number of students directly affected by the declining birthrate. The number of junior high school students was 6.1 million in 1986, but it has fallen to 3.3 million by 2017 (45% decrease) (Ibid.). The number of high school students reached 5.6 million in 1989. However, since then the number has decreased to 3.3 million in 2017 (42% decrease) (Ibid.). Reflecting this trend, the number of schools has been dropping steadily by around 10% compared with the peak period. In 2017 there were 10,325 junior high schools and 4,907 high schools (Ibid.). In terms of the share of students in private schools, it was around 7% in junior high schools and around 30% in high schools (MEXT 2018b).

Higher education in Japan is mainly provided by three types of institutions: universities (Daigaku), junior colleges, (Tanki Diagaku) and colleges of technology (Koutou Senmon Gakkou). Correspondence education provided by universities and junior colleges is officially defined as higher education as well. Higher education is also provided through specialized courses (Senmon Katei) in specialized training colleges (Sensyuu Gakkou). Strictly speaking, in addition to the above-mentioned institutions which are determined by School Education Law (Gakkou Kihon Hou) and under the control of MEXT, there are also several higher education institutions which are not under the control of MEXT. In recent years, the enrollment rate for higher education reached more than 80%. In 2017, the ratio of students who enrolled in higher education institutions was 80.6%, while enrollment rate for university was 57.3% (MEXT

2018b). This chapter focusses on the issues in universities where government has been providing lots of support for developing global human resources.

In terms of financing for education, Japan is known as a country whose public spending on education as a percentage of gross domestic product (GDP) is low while the proportion of household expenditure is high. Not only this trend is prominent in tertiary education sub-sector, a similar trend is also observed in upper secondary education institutions. Nevertheless, in contrast tuition fees are completely free in public junior high schools thanks to the sufficient public spending for compulsory education. However, parents still have to pay for school lunch, school supplies, transportation, PTA (Parents Teacher Association) fees, and books related to school subjects other than textbooks even though they choose to send their children to public schools (Murata and Yamaguchi 2010; Uzuki 2013).

In addition to curriculum reforms which will be reviewed in the following section, there is much debate about the introduction of tuition-free programs in recent years. As a first step in the tuition fee reforms, the government introduced tuition-free high schools program in 2010. The initial program made tuition fees free for all students enrolling in public high schools regardless of their family income (MEXT 2009b). It also provides financial aid to students enrolling in private high schools to mediate the financial burden of their family. The program was upgraded in 2014 to be more favorable to low income households by setting an income limit (MEXT n.d.). Subsequently, the government has introduced a program for making early childhood care and education free in 2019, and a free higher education program will be introduced in 2020.

# GOVERNMENT APPROACHES FOR MAINSTREAMING TWENTY-FIRST-CENTURY COMPETENCIES

## CONCEPTUAL FRAMEWORK

The concept of 21CC is embedded in Japan's current core educational concept: "Zest for Living" (Kimura and Tatsuno 2017). This concept has three key components: academic abilities (Chi), richness of mind (Toku), and a sound body (Tai) (see Figure 1). Academic abilities include quality and ability for steadily acquiring the basics, identifying issues independently, learning and thinking independently, and voluntarily making decisions, taking action, and finding better solutions to solve issues. Richness

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2  Only the education accredited by National Institution for Academic Degrees and Quality Enhancement (NIAD-QE) is categorized as higher education. These types of institutions include National Defense Academy of Japan, National Police Academy, and Polytechnic University.
 3 In 2014, public expenditure on upper secondary and post-secondary non-tertiary education institutions in Japan was 0.7% of GDP while the average of Organisation for Economic Co-operation and Development (OECD) countries was 1.1% (OECD 2017, 189). In 2014, the proportion of private expenditure on general and vocational programs in upper secondary education in Japan was 18% while the OECD average was 12% (OECD 2017, 197).

in mind stands for cooperation and consideration combined with self-discipline: ability to get moved impressed. A sound body means health and physical strength for living vigorously.

Although there is no official framework of the Japanese 21CC, the one proposed by the National Institute for Educational Policy Research (NIER) is commonly used during the process of making polices for promoting competencies-based teaching and learning in Japan. As shown in Figure 2, a framework for the 21CC, proposed by NIER, is comprised of three domains; namely, basic literacy, thinking ability, and practical ability. Basic ability includes literacy, numeracy, and information-communication technology (ICT) literacy. With a remarkable technological innovation and expansion of computerization, ICT literacy has become indispensable along with basic abilities: namely, literacy and numeracy. Besides, basic literacy supports the second domain: thinking ability. Thinking ability is characterized by the following components: problem finding and solving, logical and critical thinking, meta-cognition, and adaptability. Moreover, thinking ability is connected with practical abilities including autonomous activities, relationship building, motivation to social participation, and responsibilities for building a sustainable future. All of these three domains play a significant role to survive in the complex society in the twenty first century.
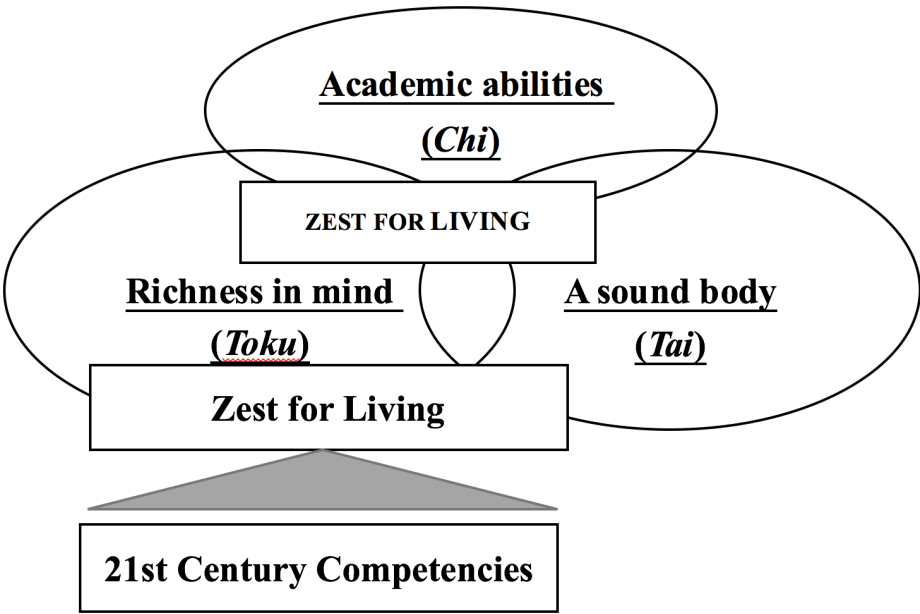


*Figure 1: Framework for Zest for Living in the Japanese Education System. Diagram from the authors based on MEXT (2011).*

4 Kimura and Tatsuno (2017) argue that the concepts of competencies related to social and emotional skills were also embedded in the Imperial Rescript on Education, which was setting guiding principles in the Empire of Japan by the time it was abolished in 1948.
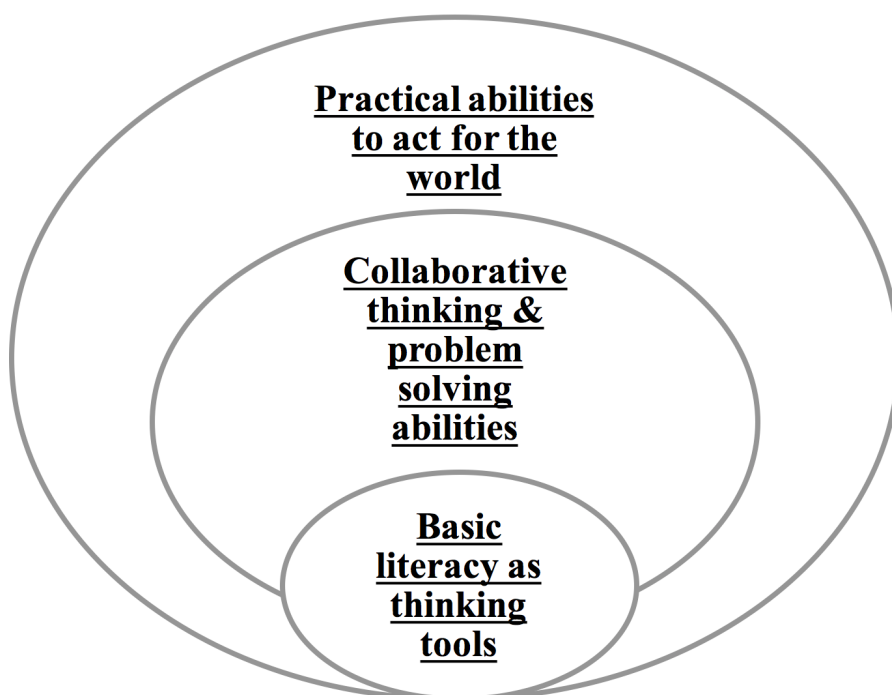
*Figure 2: Framework for Twenty-first-Century Competencies in Japan. Note: Diagram from the authors based on NIER (2013) and Kimura and Tatsuno (2017)*

# CURRICULUM REFORMS

## RELAXED AND COUNTER RELAXED EDUCATION

In Japan, subjects taught in schools, and the standard class hours are prescribed by the School Education Law. Besides, MEXT sets a national standard for curriculum, called the Course of Study (CS: Gakusyu Shido Yoryo), in schools at different education levels, including junior high schools and high schools. Each school organizes its curriculum in line with these government regulations as well as taking account of local context and its conditions. The CS plays a critical role in determining what is taught in Japanese classrooms, and has been revised every ten years.

This concept of Zest for Living, which is a Japanese version of 21CC, first appeared in a report, entitled "Priorities and Prospects for a Lifelong Learning Society," submitted in 1996 by the Central Council for Education (CCE), a top advisory board of MEXT. Responding to CCE's proposal, Zest for Living was declared as a central concept of Japanese curriculum when MEXT revised the CS in 1998, and this new

teaching guideline was implemented from 2002. Zest for Living was also formally articulated as a central goal of Japan's education system in the revised FLE (2016) with the definitions of three key components. Part of the School Education Law was also revised accordingly in 2017.

The revision of the Couse of Study introduced in 1998 was considered radical. It brought drastic reductions in teaching subject contents (approximately by 30%) and teaching hours (from 1,050 to 980 hours per year in junior high schools), as well as implementation of a five-day school week. It also introduced a new subject called "Integrated Studies," which aims to promote cross-curricular, comprehensive studies such as international understanding, information education, environmental protection, and experience in nature. Highlighting its feature on reducing teaching contents and hours, this policy is often referred to as a relaxed (Yutori) education policy.

Nevertheless, the new policy was expected to become a landmark step for mainstreaming the teaching and learning of 21CC in Japanese classrooms, the government made a quick decision to retreat from the relaxed education policy partly due to the shock of the poor performance in PISA released in 2003. During the subsequent revision of CS in 2008, teaching contents and time returned to the level of 1989: another decade before the radical revision in 1998. Under this reform, math and science education was expanded, while teaching hours for Integrated Studies were significantly reduced. This move in curriculum reforms is sometimes called a counter relaxed (Datsu Yutori) education policy.

## TRANSFORMING TEACHING STYLE WITHOUT LOWERING ACADEMIC STANDARDS

The latest revision of the CS was made in 2017 (at the end of fiscal year 2016). Currently, the new teaching guidelines for junior high schools and high schools are in a transitional period, and scheduled to be implemented from April 2021 and April 2022, respectively. Figure 3 shows an overall structure of the new curriculum. A fundamental aim of the revision is to realize a "curriculum open to society." To achieve this aim, the new curriculum first restructured the desired 21CC, embedded in Zest for Living, (what to be acquired) into three pillars: 1) knowledge and skills; 2) ability to think/make decisions/express oneself; and 3) ability geared toward learning/human nature. The third pillar means the capacity to take proactive actions for exploring issues and finding solutions. In accordance with these competencies, it also lays out the direction for the reform of educational contents (what to learn) as well as learning process (how to learn). The structure of the new curriculum is discussed in more detail below

_There have been a lot of discussions on the root of this curriculum reform. According to Sakurai (2016), the neoliberal agenda, which guided the curriculum reforms in 1990s, was set by the Ad Hoc Council on Education, which was launched by the then Prime Minister Yasuhiro Nakasone in 1984._
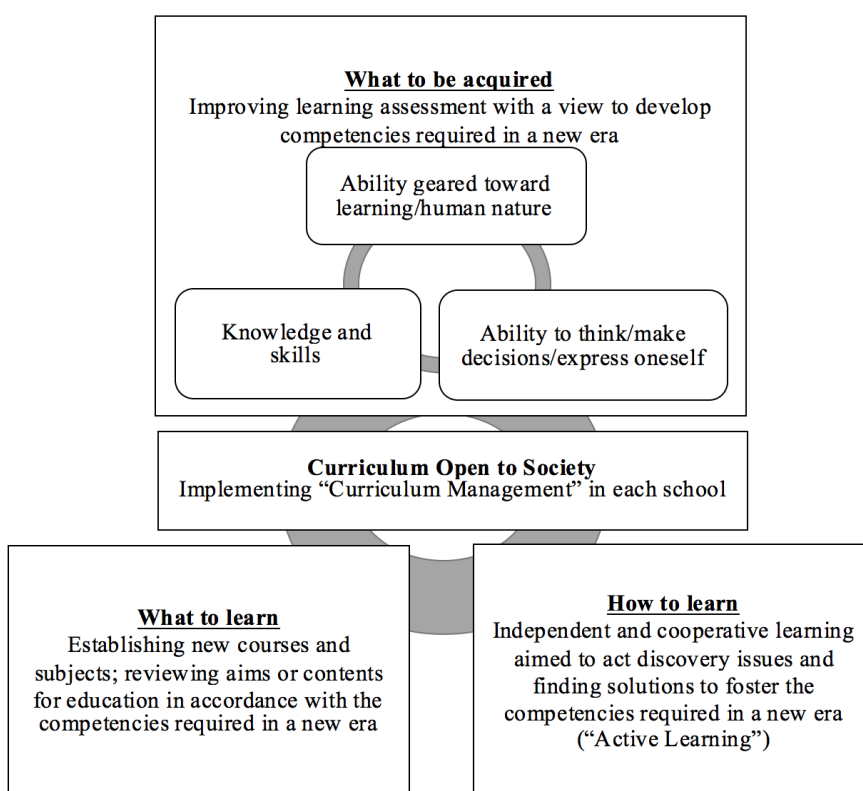
Source: Created by the authors based on MEXT (2014).

*Figure 3: Structure of the New Curriculum Revised in 2017*

Table 4 and Table 5 below show the detailed components of the curriculum under the revised CS of junior high schools and high schools, respectively. New curriculum did not make any significant change with regard to the standard teaching hours and/or number of credits. At the lower secondary level, teaching hours stay unchanged (1,015 hours per year). There was also no change in the number of credits minimally required to graduate from high school (74 credits). However, new curriculum made some significant changes in its contents for developing the competencies required in the twenty first century. As part of this effort, a new subject, titled "Moral Education as a Special Subject" (Tokubetsu No Kyouka Dearu Doutoku), was created in the junior high school curriculum. One of the major revisions in a high school curriculum was adding a new subject, public (Kokyo), as one of the subjects on Civics. In addition, lots of revisions have been made in the descriptions of the learning goals and contents in CS to clarify what are the 21CC which students can obtain through studying each subject. With regard to English education, which is directly related with developing global human resources, using English as a medium of instruction became a requirement for the first time in CS for junior high schools.

*Table 1. Standard Number of School Hours per Year in Junior High Schools*

|  |  | Grade 1 | Grade 2 | Grade 3 |
|---|---|---|---|---|
| Subjects | Japanese Language | 140 | 140 | 105 |
|  | Social Studies | 105 | 105 | 140 |
|  | Mathematics | 140 | 105 | 140 |
|  | Science | 105 | 140 | 140 |
|  | Music | 45 | 35 | 35 |
|  | Fine Arts | 45 | 35 | 35 |
|  | Health and Sports | 105 | 105 | 105 |
|  | Industrial Arts and Homemaking | 70 | 70 | 35 |
|  | Foreign Language | 140 | 140 | 140 |
|  | Moral Education as a Special Subject | 35 | 35 | 35 |
| Period for Extracurricular Activities | | 35 | 35 | 35 |
| Table 5. Period of Integrated Studies | | 50 | 70 | 70 |
| Total | | 1,015 | 1,015 | 1,015 |

*In addition to the compulsory subjects listed in Table 1, junior high schools are allowed to create elective subjects-based on, MEXT*

*In Japan, period for moral education was introduced in junior high school curriculum in 1958. However, since then, moral education had not been taught as a subject (Hayashi 2015).*

*Table 2: Standard Number of Credits for General Education Subjects in High Schools*

| Subject Area | Subject | Number of credits | C/ CE | Exceptional rules |
|---|---|---|---|---|
| Japanese Language | Contemporary Japanese Language | 2 | C | |
|  | Language Culture | 2 | C | |
|  | Japanese Language (Logic) | 4 | | |
|  | Japanese Language (Literature) | 4 | | |
|  | Japanese Language Expression | 4 | | |
|  | Advanced Classics | 4 | | |

| Subject Area | Subject | Number of credits | C/ CE | Exceptional rules |
|---|---|---|---|---|
| Geography and History | Geography | 2 | C | |
| | Advanced Geography | 3 | | |
| | Modern and Contemporary History | 2 | C | |
| | Advanced Japanese History | 3 | | |
| | Advanced World History | 3 | | |
| Civics | Public | 2 | C | |
| | Ethics | 2 | | |
| | Politics and Economy | 2 | | |
| Mathematics | Mathematics I | 3 | C | The number of credits can be reduced to 2. |
| | Mathematics II | 4 | | |
| | Mathematics III | 3 | | |
| | Mathematics A | 2 | | |
| | Mathematics B | 2 | | |
| | Mathematics C | 2 | | |
| Science | Science and Our Daily Life | 2 | CE | It is compulsory to take "Science and Our Daily Life" and at least one more subject. Even though a student does not take "Science and Our Daily Life," he or she can also meet the requirement by taking at least three of the following basic subjects: "Basic Physics," "Basic Chemistry," "Basic Biology," and "Basic Earth Science." |
| | Basic Physics | 2 | CE | |
| | Advanced Physics | 4 | | |
| | Basic Chemistry | 2 | CE | |
| | Advanced Chemistry | 4 | | |
| | Basic Biology | 2 | CE | |
| | Advanced Biology | 4 | | |
| | Basic Earth Science | 2 | CE | |
| | Advanced Earth Science | 4 | | |

| Subject Area | Subject | Number of credits | C/ CE | Exceptional rules |
|---|---|---|---|---|
| Health and Physical Education | Physical Education | 7-8 | C | |
| | Health | 2 | C | |
| Art | Music I | 2 | C | |
| | Music II | 2 | | |
| | Music III | 2 | | |
| | Art and Design I | 2 | C | |
| | Art and Design II | 2 | | |
| | Art and Design III | 2 | | |
| | Crafts Production I | 2 | C | |
| | Crafts Production II | 2 | | |
| | Crafts Production III | 2 | | |
| | Calligraphy I | 2 | C | |
| | Calligraphy II | 2 | | |
| | Calligraphy III | 2 | | |
| English | English Communication I | 3 | C | The number of credits can be reduced to 2. |
| | English Communication II | 4 | | |
| | English Communication III | 4 | | |
| | English Logic and Expression I | 2 | | |
| English | English Logic and Expression II | 2 | | |
| | English Logic and Expression III | 2 | | |
| Home Economics | Basic Home Economics | 2 | C | |
| | Home Economics | 4 | C | |
| Information | Information Study I | 2 | C | |
| | Information Study II | 2 | | |

| Subject Area | Subject | Number of credits | C/ CE | Exceptional rules |
|---|---|---|---|---|
| Science and Mathematics | Basic Inquiry-Based Study of Science and Mathematics | 1 | | |
| | Inquiry-Based Study of Science and Mathematics | 2-5 | | |
| Period for Inquiry-Based Integrated Studies | | | 3-6 | The number of credits can be reduced to 2. |

*Notes: C=compulsory. CE=compulsory-elected. One class period in upper secondary schools is 50 minutes. In principle, one credit is given to the course with 35 classes. Data reprinted from MEXT (2019).*

The heart of this curriculum reform is to drastically change the teaching and learning process in the classrooms by neither radically reduce (Yutori) nor intensify (Datsu Yutori) teaching content and hours. Specifically, it introduces Active Learning (AL) as a tool to make students' learning more interactive, more proactive, and deeper. According to Mizokami (2014), the term AL first started becoming a buzz word in the context of Japanese higher education since CCS's 2012 report, entitled "Qualitative Transformation of Undergraduate Education," which put emphasis on the importance of AL. CCS (2012) defines that "active learning is a collective term for teaching and learning methods which incorporate active participation of students in a study process, rather than the method of education in a form of lecture given unilaterally by a teacher. More specifically, active learning includes discovery learning, problem solving learning, experiential learning, and investigative learning. Group discussions, collaborative learning, debate, and group workshops are also effective methods of active learning" (Hiroshima University n.d.).

Another important approach introduced in the new curriculum is the Curriculum Management (CM). Kuramoto and Shi (2012) stated that CM is a concept which has roots in both curriculum development/instruction theory and school management theory. Under the new CS, each school is encouraged to arrange teaching contents by itself from a cross-curricular perspective considering its own educational goals. Each school is also encouraged to establish PDCA (plan-do-check-act) cycle to constantly improve its curriculum based on its own evidence-based assessment. It is expected that each school can tailor its curriculum by making the best use of available physical/human resources including the ones from local community.

*According to Kobari (2018), the first teachers' guide for an AL type teaching method in Japan was published in 1883. Kobari (2018) states that an AL type teaching method first became popular in Japan*

## OVERHAULING THE CONNECTION BETWEEN HIGH SCHOOL AND UNIVERSITY

In Japan, a brutal competition for wining a limited number of seats in traditional top national universities and a few top-class private universities has been seen as a social problem. It is common for high school students in Japan to go to private cram schools (Juku) in the evenings during weekdays and/or on weekends to take additional tutoring specifically designed to earn high scores in the university entrance exam. Some young adults who failed in an entrance exam for their top-choice universities make decisions to continue their studies to prepare for next opportunities in the following years (Saito 2011). These students are commonly called "ronin," which originally refers to a bladesman (samurai) during the feudal period of Japan, who lost his lord or master and is in a traditional form of unemployment.

In order to mediate this over-competition, sometimes called "exam hell," the MEXT introduced the Joint First-Stage Achievement Test (JFSAT) in 1979. The JFSAT was a nationally standardized test administered by the National Center for University Entrance Examinations, which was established in 1977 under the jurisdiction of the MEXT. In this system, all applicants for national and public university entrance first took the JFSAT. Each national or public university selected students based on the results of both the JFSAT and a second-stage exam administered by each university. However, there is a criticism on this reform, pointing out that a rule to take all five core subjects, namely Japanese literature, mathematics, English, social studies and science, made university ranking more transparent and put more burden to candidates. JFSAT has too many subjects and there had been little change in second-stage individual university examinations (MEXT 2009a).

Partly responding to these criticisms, the MEXT updated the JFSAT to a new standardized test, called Center Test, in 1990. The Center Test allowed universities to decide which subjects they use in their admissions so as to make university ranking less transparent. Another major reform was to allow private universities to use the test scores in selecting the candidates. A growing number of private universities are using the Center Test in their admission process (Ibid.), which results in a greater influence of nationally standardized test on high school education (Kuramoto and Koizumi 2016). However, there was little change in highly criticized multiple-choice style of the JFSAT. As it was the case in JFSAT, the Center Test also only gives one chance for university applicants to sit in the exam per year.

*through the New Education Movement which began during the Taisho period (1912-1926), and AL type teaching method was conveniently used during the Second Sino-Japanese War from 1927. AL type teaching method, based on empiricism, was also systematically introduced during the post-war curriculum reform.*

As reviewed in Kuramoto and Koizumi (2016), it is also worth noting that, during the 1990s, the MEXT encouraged universities to introduce admission methods which do not select the candidates by undertaking academic test only. There are three types of selection methods without academic tests: 1) recommendation-based examinations; 2) Admissions Office (AO) examinations; and 3) special selection examinations. As of 2017, 20% of students who were selected to enter national or public universities went through these admission methods without academic test. In private schools, more than 50% of students were selected without taking any academic tests (MEXT 2017a).

Against this background, a blue print for the integrated reforms in university entrance examination and high school/university education is drawn in CCE's report submitted in 2014 (CCE 2014). This ambitious reform proposal claims that, by 2020, the Center Test will be replaced by a completely new standardized test which evaluates not only students' subject-based knowledge but also their ability to use knowledge and skills, aligned with the latest curriculum reform. The new test can be computer-based with written components and English assessments developed by external organizations, and undertaken multiple times per year. CCE (2014) also strongly encourages all universities to create their own admission procedures combining various types of evaluation methods including essay writing, presentations, group discussions, and interviews in addition to common tests. Moreover, CCE (2014) proposes to develop a totally new learning assessment system for high school students.

# CHALLENGES AND BEST PRACTICES IN SECONDARY SCHOOLS

During the transitional period to the curriculum revised in March 2017, efforts are currently being made to implement the newly introduced approaches, especially AL and CM, on a trial basis. Several studies have been conducted by different entities to accumulate know-how on successful implementation of these approaches. This section reviews some of the major teacher training programs and studies to reveal key challenges and innovative practices in implementing the new ambitious curriculum at the school level.

## TEACHER TRAINING PRACTICES

While the CCE was discussing their proposal on the curriculum reform, the MEXT in 2015 initiated their efforts to strengthen both pre-service and in-service teacher training programs. As a first step, the MEXT opened a new center, called the Center for Promoting Education for Next Generation, in the National Institute for School Teachers and Staff Development (NITS). From 2015 to 2017, the center implemented a project specifically focusing on enhancing teachers' ability to implement new

teaching methods. In collaboration with teaching profession graduate schools, eleven prefectural boards of education were commissioned to select a certain number of teachers from the pilot schools, and send them to the NITS's center. In total, 27 primary and secondary schools were selected as pilot schools. These teachers received special training at the NITS to become facilitators of new teaching methods in his or her pilot school. An in-school training model has also been developed and disseminated through different channels with packages of the best teaching method practices. As of 2019, 200 best practices were reported on their website.

In Akita Prefecture, the training program was implemented under the structure depicted in Figure 4. As is reported in Akita Prefectural Board of Education (2018), NITS maximized the exiting teacher training mechanism at the prefectural and municipal levels as well as local experts in the university. Specifically, educational supervisors (Shidosyuji) of Prefectural/Municipal Board of Education and advisors from NITS conducted the lesson study workshops in the targeted schools. Moreover, faculty and students from Teaching Graduate School got involved in the prefectural in-service training program by delivering lectures or providing advice. Prefectural Education Center also played a significant role in sharing school-level best practices with the other schools inside and outside the prefecture. There were also seminars for mid-career teachers by the lectures from Akita University at the Prefectural Education Center.
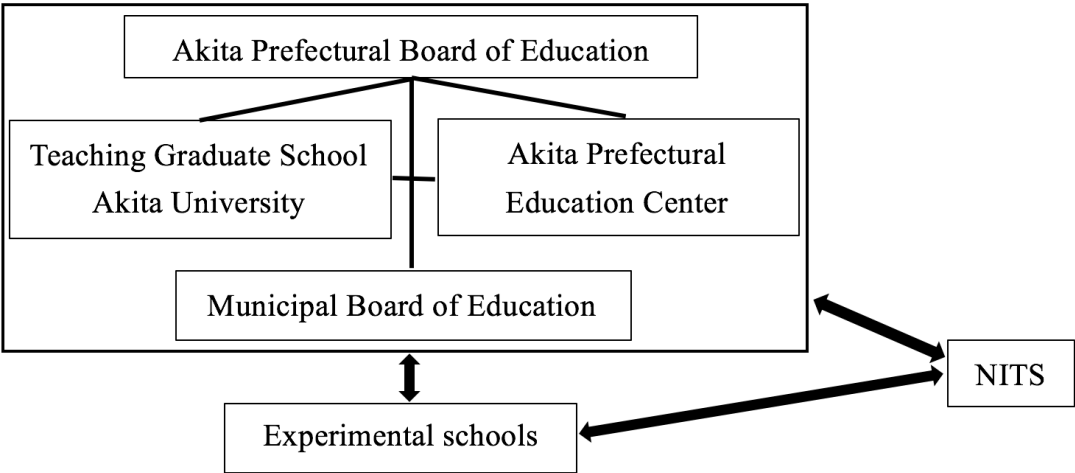


*Figure 4. Implementation Structure of NITS's In-Service Teacher Training Project in Akita Prefecture. Note: Diagram based from the Akita Prefectural Board of Education (2018,1)*

In the targeted junior high school, first year program focused on cultivating a shared understanding of AL among teachers. In the second year, the school discussed and decided on what are the unique competencies and abilities which they target to develop in their students through teaching based on the Japanese school motto which means hope, friendship, and discipline. Then, teachers review the curriculum and seek the possibility to introduce new pedagogical methods to develop these competencies and abilities in teaching their class subjects in charge. These CM practices were undertaken during the seminar where all teachers who were in charge of different subjects at the different grade participated. This type of workshop helped the school to maximize the synergy among different subject teachings in equipping their students with a certain competency or ability.

Several new pedagogical approaches were introduced as a result of this program in the experimental schools. For instance, in the Japanese language class of the junior high school, it is compulsory to teach about a traditional Japanese poem, called "Tanka," containing five lines of 5, 7, 5, 7 and 7 syllables, respectively. Instead of just letting students memorize the famous poems and teaching the interpretations of them, the Japanese subject teacher of the experimental school, introduced in NITS (2018), organized a poem contest during his class. In this class, students were divided into some groups, and each group selected the best poem among the ones composed by their classmates in accordance with the examination standard. After this, each group presented their examination result with their comments on the reason why they selected that poem. This case shows an example of how we can introduce AL through CM in the course unit where rote learning was common by default.

The MEXT themselves also have been undertaking an action research project on AL since 2016. In 2016, five prefectural boards of education, three municipal boards of education, and three national universities were commissioned to select pilot schools, provide in-service training about AL for teachers, provide each pilot school with support to implement AL, and develop a practical information package such as guideline and catalog of best practices. In total, eleven primary schools, eight junior high schools, seven high schools, and one integrated junior high/high school were selected as pilot schools. In May 2018, the MEXT organized a symposium to disseminate the key findings from action research conducted by each board of education or national university for two years from 2016 to 2017.

The University of Tokyo is also taking a lead in establishing a mechanism in which universities provide practical support for teachers based on their study findings in collaboration with boards of education and private entities. This project, called the Consortium for Renovating Education of the Future (CoREF), initiated in 2008, responding to the proposal by a government advisory panel on education reform

for the then Prime Minister Yasuo Fukuda and his cabinet in 2007. The CoREF is still actively working to share useful resources to implement new teaching methods including AL, which were mainly developed by the research team of the University of Tokyo, with cooperation of teachers of primary, junior high, and high schools across the country.

There are also many innovative study projects about AL and/or CM led by universities and other non-government agencies/organizations which have a nationwide impact. For instance, in 2015, the Center for Research and Development of Higher Education of the University of Tokyo and the Japan Center for Educational Research and Innovation (JCERI), which was established by one of the leading cram school companies, Kawaijuku, launched a project to support high school teachers to implement AL in classrooms. The project is now being implemented as a research project of a Japanese private university, Rikkyo University, sharing know-how and innovative practices of AL and serving as a digital community hub for high school teachers.

# GOVERNMENT INITIATIVES FOR UNIVERSITIES TO ENHANCE THEIR INTERNATIONAL COMPETITIVENESS FOR DEVELOPING GLOBAL HUMAN RESOURCES

## EXPANDING HIGHER EDUCATION OPPORTUNITIES FOR FOREIGN STUDENTS

The first government initiative was to "internationalize" higher education to attract foreign students to study at Japanese universities. The initiative which was commonly known as the "100,000 Foreign Students Plan," was first implemented in 1983. This initiative set a goal to increase the number of foreign students to study in Japan to reach 100,000 by the beginning of 21st century. Accordingly, there was a significant increase in government expenditures on providing scholarship for international students (Umakoshi 1997). This goal was met in 2003, and prompted the Government to launch the next government initiative, titled the "300,000 Foreign Students Plan," in 2008. This plan aimed to increase the number of foreign students in Japan from 140,000 to 300,000 by 2020. In the same vein, the Government introduced a large-scale project called "Go Global Japan (GGJ)," to send Japanese students to study abroad promoting student mobility going out of Japan, The GGJ program was implemented from FY 2012 to FY 2016.

Since 2008, following the successes of the new initiatives, a series of new programs has been introduced by the government to address the risk of losing competitiveness of

Japanese universities in the globalized market. Details of each initiative are summarized in Table 4. It is important to note that, in the "Global 30 Project," the government explicitly put emphasis on making Japanese universities friendly to English speaking students so as to attract top talents from all over the world. As a follow up to this project, a new 10-year project, called "Top Global University Project," has recently been launched in 2014. One of the key features of this program is in calling for selected universities to carry out not only reform of academic programs but also governance reform (Sugimura 2016).

## UNIVERSITY NETWORKING

Promotion of university networking between Japanese universities and their counterparts in various countries all over the world is another important strategy to enhance international competitiveness of Japanese universities. Since 2011, MEXT has been supporting this effort by implementing an "Inter-University Exchange Project." In this project, selected universities will receive grants from the government to implement their various types of 5-year projects. One unique initiative which aims to promote the regionalization of higher education in Asia, called "Collective Action for Mobility Program of University Students in Asia (CAMPUS Asia)," has been implemented under this scheme. Among the 10 CAMPUS Asia projects completed by the end of FY 2015, MEXT decided to continuously support 8 projects until the end of FY 2020. Adding 9 newly established projects, there are currently 17 ongoing CAMPUS Asia projects.

*Table 3. Major Government Initiatives for Enhancing International Competitiveness of Universities in the 21st Century.*

| Implementation period | Name | Key components |
|---|---|---|
| FY 2008−2020 | 300,000 Foreign Students Plan | In collaboration with other relevant ministries and institutions, MEXT initiates comprehensive programs for supporting foreign students, aiming to increase the number of foreign students in Japan from 140,000 to 300,000 by 2020. |
| FY 2009−2013 | Global 30 Project (Project for Establishing University Network for Internationalization) | As part of the implementation of the "300,000 Foreign Students Plan," MEXT provided financial support for selected 13 universities (7 national universities and 6 private universities) for developing new English undergraduate and graduate programs as well as strengthening academic and personal support for foreign students. |

| Implementation period | Name | Key components |
|---|---|---|
| FY 2011– | Inter-University Exchange Project (Re-Inventing Japan Project) | MEXT provides financial support for universities which newly establish and implement educational exchange programs which then allows the mutual recognition of credits/academic records and conferral of degrees, etc. |
| | | University Exchange Programs<br><br>•USA, Canada and EU countries: 12 projects (FY 2011–2015)<br><br>•ASEAN countries: 14 projects (FY 2012–2016), 8 projects (FY 2016–2020)<br><br>•Russia and India: 9 projects (FY 2014–2018), 11 projects (FY 2017–2021)<br><br>•Latin America and Turkey: 11 projects (FY 2015–2019) |
| | | SEND (Student Exchange Nippon Discovery) Programs<br>• ASEAN countries: 5 projects (FY 2012–2016) |
| | | Partnership with Regional Exchange Programs<br><br>•EU (ICI-ECP): 2 projects (FY 2013–2017), 4 projects (FY 2014–2018)<br><br>•ASEAN (AIMS): 7 projects (FY 2013–2017) |
| | | Trilateral Partnership among Universities in Japan, China and Korea<br><br>•CAMPUS (Collective Action for Mobility Program of University Students) Asia: 10 projects (FY 2011–2015), 17 projects (FY 2016–2020) |
| FY 2012–2016 | Go Global Japan | MEXT provides financial support for selected 42 universities (11 university-wide programs and 31 faculty-specific programs) for increasing the number of students who study abroad. |

| Implementation period | Name | Key components |
|---|---|---|
| FY 2014–2023 | Top Global University Project | MEXT provides financial support to selected 13 universities (Type A: 11 national universities and 2 private universities), which have the potential to be ranked in the top 100 of the world's best universities, and 24 universities (Type B: 10 national universities, 2 public universities and 12 private universities), which have the potential to lead the internationalization of Japanese societies, for carrying out university-level reforms to enhance their international competitiveness. |

*Note: Data from JSPS (2017), Katsu (2015), MEXT (2008) and MEXT (2017b).*

# TRENDS OF POTENTIAL INDICATORS ON GLOBAL COMPETITIVENESS IN THE 21ST CENTURY

## STUDENT MOBILITY

As shown in Figure 5, the number of foreign students who study in Japan has been increasing in the 21st century. In 2016, the number was more than 170,000, which was around 2.5 times higher than that in 2000. Looking into the details, there was a downward trend for a few years after 2010. However, it has started to rise again since 2014, reflecting an increase in the number of international students enrolled in specialized courses at specialized training colleges. On the other hand, there has been a modest increase in the number of international students who study in universities, junior colleges and colleges of technology. Although the number of international students who study in graduate courses in universities steadily increased and has nearly doubled since 2000, the number of international students in specialized training colleges was higher than those studying in graduate schools for the first time in the 21st century.

Figure 6 shows a dramatic increase in the number of Japanese students who study abroad especially after 2009, when the government launched Global 30 Project at selected 13 universities. However, it is worth noting that this sharp rise in total number seems to be attributed to the increase in the number of students joining a program which lasts less than 1 month. There was no significant change in the number of Japanese students who study abroad over the past decade. Although the number

rose to more than 1000 at one time in 2010, it dropped to 510 in 2011, and has never got back to that level even after the launch of the "Go Global Japan" program in 2012.
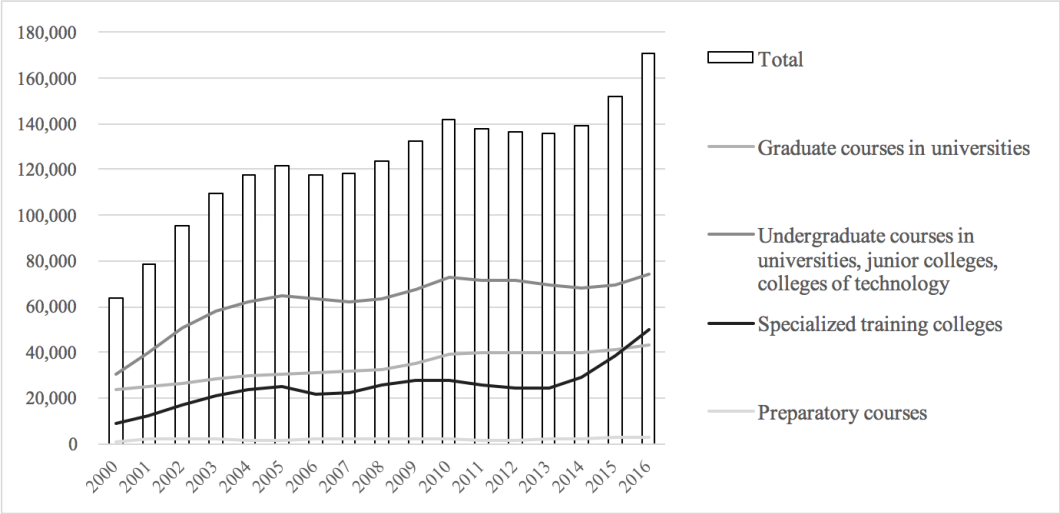


*Figure 5: Trends in Number of Foreign Students Studying in Japan from 2000 to 2016. Note: Figure based JASSO (2017a).*

Only the number of students enrolled in specialized courses at specialized training colleges was counted. The number of students enrolled in institutions which offer Japanese language education was excluded from counting.
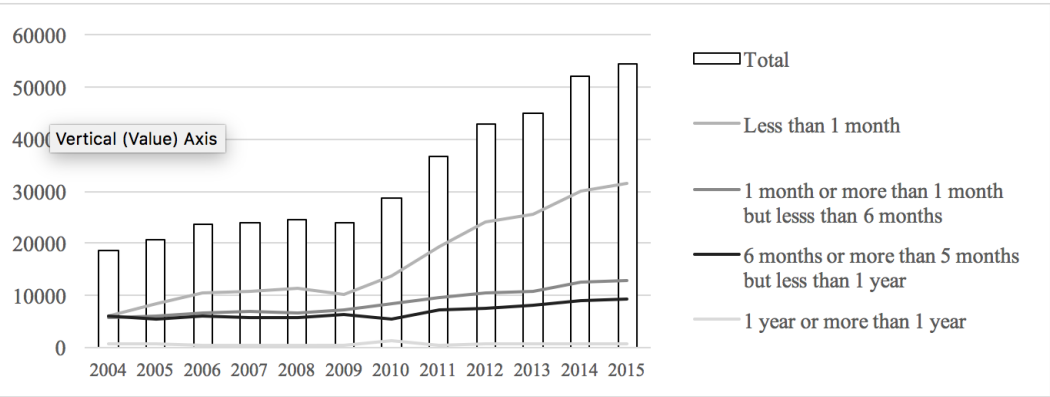


*Figure 6: Trends in Number of Japanese Students Studying Abroad from 2004 to 2015. Note: Data from JASSO (2017b).*

Figure 7 shows that there was no change in regions where international students come from. In 2000, 91% of foreign students was from Asia, and the percentage was slightly increased to 93% in 2016. Similarly, Figure 10 depicts an increase in the proportion of Japanese students who study in Asian countries. Although the United States of America (USA) is still the most popular country where Japanese students go to study, the percentage has been declining from 29% to 23% between 2004 and 2015. According to JASSO (2017b), there was also a drop in the percentage of students who study in

China during the same period. Interestingly, the proportion of Japanese students in South Korea remained the same. The observable rise in Asia is reflecting the fact that the percentage of Japanese students who study in Asian countries other than China and South Korea significantly increased especially between 2008 and 2015. This might be the result of a series of government initiatives, including the Inter-University Exchange Project which started in 2011.
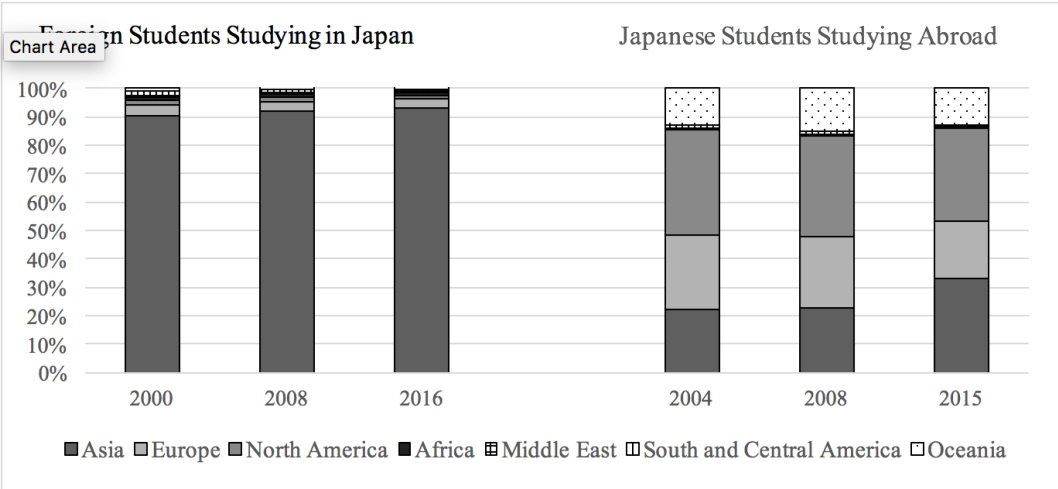


*Figure 7. Regions Where International Students Come and Go. Note: Data adapted from JASSO (2017a) and JASSO (2017b).*

## UNIVERSITY RANKING

There is a widely shared understanding that university ranking systems could make contributions to improving the global market on higher education. Although they are sometimes heavily criticized because of their over-reliance on research data and peer review as well as bias towards science disciplines and English-language publications, well-designed world university rankings are establishing leading positions in providing information on the global competitiveness of each higher education institution, and being used by both policy makers and universities as a useful tool (Hazelkorn, 2009).

Table 4 shows the trend in the Japanese universities' rankings provided by two major world university ranking systems, namely the Academic Ranking of World Universities (ARWU), which was originally started by Shanghai Jiao Tong University, and the Times Higher Education (THE) World University Rankings, published by the British publisher, THE. The table shows that, as a general trend, Japanese universities have been moving down on the list in both of the ranking systems. In ARWU, the number of universities ranked in the top 100 has dropped from five in 2003 to three in 2017. In THE World University Ranking, a similar trend is observed although the number of top 100 universities remains the same (2 universities).

Table 4. World University Rankings of Japanese Universities

| | ARWU | | | | THE World University Rankings | | |
|---|---|---|---|---|---|---|---|
| | 2003 | 2008 | 2012 | 2017 | 2012 | 2015 | 2018 |
| Top 100 | 5 | 4 | 4 | 3 | 2 | 2 | 2 |
| Top 200 | 9 | 9 | 9 | 7 | 5 | 5 | 2 |
| Top 300 | 14 | 12 | 9 | 9 | 11 | 8 | 5 |
| Top 400 | 24 | 18 | 16 | 13 | 16 | 12 | 7 |
| Top 500 | 36 | 31 | 21 | 17 | | | 10 |
| Top 600 | | | | 22 | | | 12 |
| Top 800 | | | | 36 | | | 29 |
| Top 1,000 | | | | | | | 71 |

Note: Data adapted from Shanghai Ranking Consultancy (2017) and THE (2017).

In 2017, THE published Japan University Ranking for the first time in collaboration with Benesse, which is one of the Japanese leading companies in correspondence education and publishing. This ranking uses the indicators which are not used in THE World University Rankings but can reflect a more domestic context. Panel A in Table 6 shows the top 10 universities in scores on one of the country-specific indicators looking at the overall academic reputation of the university within Japan and the overall reputation of the university among employers. Panel B in Table 6 shows the list of universities ranked as top 10 in scores of indicators looking at the proportion of international students and staff on campus.

Table 6 interestingly shows that all the universities ranked as top 10 in terms of the reputation from academia and employers had relatively bad score in the progress of internationalization. On the other hand, Table 6 depicts that most of the top 10 universities, which may succeed in attracting talent from all over the world, are private universities. Tokyo University of Foreign Studies is the only university which ranked in top 10. Some of these private universities even had a very bad score in the reputation among academia and employers. Only one university, namely Sophia University, was listed on THE World University Rankings. Moreover, six universities were not selected to receive grant under "Top Global University Project."

*Table 5: Japan University Rankings on Outcomes and Environment*

| **Panel A: Top 10 universities in scores on outcomes** | | | | | |
|---|---|---|---|---|---|
| Ranking | Name of Universities | Type | Grant | World Ranking in 2018 | Ranking in Learning Environment |
| 1 | The University of Tokyo | National | A | 39 | 54 |
| 2 | Kyoto University | National | A | 91 | 58 |
| 3 | Osaka University | National | A | 251-300 | 39 |
| 4 | Tohoku University | National | A | 201-250 | 41 |
| 5 | Keio University | Private | A | 601-800 | 130 |
| 6 | Nagoya University | National | A | 301-350 | 26 |
| 7 | Tokyo Institute of Technology | National | A | 251-300 | 45 |
| 8 | Hokkaido University | National | A | 401-500 | 59 |
| 9 | Kyushu University | National | A | 351-400 | 44 |
| 10 | Waseda University | Private | A | 601-800 | 17 |
| **Panel B: Top 10 universities in scores on environment** | | | | | |
| Ranking | Name of Universities | Type | Grant | World Ranking in 2018 | Ranking in Outcomes |
| 1 | Ritsumeikan Asia Pacific University | Private | B | | 39 |
| 2 | Osaka University of Economics and Law | Private | | | - |
| 3 | Tokyo International University | Private | | | - |
| 4 | Reitaku University | Private | | | 113 |
| 5 | Sophia University | Private | B | 801+ | 18 |
| 6 | Tokyo University of Foreign Studies | National | B | | 85 |
| 7 | Fukuoka Women's University | Public | | | 121 |
| 8 | Yamanashi Gakuin University | Private | | | - |
| 9 | International Christian University | Private | B | | 20 |
| 10 | Hokuriku University | Private | | | - |

*Note: Data adapted from Shanghai Ranking Consultancy (2017) and THE (2017).*

Note: If a university is selected as a Type A and B universities in the "Top Global University Project," Gant becomes "A" and "B," respectively. "-" indicates that the university was ranked lower than 150.

# CONCLUSION

This chapter reviewed the Japanese government's efforts to promote teaching and learning 21CC in lower and upper secondary schools. It focused on reviewing the recent curriculum reforms for junior high schools and high schools and challenges in implementing the latest curriculum at the school level. The chapter also presented an overview of Japanese government's initiatives to support universities for enhancing their global competitiveness to develop global human resources. Based on the reviews of government strategies and previous studies on school-level practices, the chapter identified that the following points need to be taken into account for successfully teaching 21CC for developing global human resources.

First, the review of studies on school-level practices show that there is a clear need to ensure a sufficient number of teachers in each school as well as to equip teachers with knowledge and skills to implement new teaching methods, such as AL. Heavy teaching load for teachers has been a major issue in Japanese school system long before the new curriculum was introduced in 2017. It is recognized that a high performance of Japanese education system is mainly attributed to the teachers' hard work (Kimura and Tatsuno 2017). However, it is not clear weather teachers can effectively implement the new teaching method under the current working environment and in-service training opportunities. It is recommended that the government should also take bold measures to support teachers if it wants to make drastic changes in classroom teaching as is stated in the revised CS.

Second, the review shows that effectively implementing new teaching strategies in disadvantaged schools is a key to successfully implement this curriculum reform. There are many innovative practices in which universities and private stakeholders, including cram schools, jointly support selected local schools and share the best practices through various channels. However, there is little evidence which shows that the new teaching method had a significant effect on enhancing students' learning achievement in disadvantaged schools. It is recommended for the government not only to financially support innovative practices in some selected schools but also to take substantive action to provide practical support for disadvantaged schools which the private sector may not reach out.

Third, another critical factor which determines the success of this curriculum reform is to what extent the government will be able to drastically change the university

entrance examination in line with the change of curriculum at the secondary level. In the Japanese context, one of the biggest reasons why drastic change have not yet taken place in classroom teaching in secondary education is that there has been no significant change in the university entrance exam. In Japan, attending prestigious universities is seen as a gate to improve chances to obtain jobs in top companies and earn respect from a society, so that it is common for high school students to attend private cram schools for extra study under the previous curriculum. All efforts will go to waste if it fails to create a clear linkage between the competencies taught in high schools and the competencies measured in entrance exams of especially the top universities.

Fourth, it is essential to make more efforts to conduct high quality study for examining the impact of the new teaching method on students' 21CC. Although the review shows that there is a growing number of studies on the new teaching methods, especially AL, most of them rely on the data about the perceptions of stakeholders in analyzing the effects of intervention. As pointed out by Kuramoto and Koizumi (2016), this may be attributed to a lack of testing experts in Japan. So far, as is mentioned in 4.2., one of the best practices is a learning assessment program implemented in Saitama Prefecture. It is recommended that the government to selectively provide more support on programs with rigorous learning assessment component like the one in Saitama Prefecture. Related to this, more theoretical discussion is required to define the 21CC in Japanese cultural context among both researchers and practitioners.

Fifth, findings from the review of university programs may imply that there is a need for the government to provide a road map on how universities can link their efforts on internationalization of the campus with the enhancement of their competitiveness in the global academic community. There is nothing wrong with the fact that tangible rise in the world ranking has not yet been observed. In addition, quantitative increase in the mobility of students should not be underestimated as a result of government's significant efforts. However, what is missing so far may be an attention to the quality aspects of the programs. Specifically, it is recommended for the government to selectively allocate more funding to the programs which have a combination of projects for enhancing research capacity and learning environment in the specific academic field and projects for internationalizing universities. AL has also become increasingly popular in university teaching. However, as is pointed out by Ito (2017), there is lack of clear understanding of AL among Japanese university instructors. Efforts to reform universities' entrance examinations should be tandem with the efforts to promote AL in university teaching in a more systematic manner.

Lastly, the findings may also imply that private institutions have a great potential in coming up with innovative practices in promoting the internationalization of universities. There seems to be no reason to oppose to the ideas on making use of

dynamism of private sector, considering the limited government budget for this sub-sector. It is recommended for the government to make more efforts on sharing best practices of private universities and establishing a healthy competitive environment, which may benefit top national universities with the burdens of domestically-oriented culture. There may be the need for the government to undertake measures to strengthen the linkage between their efforts for internationalization and the enhancement of their competitiveness power first in the domestic market.

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# TVET PUBLIC PRIVATE PARTNERSHIP (PPP) A SCHOOL IN FACTORY (SIF) PILOT PROJECT

## A JOINT UNDERTAKING OF THE NATIONAL SCIENCE TECHNOLOGY AND INNOVATION POLICY OFFICE (STI), GOVERNMENT OF THAILAND, RAJAMANGALA UNIVERSITY OF TECHNOLOGY LANNA (RMUTL) AND SIAM MICHELIN COMPANY LIMITED

Dr. Niwat Moonpa
Dr.Numyoot Sonthanapitak
Dr. Yoopayao Daroon

*This chapter describes salient features of Schools in Factory (SiF), its impact, weaknesses and strengths, and its possible transferability to other members of Association of South East Asian Nations (ASEAN) based on the experiences and insight gained from managing this PPP project. PPP is an approach and modality for employers' engagement to support the TVET system in Thailand. The scope and contents of the paper are based on the results of group discussions with the SiF project team of RMUTL who have been involved in the project since 2013. The discussions focus on key questions and issues in order to find solutions or answers to the following questions: (i) what approaches and financing mechanisms have been effective in encouraging partnership between employers and training providers within the broader context of the TVET system?, (ii) how can the SiF model be adapted to enhance employable skills of TVET graduates in Thailand?, and (iii) how can the SiF model be replicated or transferred to other ASEAN countries?*

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# BACKGROUND

It is widely recognized that professionally qualified technicians play an important role in the development of industries in emerging countries. A case in point is Thailand which in the past few decades has actively promoted and expanded industrial based economy to increase productivity and enhance the country's competitiveness. However, evidences from research and feedback from both the public and private sectors have highlighted the fact that educational institutions have not been able to produce work ready technicians who possess knowledge and skills required by industries (Jitsuchon, 2012). According to Vocational Education Act of 2008, one of the main goals of the National Economic and Social Development Plan and the National Education Plan is to develop technical manpower including skilled craftsmen, technicians, and technologists to meet the demands of labor markets by integrating international theoretical knowledge with Thai wisdom to equip students with practical knowledge and competencies needed for their chosen occupations (UNESCO, 2011).

In response to the demands for skilled workers in the growing Thai manufacturing industry, TVET institutions ranging from schools, colleges, and universities have introduced innovative curriculum and programs to prepare technical manpower required by industries. This paper describes an initiative by Rajamangala University of Technology Lanna, Thailand (RMUTL) which introduced the School in Factory (SiF) Pilot Project with the cooperation of Siam Michelin Company Limited which is located in the eastern seaboard industrial belt in Chonburi and Rayong provinces.

Traditionally in its TVET and engineering programs RMUTL has adopted an internship approach known as a dual system or cooperative education which combines campus-based learning and work-based practical training in factories or production facilities. The dual system enables students to acquire practical skills and experiences under the supervision and guidance of skilled workers or trainers who are assigned this responsibility.

However, despite its merits, the dual system also has some weaknesses. One such weakness is that the students carry out their internship in workplace for a short period of time which is not sufficient for them to gain enough experiences required by industries. Meanwhile, the instructors, instructional methods, and the equipment and machinery employed by the university are neither well-equipped nor up-to-date as those used in the industries. As a result, the students fall short in their skills when they join the workforce.

At present, RMUTL is striving to gain recognition as a higher education institution which offers TVET and engineering education programs ranging from certificate to postgraduate levels. In order to produce professionally qualified graduates, RMUTL

regards industries as essential partners to provide venues to train the students for practical work while the university provides students with theoretical knowledge and allows them to practice basic skills needed until they are competent enough to join the workforce.

In response to this need, the National Science Technology and Innovation Policy Office (STI) and RMUTL in collaboration with Siam Michelin Company Limited initiated a pilot project titled School in Factory (SiF) in 2013 in order to find a better way to develop and implement an education program that addresses the need of industry.

## ISSUES AND CHALLENGES OF TVET IN THAILAND

From the education sector viewpoint, there are two deterrent factors affecting the quality of the workforce in Thailand. Firstly, Thailand is facing a lack of highly qualified manpower in the industrial sector especially in the fields of technology development and applications, research engineers, and technical staff (Parpart, 2015). The main issue is a weakness in the curriculum design and development adopted in most vocational colleges and technological institutes as the programs and courses offered are found to be outdated and lacking in practical approaches. The second reason is the lack of interest in TVET among young Thai students with high academic potential, largely due to the fact that technical positions pay lower salary in comparison to other professions, despite long hours and heavy workload in work places.

With respect to the socio-economic landscape, Thailand, similar to most ASEAN countries, is stuck at what is referred to as the middle-income trap (Jitsuchon, 2012). This trap occurs when a country is stuck at the income level dictated by limited resources and initial advantages cannot rise beyond that threshold (Maddison, 2003). One of the methods adopted by advanced countries, in order to get out of this trap is to create an effective integration of public private partnership as a means of collecting and sharing industrial information between government, businesses, and education institutions which help improve knowledge, skills and technologies of the workforce, thereby enabling the country to increase the income per capita of the economy.

As a higher education institution specializing in TVET and engineering related disciplines, RMUTL takes these challenges as an opportunity to become a leader in providing hands-on graduates who are well-trained in advance and up-to-date technologies while at the same time focusing on developing an innovative learning curriculum. It also allows the university to build a Public-Private Partnership (PPP) initiative which supports the industries in recruiting highly qualified staff while allowing the students to be trained as professionals as an integral component of their studies.

At RMUTL, the main objective of the initiative is to produce graduates who have a good foundation in science and technology and provide opportunities for further studies. Redesigning the work-integrated learning curriculum with hands-on approach which requires working together with the stakeholders, the industry, the instructors, and the students is an important step in this direction (Figure 1). In order to address the issues in a more systematic manner RMUTL introduced the School in Factory (SIF) program in which students from the Faculty of Engineering, RMUTL Chiangmai Campus are assigned to work with Siam Michelin for 2 years as part of the course requirements. With the support from Siam Michelin and instructors from RMUTL, the students are trained and equipped with theories and practical knowledge and skills required by the company. Meanwhile, the instructors in this program redesign the curriculum to fit the immediate requirements of students and graduates as well as the needs of the industry. Figure I depict relations between industry and educational institutions through the SiF model.



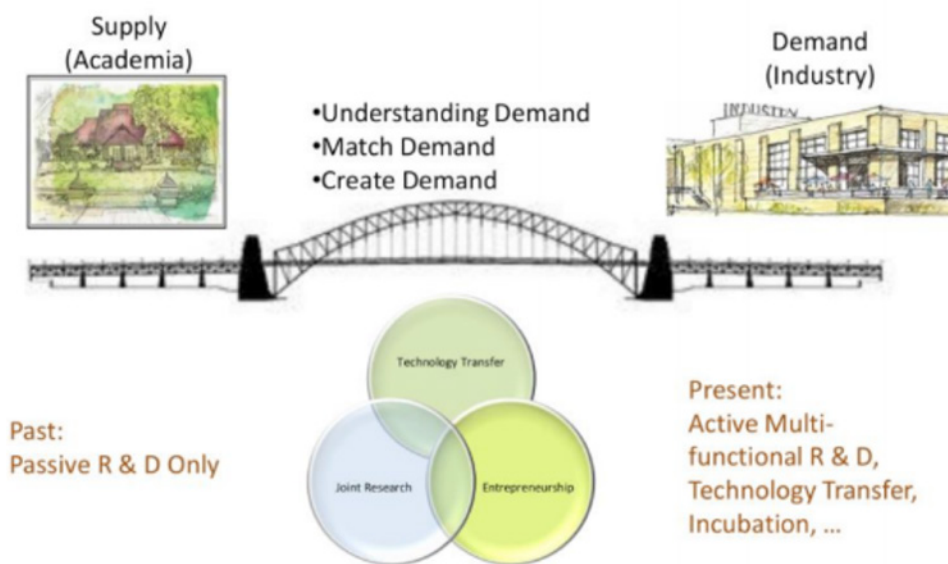*Figure 1: Public Private Partnership in education*

## THE SIF MODEL

Siam Michelin recognizes that high productivity comes from a quality workforce which is the reason why they would like to work together with an institution to train students while they try to complete their studies and eventually will be employed as workers after graduation. The company started by offering scholarships to the diploma

students from RMUTL with combined support from STI and RMUTL. SiF was the first pilot project between RMUTL, Michelin and STI which started in 2013. Figure 2 shows the SiF education management model adopted in the pilot project. As the figure shows, RMUTL, STI and Siam Michelin play equally crucial roles in order to make the SiF program workable, meaningful, and successful.
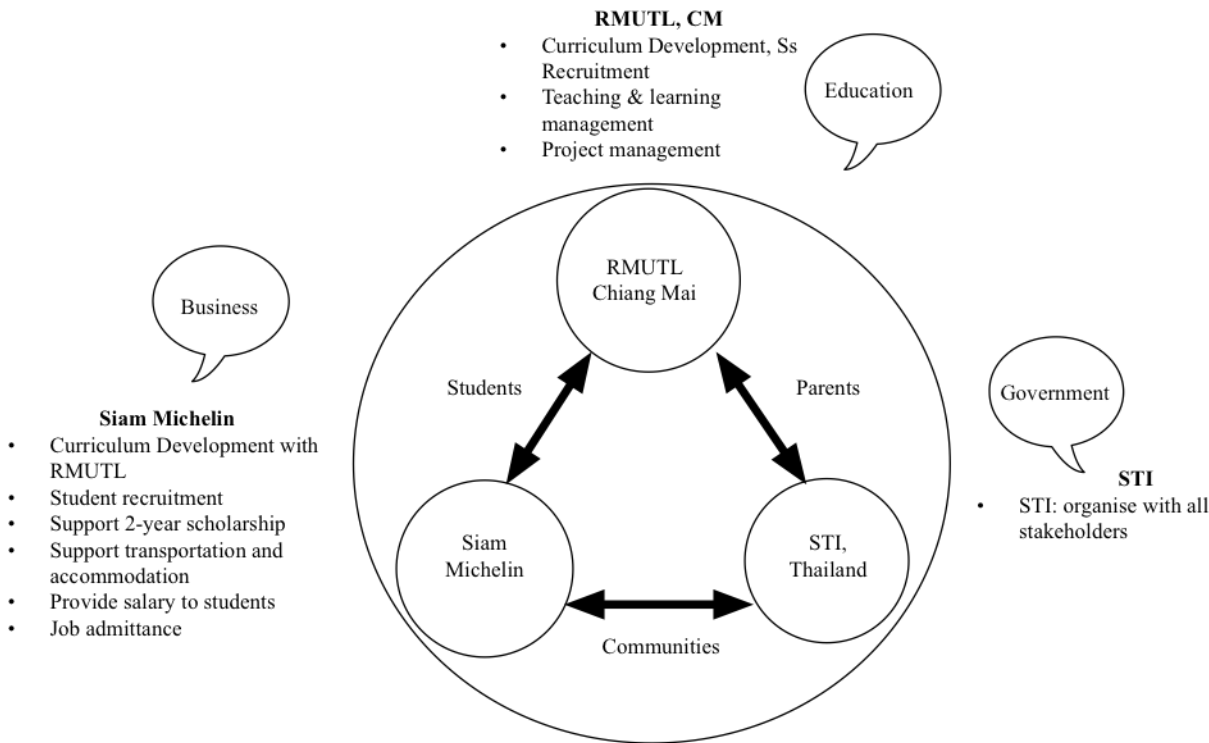


*Figure 2: SiF Education Management Model*

## BACKGROUND INFORMATION ON STI

As Figure 2 shows the National Science, Technology and Innovation Policy Office (STI) is one of the key stakeholders and funding parties to establish the SiF program. STI was established in 2008 under the National Science, Technology and Innovation Act 2008. Its goal is to unify STI commitments among public agencies and to strengthen collaboration with and among the private sector, academics, and research institutes.

The STI focuses on the development in three strategic areas – (1) society and local communities, (2) economy, and (3) energy and environment- with the ultimate goal of having a quality society driven by sustainable and green innovation (National Science Technology and Innovation Policy Office, 2016).

## BACKGROUND INFORMATION ABOUT SIAM MICHELIN COMPANY LIMITED

Siam Michelin Group was established in 1987. The company operates 3 tire-manufacturing plants, one mold manufacturing plant, and one steel cord manufacturing plant. It employs more than 6,700 people in total. Michelin has a firm belief in contributing to the local economy in a sustainable way which is one of its missions. In addition to this, it has a firm belief in developing its employees, communities, and societies around its facilities.

# THE SIF PROJECT FRAMEWORK

In the past few decades with a clear strategic vision and dedication of the government and the Thai people, Thailand has become a leader in many production industries such as automotive and parts, electrical appliances, electronics and telecommunication, etc, Currently, Thailand is also a production base of companies from the US, Europe and Japan. With steady growth and expansion of industries, there is a shortage of qualified and work-ready graduates who can function effectively in multinational industries upon graduation. Along with creating employment opportunities, Thailand has tried to improve the standard of living of the workforce.

One effective approach is to train high quality graduates who can work in industries with the necessary skills, competence, and expertise which enable them to command higher wages for their services. Prior to the introduction of the SiF, there was co-operative education and apprenticeship scheme, also known as internship program offered at RMUTL. However, one major difference between the internship program and the SiF program is that the SiF requires the students to work in a company continuously for 2 years which means there is no turnover for the businesses which in itself is an enticing prospect for companies. After completing the program, the students may opt for further studies if they wish to or continue to work for the company which they receive training.

The management of SiF aims to produce technicians who are well-equipped to work in their chosen careers. Student intakes are graduates of high schools and vocational colleges who will work and study at the tyre mould company in Lam Cha Bang Industrial Estate, Chonburi province, and at a tyre's wire factory in Hemaraja Industrial Estate in Rayong province.

Through the SiF program students will study basic technician skills and higher professional skills at RMUTL for two months based on actual job requirements they will encounter in the factories. During this period they have to integrate knowledge

from sciences, technology, engineering, and mathematics to prepare for jobs they will be involved in factories. This preparatory phase is called work-integrated learning (WiL). This active work-based learning requires the students to make presentation of the outcome of their learning at the end of each unit.

The instructors at the factory will act as facilitators to support the students in acquiring theoretical knowledge to meet the requirements. The students have to report the progress and outcome of their work-integrated learning to the professional teachers once a month.

The SiF program includes 3-4 hours of classroom studies and 8 hours of working every day in the factories for 6 days a week through the entire curriculum. University teachers who work in the SiF program need to understand the business systems of the industry; be familiar with modern industrial technologies, and possess necessary knowledge regarding management practices in the factories.

Due to its success, the SiF Project has introduced a new SiF Master Program in Mechanical Engineering in which candidates, while doing this program, must be teacher assistants in the SiF system as part of work-integrated learning. Such teachers who follow this SiF method will learn to integrate their knowledge while they work, carry out their research projects, and gain practical experiences working in industry with engineers and factory managers. In addition, they need to learn how to take care of the SiF students and study and appreciate the working environment from professional teachers in industry. (See Figure 3)

## FACTORS THAT CONTRIBUTE TO THE SUCCESS OF SIF

The success of SiF is based on five factors:
1. Teachers who possess good attitude in the SiF context,
2. Work-integrated learning curriculum and teaching pedagogy,
3. Actual manufacturing equipment and machinery that are used as teaching aids for individual students,
4. Good understanding of how the SiF program is conducted among all stakeholders
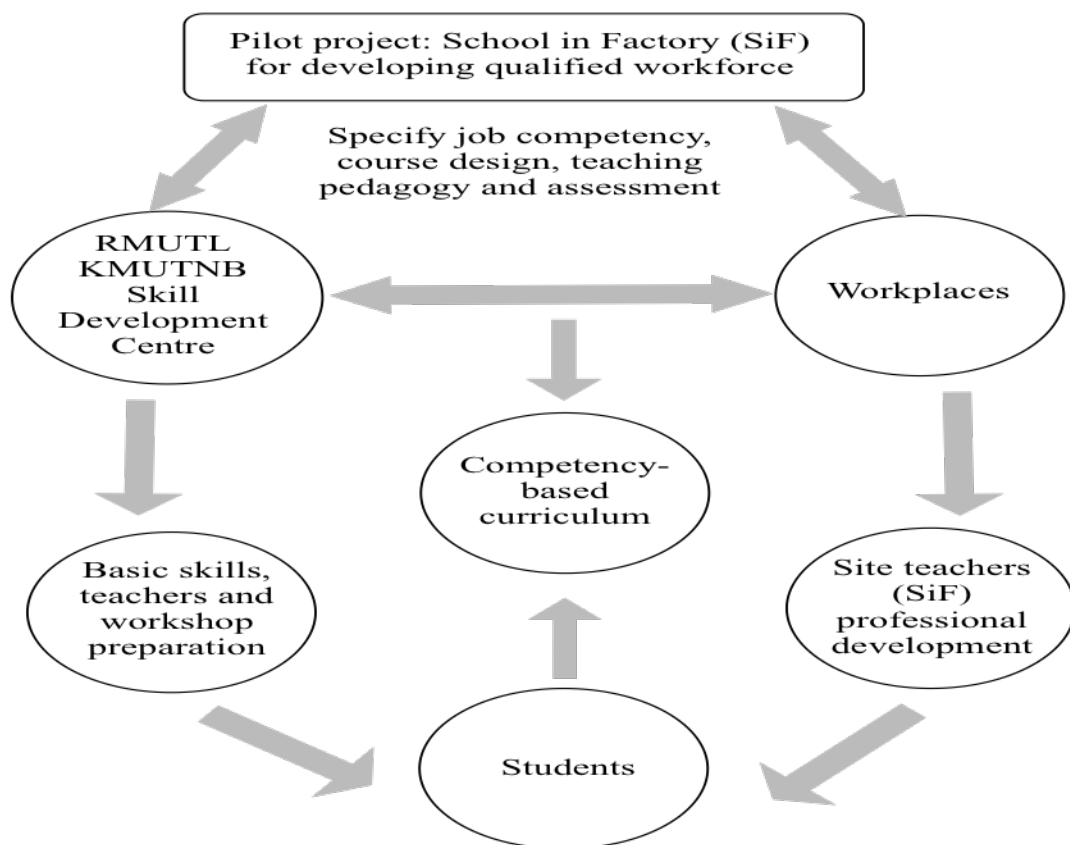5. Budget support from public-private partnership stakeholders

*Figure 3: SiF education management model*

The work-integrated learning model of SiF (Figure 3) assures that the students acquire the skills necessary for work when they complete the 2-year training period in the factory.

## PROGRAM STRUCTURE

Figure 4 below illustrates the program structure adopted in the SiF pilot project. As the diagram illustrates, during the first three months of the semester students are trained in the university to have foundation knowledge needed for work in the factory. In the next phase, the students work at the factory for 9 months. Each day the students will work for 8 hours and study technical and related subjects for 3 hours. During the summer the students spend 2 months at the university to study general education subjects and experience life as students with other RMUTL students.
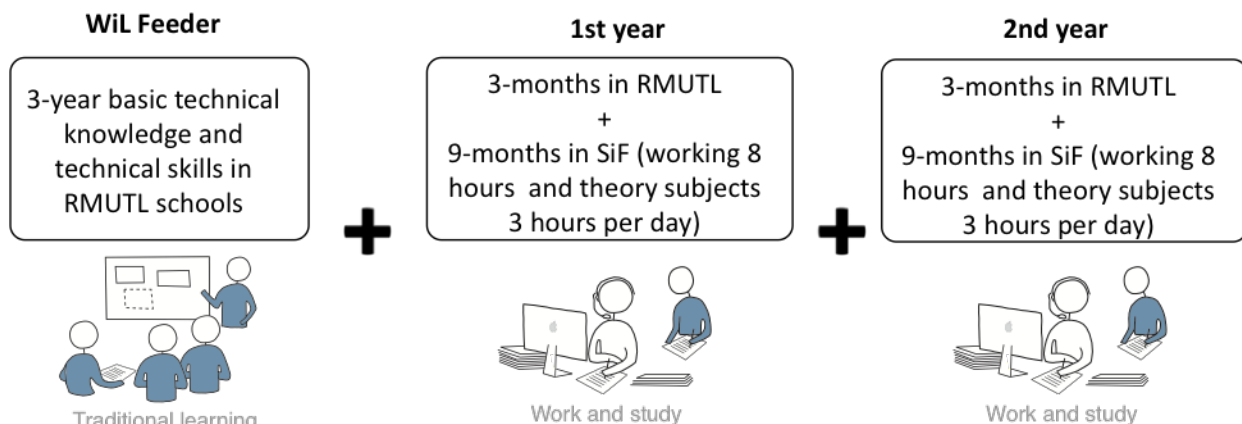
*Figure 4: SiF education management program structure for diploma program*

Meanwhile. Figure 5 depicts the 3-year work-integrated Master Program in Mechanical Engineering which came about as an unexpected outcome from the success of the diploma program.
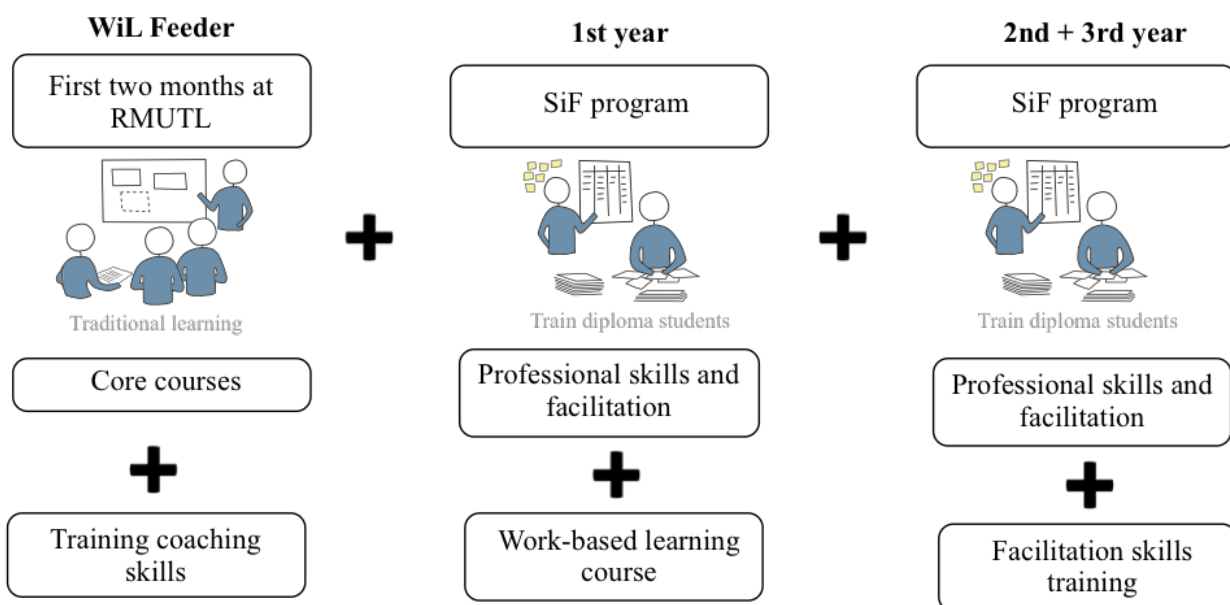


*Figure 5: SiF education management program structure for the master program*

Students attending the master program are expected to conduct research projects on given topics by the company while mentoring the undergraduate students taking part in the SiF program. It is an unexpected but invaluable outcome, borne from the necessity of teachers who understand the business systems in industries, and have the knowledge, skills, and experiences of working in a factory. Due to this demand, the SiF project started the SiF Master Program in Mechanical Engineering field. The

students in the master program learn to take care of the higher vocational certificate SiF students and acquire experiences working in the factory with guidance from professional teachers at the company.

## OBJECTIVES OF THE PROJECT

- To push the Thai TVET policy makers to introduce, replicate, and expand the teaching and learning system, methodology, and practices by adopting innovative features of the SiF program.

- To enable TVET stakeholders to understand, recognize, and appreciate the philosophy of SiF and learn to adopt a new approach to curriculum design and development, pedagogy, and practices under the SiF. In particular, TVET teachers who want to join the program need to have a good understanding of the SiF before they are allowed to join the program.

- To provide opportunities for TVET teachers who are involved in the SiF project to truly understand the needs and requirements of industry and develop capacities and skills to assess whether the students achieve the expected learning outcomes. The assessment process of SiF is a collaborative effort between the professionals from the industry and the instructors from the university who teach the course.

- To redesign up-to-date work-integrated learning curriculum and teaching learning materials in accordance with SiF philosophy, principles, and practices.

- To help expose TVET students to the real world of working in industry. This exposure will help them to become more mature and responsible for their learning and work.

## BUDGET AND FINANCING OF THE SIF PROJECT

The funding of the SiF project came from three sources; namely, the government STI, Michelin, and RMUTL. For Siam Michelin Co., Ltd. The budget paid to student trainees and other related expenditures is converted into educational expenses of the SiF program. These include teachers' salary, travel expenses of senior lecturers, school fees of SiF students, monthly allowances, accommodation costs, books, health insurance, and transportation costs.

Upon completion of the SiF program the students are not required to repay money to cover the expenses incurred by the company. Expenses and compensations to the project advisor, project head, committee, and site director and coordinators, are covered by STI. RMUTL pays the salaries of professors and the incurring costs of using the machinery and workshops on campus by the students.

# RESULTS AND BENEFITS OF THE SIF PROJECT

The SiF project is an outcome of close collaboration between the National Science Technology and Innovation Policy Office (STI), Rajamangala University of Technology Lanna (RMUTL), and Siam Michelin Company Limited. The three stakeholders make different types of contributions to the workable educational platform for work-integrated learning for TVET in Thailand.

Through the SiF program, the students have the opportunity to benefit from their practical training in industry at three levels: applied knowledge, practical experiences, and professional recognition. The students receive full academic support from the university to assist them in integrating their theoretical knowledge with practical knowledge at the beginning of the program. During the three year period in which the students spend their time as full-time workers they gain practical knowledge as per the instructions from the instructors and work supervisors. After completing the program, the students are awarded a Diploma in Industrial Technology while at the same time obtain professional recognition of working for a multinational organization, Siam Michelin. The SiF program is the first long-term PPP in TVET through close collaboration among RMUTL, SIT, and Industry (i.e. Siam Michelin Co. Ltd.).

The uniqueness of the SiF program is its long-term arrangement which provides a win-win situation for all parties involved in the collaboration. The students gain a solid work experience while Siam Michelin has very small or no turnover rate at all at the industrial engineering level for two or three years depending on the length of the study program. This is one of the key factors underlying the success of the SiF program as there is much to be gained for all parties involved which share the same goal. As Figures 6 and 7 and also Table 1 illustrate, the partner university, RMUTL in this case, the industry partner, Siam Michelin, and the government, the STI, contribute different types of resources in terms of knowledge, finance, or business incentives. The SiF model demonstrates that in order for all parties to achieve their common goals, all the tri-lateral network stakeholders need to work together for the achievement of such cooperation programs.

Another key success factor is the networking and communication of the heads of departments from the university, Siam Michelin, and workplace instructors. All three

groups must share the common goal and all three institutions must share the same philosophy in order for the SiF program to thrive and success in the long-term.

Based on results of interviews with the instructors, it was found that the SiF program provides equal opportunity to students from all social and economic backgrounds. The instructors also feel that it is a merit-based system where the students are graded from various dimensions, not limited to textbook knowledge only but also practical knowledge and work habits and performance as well.

The third and final success factor of the SiF program is that the company needs to see a clear result that it also benefits from this partnership. Under the SiF program the students prove time and again that they are key responsible persons in the various departments they are assigned to work. As the company has a first-hand opportunity to select and train potential higher level personnel for its future operations, the SiF program provides a rare opportunity of honing the skills of individual workers who will play a role to ensure the company growth and sustainability.
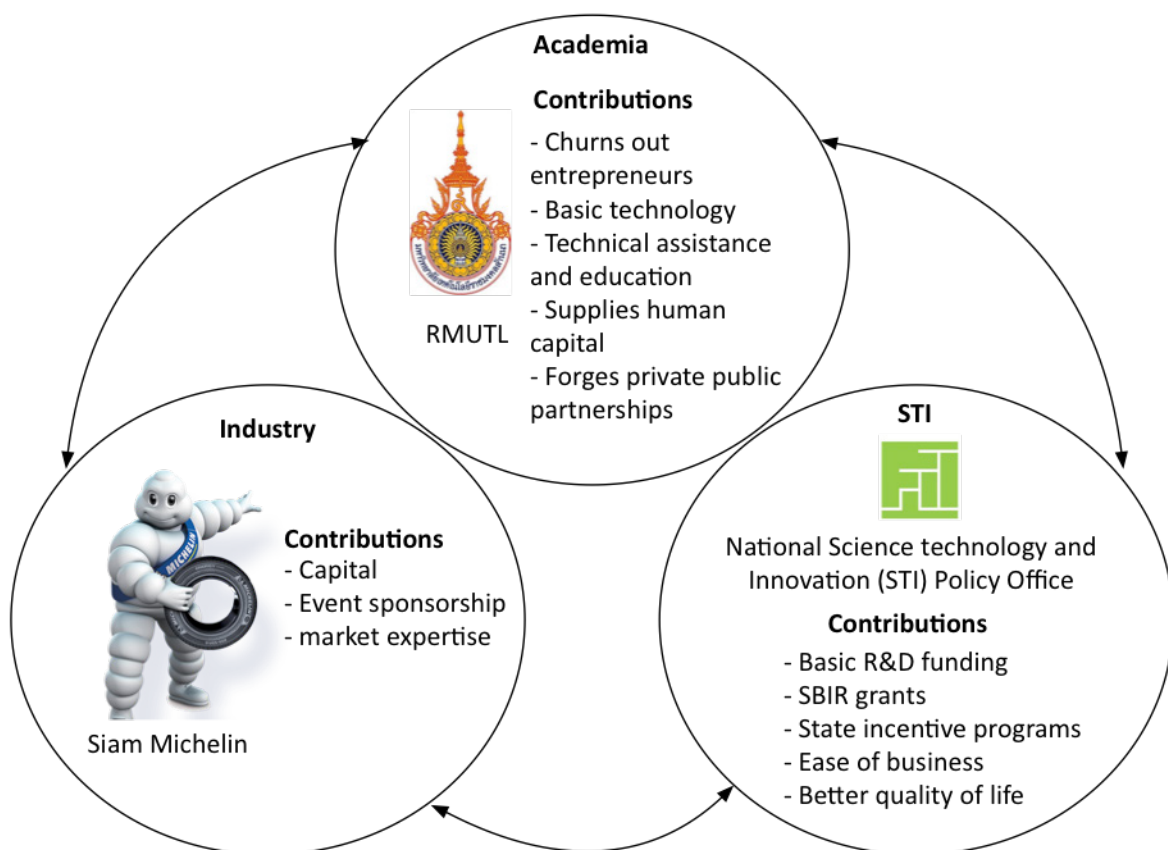


*Figure 6: Model of tri-lateral network interaction adopted in the SiF program*

SiF students benefit from their practical training through application of technical knowledge, hands on experiences, and professional recognition. The students in the SiF program working at Siam Michelin plants demonstrate clearly that their work performance is better than that of regular employees because the students are highly motivated to learn in a good working and learning environment.

They can develop their capacities through their participation in higher levels of training in real working environment and through sharing of knowledge with professionals in the industry. The students in the SiF program receive full academic support from the university to assist them in integrating their theoretical knowledge with their practical work. From educational perspective the SiF model operates according to an interactive rather than a linear model of innovation. In addition, through their participation in the SiF program, the students learn to work, earn income, and obtain a qualification. At the factory, the theories they learn from their teachers can be immediately applied in a practical work situation.
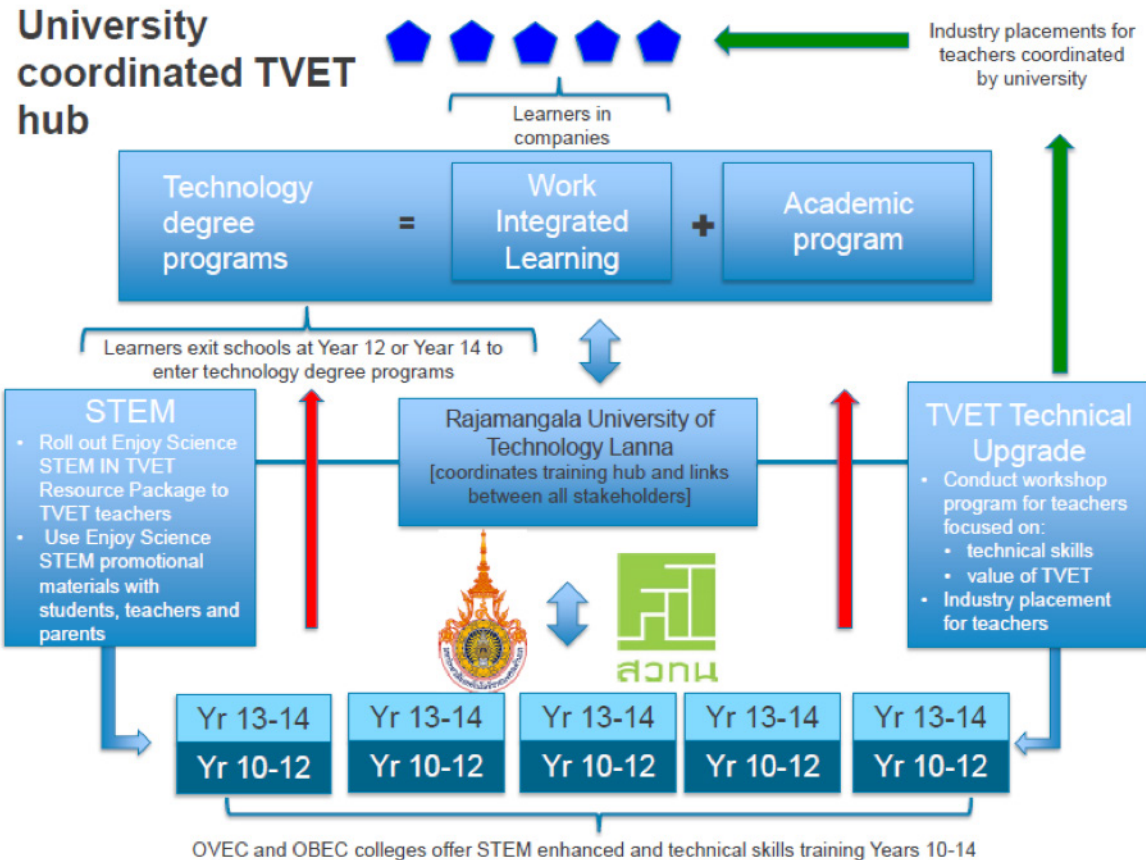


*Figure 7: Work-integrated Learning Model in SiF program of RMUTL*

*Table 1. The benefits of the program for stakeholders*

| Students | Siam Michelin | RMUTL | Government/ Country |
|---|---|---|---|
| Gain Diploma in Industrial Technology from RMUTL | No turnover of staff for 3 years | Recruit and produce quality graduates ready to work in the industry | Higher knowledge means higher contribution to the national GDP. improving the overall quality of living for the general public |
| Gain a solid industry experience from working in an organization | Opportunity to recruit quality workers who can be trained and later on become high-level professionals | Bridge the gap between private and public partnerships necessary to strengthen practical approaches required in the vocational education sector | Attract quality business and industries from around the world to Thailand |
| Earn income while studying | Productivity in the operation line | | |
| Become more confident and responsible as the students have to be responsible adults in the workplace. | Opportunity to mold the right kind of employees which the company requires; tailored for the specific industry and role | Develop curriculum appropriate and relevant to the current industry landscape.<br><br>Teacher professional development | Become a pioneer in providing vocational and technical education and training which can be shared among the ten members of ASEAN. |
| Education and other expenses paid for by the company | Tax reduction from the government 200%. | Students have the rare and invaluable opportunity to work in an industry and learn to communicate with workers from various levels from managing director to the cleaning staff. | |

## WEAKNESSES OF SIF PROGRAM

As the SiF program is a pilot project, several weaknesses were observed which could serve as a basis for further improvements of the ongoing and future SiF programs.

One weakness was that a major gap exists between the workplace and academia. Initially, through several rounds of discussions and consultations among heads of projects it became evident that university teachers were not so keen and ready to work in the (SIF program) system as they were expected to move from the university to the

factory. Although some teachers volunteered to join the program they had to change their mindset, revise the curriculum, prepare new lesson plans and teaching learning materials to fit the requirements of factory work experiences. The teachers in the SiF program also expressed their concern that they had to improve their pedagogical knowledge and approach which are different from traditional classroom lecturing approach.

One of the weaknesses of the SiF from the students' perspective is that they lack university life and must carry heavy workload while learning and working. Also there is lack of intellectual atmosphere and articulate teachers who are well-versed in academic knowledge although there are plenty of practices and practical-oriented mentors. From the business perspective, the company has to cater to educational needs of the students and as a result they sometimes have to digress from their main business goals. As a result, there is increased workload for factory workers.

From the teachers' perspective, teachers have to be liaisons between the business and the students. In addition to this pressure, the teachers have more workload, as they are asked to redesign the curriculum as part of the requirements from the university while the industry side also expects the teachers to solve some of the problems in the factory as they also expect professional knowledge from the teachers.

## SUMMARY, CONCLUSION, AND FUTURE DIRECTION

To sum up, this study confirms the fact that factories can provide opportunities for students and teachers to expose to the real world of work as well as financial support needed with appropriate arrangements. Universities can also provide support in terms of assigning teachers to work in factories alongside management and supervisors in the factory, redesigning curriculum with inputs from industries, and introducing necessary quality control process and mechanisms to ensure the relevance and technical and academic standard of the study programs. The government may need to adjust some policies including lowering taxes and providing welfare and incentives to attract industries to join the scheme. In the past, TVET institutions and private industries might not closely cooperate due to limitations and constraints facing both sides. However, in recent years the attitude on both sides has gradually changed as both parties realize the benefits to be gained through close cooperation with each other.

The government policy especially on PPP also plays an important role in supporting cooperation between TVET institutions and industries by providing incentives to private companies which give opportunities for TVET students to learn and acquire

skills in workplace as part of graduation requirements. The SiF project between Siam Michelin and RMUTL with the support of STI is a good example of how work-integrated learning could be developed and implemented effectively (see Figure 8) through close cooperation between the education and private sectors in order to produce higher quality human resources for companies, industries, and the overall economy .

Rajamangala University of Technology Lanna (RMUTL), one of the technological universities in Thailand, is under pressure to transform the way it trains and produces graduates in response to the rapid change of economic landscape, technological development, and growing demand of industries for highly skilled and work ready TVET and engineering graduates. The pilot project and case study of the SiF modality which focuses on work-integrated learning as described in this chapter can serve as a model or framework for similar higher education institutions to emulate in order to prepare students to meet the demands for smart workforce in the 21st century.

Following the success of the SiF project, TVET institutions should seriously examine and take necessary actions to enable their students to obtain authentic learning experiences with cooperation of private industries in order for them to gain practical knowledge and working experiences that will help prepare them for employment in line with the needs of industries. Such PPP initiative will also help upgrade the knowledge and skills of TVET teachers who will use the practical knowledge and experiences to improve the quality of their teaching in their classes. The government should also come up with policies, strategies, and mechanisms to attract and encourage the private sector to invest in education system to prepare qualified workforce for their industries. Further research in this area is needed.

The pilot SiF program began in 2013 with 6 students from a 2-year Farm Machinery Engineering Program and 11 students from Industrial Technology Program. In 2019, the program consisted of 231 students at the diploma level in Industrial Technology, 20 students in a bachelor's degree program in mechanical engineering, and 10 masters' degree students in mechanical engineering. In order to sustain this successful long-term partnerships, the SiF program required a lot of reshaping and redesigning the scope, contents, and structure of the program through countless meetings and consultations to get to the present stage. Only through comprehensive analysis and reflection of the past mistakes and understanding of the challenges and continuous efforts to solve the issues as they arose the SiF has withstood challenging times that resulted in twenty fold increase in the number of students and teachers who actively participated in the SiF program.

The outcomes at the present stage of the pilot project show that students from the SiF program have opportunities to acquire applied knowledge, practical, and professional

skills needed by industry. Feedback from the supervisors confirmed that the students' work performance is better than that of regular employees as the students are driven by goals to complete their studies coupled with the fact that they are in an authentic learning environment which motivates them to achieve more than their peers. In TVET and engineering related disciplines in which practical knowledge is the key to be successful on the job and in the profession it is very crucial to move away from the traditional style of learning and teaching which emphasizes rote learning and memorization of theories and information for examinations.

The way forward is for higher education institutions to adopt an innovative approach by creating opportunities for students to apply theoretical knowledge in a professional context with cooperation and support of industries. In addition to getting positive feedback from the company for their performance and contributions, the students also excelled in their academic studies.

The latest update of the SiF program indicated that in 2019 most of the students who graduated from the program were offered jobs at the rubber molding factory of Siam Michelin Co., Ltd in Computer Numeric Control (CNC) and CAD sections and other positions related to their competency and skills obtained in the program.

The findings from the interim study indicate that the SiF program could help solve the problem of lacking highly qualified workforce in industries. The teachers who participated in this program also mentioned that the SiF is the best way for teachers who have never been exposed to the real world of work to design authentic experiential learning courses in the work process and how to design the learning tasks that can enhance the SiF students' learning outcomes and connect to the work in different types of industry.



*Figure 8: The collaboration between academic, industry and government (Moonpa 2019)*

In terms of the subject transferability, the pilot project focusing on work-integrated learning of RMUTL at Siam Michelin has been found to be applicable to other companies and industries such as service and agro industries (see Figure 8). Ongoing and future studies will tell whether the SiF model can be applied to other industries which require work ready graduates with practical knowledge and work experiences. However, the direction in which the education sector is moving in the industry-based economies and other technologically advanced countries highlights the fact that extending the classrooms to the working world will become the future of most areas of studies.

## WAY FORWARD AND POTENTIAL KNOWLEDGE TRANSFERABILITY TO OTHER ASEAN COUNTRIES

As a partner in the SiF program, Siam Michelin benefits from the project in three major areas. Firstly, it gets highly motivated student trainees to work full time alongside regular employees while they acquire the knowledge and skills and earn income to support their studies. Secondly, it is assured of a supply of highly skilled workers who are loyal and committed to the company. Thirdly, it has built a reputation for itself as a partner to develop a pool of highly qualified and committed workforce for the company, for the industry, and for the country in the long term.

Through this program the company can proudly claim that they are returning the benefits to the community and the country which is a form of Corporate Social Responsibility (CSR) with concrete results. From the government side, the SiF helps save budgets which can be used for other purposes instead of investing in expensive tools and equipment at the university. RMUTL derives direct benefits from the program through upgrading of knowledge and skills of instructors who participate in the program and simultaneously improve quality of teaching and learning at the university. And last but not least, the SiF students themselves feel confident that they have a good chance of being employed at the company if they prove their worth through the SiF. Overall, it is a win-win situation for all parties.

The success of the SiF pilot program at Siam Michelin means that we can foresee potential transferability of the program in two ways. First, the SiF model can be replicated, with necessary adjustments, to suit local conditions in ASEAN countries. As other countries particularly Lao PDR, Myanmar, and Cambodia become more successful in building industrial-based economy (The Government Public Relations Department, 2016), the SiF model is applicable to the situation in these countries. Secondly, the SiF model stipulates that the ethos shared by the public sector (i.e. government), industry (i.e. private sector), and participating universities needs to be on a common ground in order to adapt it to fit the requirements and situation of each type of industry in each country. This can be achieved through various means and strategies.

However, it would require a careful analysis and planning with respect to the condition, readiness, and commitments of the university or TVET institutions and an industry seeking long-term sustainable development in conjunction with its expansion in the market and the government policies which are enticing enough for industries to partake.

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# EDUCATION EXCELLENCE FOR THE TWENTY-FIRST CENTURY – TAIWAN EXPERIENCE

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*Over the past 20 years, Taiwan has not only experienced dramatic changes in political and economic development, but has also gone through many reforms in educational systems. These reforms have produced high-quality human capital for the country and consequently enhanced national competitiveness. However, despite its successes the country has also faced several challenging domestic issues such as political party conflicts, high housing costs, low salaries, brain drain, and social inequity all of which need to be urgently addressed. Although the main objective of this chapter is to showcase successful stories of the development and progress of the education system of Taiwan, a coin has two sides: the issues and challenges faced by the country will also be discussed to give a complete picture of the country for the benefits of readers.*

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## POLITICAL AND ECONOMIC DEVELOPMENT OF TAIWAN

Taiwan, formerly known as Formosa, is a beautiful island chain situated in the West Pacific with a population of about 23 million. It has a rich cultural heritage greatly influenced by the islands' indigenous people as well as the Dutch, Spanish, Japanese,

the Han people from China, etc. The Republic of China (Taiwan) was founded in mainland China in 1912; after the Kuomintang (KMT) lost the Chinese civil war to the Communists in 1949, it retreated to Taiwan and established an independent government. Since then Taiwan was ruled under martial law proclaimed by the government until 1987. During this period, the political system was dominated by one party, the KMT, and people who expressed different opinions from the government were usually harshly dealt with (Global Investment & Business Center [GIBC], 2016).

As Taiwan went through political transformation from a dominant one-party system towards a multi-party democracy, its economy also grew rapidly. It successfully transformed itself from an agricultural society to an industrial society, and now to a professional service industry society. Taiwan is an important base of the innovative and high-tech supply chain of information and communication products, and an acknowledged strong economy in the world. It is one of Asia's chief outward investors and net exporter of capital, with investments all over the world.

Taiwan's economy, nevertheless, has also been confronted with some challenges. Due to high costs of labor, some labor-intensive industries imported cheaper labor from overseas or relocated their factories abroad to lower production costs. Local workers, especially young people, are burdened with low salary levels despite vigorous economic development. The inward flow of FDI from overseas pushes up housing costs. Low salary levels, over-concentration of wealth in a small sector of the population, high housing costs and brain drain are some of the issues that the government is actively trying to resolve. The government also faces challenges in balancing the economic growth, labor rights, and environmental protection. The government policies and goals for the 21st century are to build a "knowledge-based economy," "sustainable environment", and a "just society". The government intends to balance labor rights and sustainable environment, and to create a fair, just and inclusive country (National Development Council, 2017).

World Happiness Report 2019 (Helliwell, Layard, & Sachs, 2019), ranked Taiwan 25th among 156 countries of global happiness and well-being which were considered important indicators of social progress and public policy. According to Numbeo (2020), Taiwan ranked 1st on health care and 108th on crime index of 110 economies. Bloomberg Misery Index (2019) found Taiwan ranked low on misery index based on inflation and unemployment. These international comparisons suggested that relative to many other countries, Taiwan appeared to be a safe and moderately wealthy place with the best health care, good quality of life, high ratings on happiness and well-being, and low ratings on the misery and crime.

# EDUCATION DEVELOPMENT

A well-educated workforce is one important contributor to Taiwan's continuous economic growth; and the Taiwanese educational system plays an important role in providing skilled human resources for the country (Chou & San, 2015). In the past 20 years, Taiwan has introduced many reforms in its educational system. The reforms have produced high-quality human capital which contributes to increased national competitiveness.

The structure of the education system is shown in Figure 1. The current educational system offers 12 years of basic education, including 9-year compulsory education (6 years of elementary education and 3 years of junior high school), and 3 years of senior high school. Tertiary education programs of various lengths are offered, including 4 to 7 years of bachelor degree in academic or technical fields at a college/university, 1 to 4 years master's programs, and 2 to 7 years doctoral programs. Early childhood care and education of young children below the age of 6 are not included in the compulsory education system; however, the importance of early childhood education is recognized and is heavily subsidized by the government.

nursery schools (age 0-2, can extend to 3),
preschools (age 2-6), family child care (age 0-6)
(tuition free for all 5-year-olds)

Voluntary

Compulsory Enrollment

Primary schools
(6 years, age 6-11)

Compulsory Enrollment

Junior high schools
(3 years, age 12-14)

5-year junior colleges
(3 years)

Voluntary

Senior high schools (3 years, age 15-17) (academic-track students usually attend academic universities, while vocational-track students usually attend technical universities)

Multi-admission programs

Academic universities/colleges
( 4 years, age 18-21)

2-year technical junior colleges

4-year technical universities/colleges

3-year job experience

3-year job experience

2-year technical university/ college

Application for admission

Master's degree graduate program
(1-4 years)

Application for admission

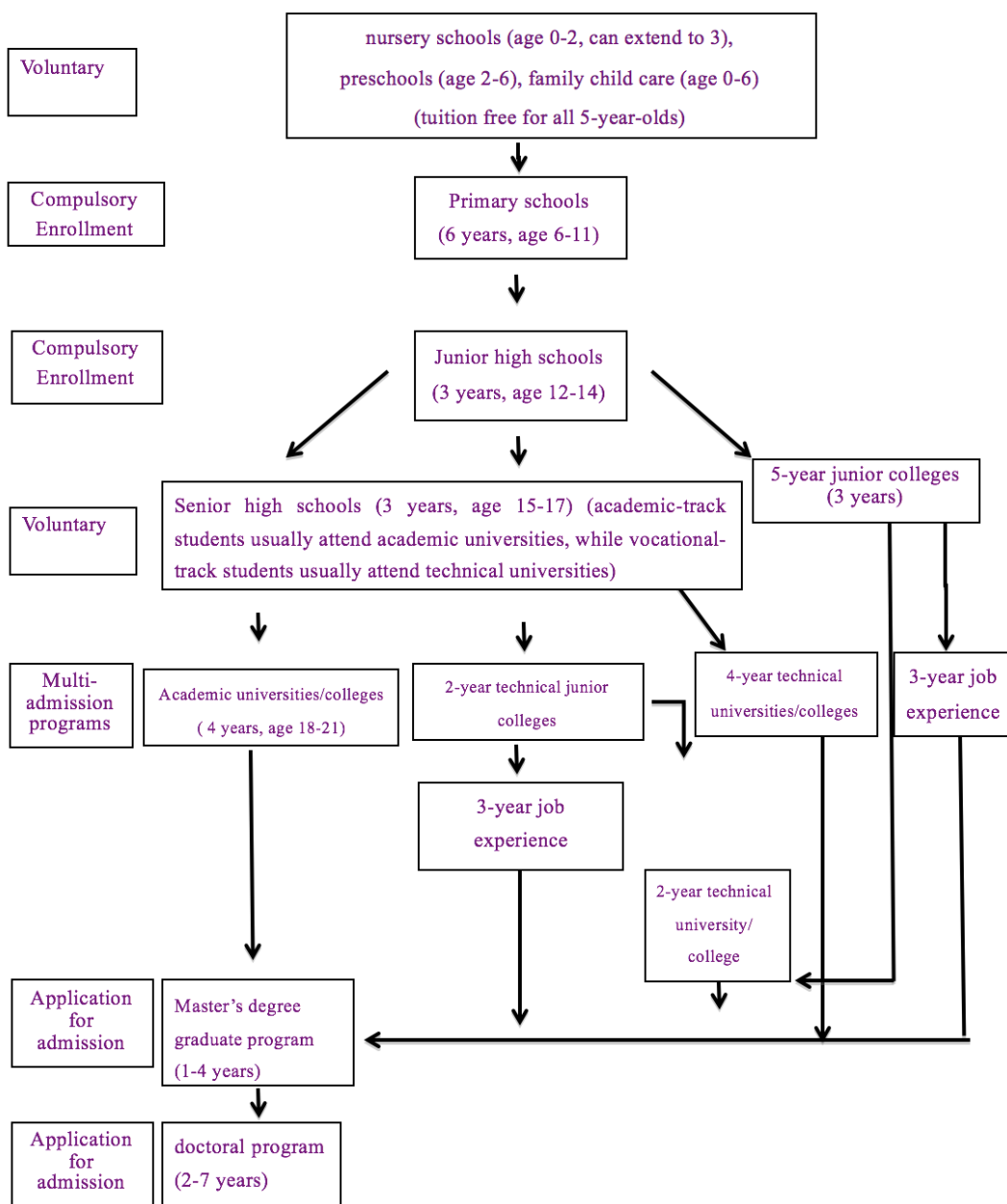doctoral program
(2-7 years)

*Figure 1. Educational system in Taiwan (Ministry of Education, 2019)*

# TAIWANESE EDUCATIONAL SYSTEM

## EARLY CHILD CARE AND EDUCATION IN TAIWAN

Pre-school education is not included under compulsory education; however, substantial subsidies are provided by the government. On August 1, 2011, the Ministry of Education (MOE) launched a tuition free policy for 5-year-old children to attend pre-school. By 2019, the enrollment rate of all 5-year-old Taiwanese children has reached 96.85% (Executive Yuan, Gender Equality Committee, 2019).

In recent years Taiwan is confronted with a serious problem of falling birth rate. According to World Population Review (2019), the fertility rate of Taiwan was the lowest in the world among the 200 countries surveyed, with a total fertility rate of 1.218. To increase birth rate and ease parents' financial burden of child care and child-rearing, the Taiwanese government has launched a number of policies such as baby bonus, parental leave, and child care subsidies, etc. The government also expands public, non-profit, and quasi-public preschools to provide sufficient and affordable quality child care services. By 2019, the net enrollment rate of preschool was 63.17%.

## NINE-YEAR COMPULSORY EDUCATION

Compulsory education was implemented in 1968. Children between the ages of 6-11 (elementary school) and 12-15 (junior high school) are entitled to have exam-free and tuition-free education. Public schools are run by the school district system and admit students from a designated neighborhood. Compulsory education is intended to achieve a balanced education that addresses moral, intellectual, physical, social, and aesthetic development. The school curricula include languages (i.e. Mandarin, native languages, English, etc.), mathematics, social sciences, natural sciences, arts and humanities, complementary education (such as home economics, scout education, and civic counseling activities), technology, health, physical education, and flexible learning activies (such as projects, clubs, special needs, etc.). Life skills education, health, gender equality, human rights, rule of law, and character education are also actively promoted. In 2019, net enrollment rates for elementary schools and junior high schools were 97.09% and 97.47%, respectively.

## SENIOR SECONDARY EDUCATION

In 2014, Taiwan launched a 12-year basic education policy, adding 3 years of senior secondary education (between the ages of 15 and 18) to the 9-year compulsory education. According to the Senior High School Act (2016.06.01, article 1), "senior high school education is a continuance of 9-year national education; its ultimate

purpose is to strengthen the students' mind and body, to develop their potentials, to lay the foundation for academic research as well as professional skills, and to cultivate quality citizens with a balanced development in the five aspects (moral, intellectual, physical, social, and aesthectic) of education".

There are 4 types of senior high schools: general, skills-based (vocational), comprehensive, and specialty-based. General schools offer the academic-track high school education. The core curriculum provides fundamental subjects to strengthen the students' general competencies. Skills-based schools emphasize vocational training and career planning. They provide professional subjects and practicum programs to enhance the students' vocational knowledge, skills, and work ethics for specific professions such as business, agriculture, nursing, or technology. Comprehensive senior high schools combine academic and vocational programs and offer students opportunities to explore options between academic and vocational education (Chou & Ching, 2012). The curriculum includes general subjects such as Chinese Literature, English, physics, chemistry, mathematics, social and natural sciences, physical education, as well as vocational courses and practicum programs to guide students to the appropriate channels. Specialty-based senior high schools are mainly for students with a special aptitude, and offer curricula on a specific subject or field, such as art and music. By 2019, the net enrollment rate of senior high school students was 95.64%.

## HIGHER EDUCATION

In the past 20 years, higher education institutions in Taiwan have expanded rapidly with 153 institutions in operation in 2019. These institutions are generally divided into the academic-track and vocational-track, and include junior colleges, universities/colleges, and graduate programs. Junior college education primarily focuses on applied sciences and is classified into 5-year or 2-year junior colleges. Academic and technical undergraduate education usually takes 4 years; specialized programs such as dentistry or medicine require 6 to 7 years, including a 1-year internship (MOE, 2016). The net enrollment rate of higher education among children aged 18 to 21 years was 71.03% and the gross enrollment rate was 84.69% by 2019 (Department of Statistics, 2019). Higher education has become universal education in Taiwan.

People with a bachelor's degree or those with an equivalent degree can apply for a Master's degree program. The study period is 1-4 years (in-service master's programs can extend by 2 years). Master's degree holders or those with an equivalent degree can apply for admission to a 2-7 year doctoral program. Outstanding students with a bachelor's degree or outstanding master's students could apply directly for doctoral programs. For people who want to pursue higher education at night or during weekends, in-service programs are offered. In addition, Open University programs are available for people who want to pursue higher education on a part-time or via

the distance learning mode such as written and audio materials, internet, television programs, etc. supplemented by face-to-face instructions (MOE, 2016).

## TWELVE-YEAR BASIC EDUCATION

Basic education is directly related to manpower quality and national competitiveness (MOE, 2016). In 2014, the government launched a 12-year basic education policy. Senior secondary education is non-compulsory; however, a tuition-free policy is applied to students attending vocational senior high schools. Tuition subsidies are provided to students attending other types of senior high schools pending certain requirements and the government's financial situations.

The curriculum guidelines for 12-year basic education are officially implemented in 2019. The core curriculum includes languages, mathematics, social science, natural science, arts, technology, health and physical education, national defense education and general activities (such as home economics, scouting education, and civic counseling activities). Curriculum guidelines offer more flexible learning, and are intended to help students gain integrated knowledge and inter-disciplinary abilities.

Exam-free open admission is implemented with the intention of encouraging junior high schools to reduce pressure on students and to enable schools and students to follow the standard curriculum without the need for extra tutorials. The 12-year basic education policy is intended to make junior high school education more flexible, creative, active, and quality-driven, and to assure the quality of senior secondary education (MOE, 2016). It is hoped that senior high schools should enhance their educational quality and create distinct features to attract students from the neighborhood. Students are encouraged to attend nearby schools based on their inclination, interest, and merit. However, parents' lack of understanding of the policy is a big barrier to its success. Taiwanese parents are generally influenced by Confucianism and greatly value academic and intellectual abilities . Most believe that attending a good school will help their children have a better future career (Chou & Ching, 2012). Instead of choosing nearby schools, they prefer that their children attend "top-ranking high schools." Thus, despite the government's exam-free open admission policy, currently all children still need to take entrance exams and go through complicated and competitive admissions screening process. Admission to top-ranking high schools is still very competitive and the pressure on students from parents and teachers is intense (Yun & Vun, 2016). The policy of the 12-year basic education is closely linked to the policy of a multi-channel admission policy which creates the biggest controversies.

# CHANGES IN SCHOOL ENTRANCE SYSTEMS

Educational liberation and diversification led to reforms in establishing a multi-channel admission of diverse standards to higher levels of education to replace one standardized way of admitting students. Between the 1950s and 2000, the entrance examination system was an important educational filter for tracking students into different types of schools (Chou & Ching, 2012). Students took one standardized national entrance examination and then were assigned a school according to their test scores and school preferences. It was then considered an open and fair method for admission. However, this system was criticized for over-emphasizing intellectual development, discouraging creativity, focusing on exam-oriented instruction ("teach-to-the-test" practice), rising of cram schools, and creating tremendous test anxiety.

In order to address the issue, a multi-channel admission policy for senior high schools was implemented in 2001 followed by a multi-channel admission policy for tertiary education which was implemented in 2002. Entrance exam scores were not the only factor for admission; performances in other areas of development were also considered important. It was hoped that the new system would help reduce the exam-oriented learning environment, promote normal instructions in schools to cultivate the students' appropriate development, and reduce students' stress and lesson the need to attend cram schools (Lin, 2010).

In theory at least open admission is the ideal admission policy and practices for the 12-year basic education. Students are encouraged to attend nearby high schools. If the number of applicants exceeds the authorized test-free quotas, applicants are admitted according to multiple criteria, including rankings of entrance exam, school preference, extracurricular activities (such as competitive performance, service learning, class or club leaders), residency in the school district, etc. Similarly, high school students can apply for admissions to higher education through a multi-channel admission system. Students have to take an entrance examination. At the first screening phase, each department will set minimum admission standards for entrance exams. Qualified students shall prepare application materials and can apply with up to 6 departments. Application materials are reviewed and screening interviews are conducted. Entrance exam scores are not the only factors to get admission to higher education. Other criteria such as interviews, academic performance at school, autobiography, study plan, competition performance, certificates of merits, etc. are all considered in the process of admission review. If students do not get admission in the first phase, they will be assigned to an institution according to their entrance exam scores and preferences in the second phase.

The design of multi-admission policy is, nevertheless, criticized as complicated, confusing, and costly to parents and students, and creates even higher stresses for most

students. Some institutions are stricter in their student assessment. Admission review committee members at universities might have difficulties in distinguishing students' potentials from short interviews and similar application materials well-prepared by students, parents, and schools. Students and parents have to spend money and time traveling to different schools for short interviews. Hence, multi-channel admission system was questioned by the public for its fairness, and hence criticized as a multi-money admission system which is unfair and detrimental to disadvantaged students. Students from higher socioeconomic status (SES) families have more resources and opportunities to prepare application materials (i.e., certificates, competition, extra-curricular activities), and can afford to pay for application fees, transportation, and accommodation during interviews (Huang & Chang, 2015; Liu, Luoh, & Yi, 2017; Yin, Tao, & Hung, 2015). In order to help disadvantaged students, a "star project admission" policy is implemented which sets quotas to admit top students in remote or rural schools. However, issues of social inequity of the policy continue to be questioned.

## TEXTBOOK REFORMS

One important reform after education liberation in 1990s was the privatization of textbook development and distribution (Chou & Ching, 2012). In 1968, nine-year compulsory education was implemented and textbooks were developed and published by the National Institute of Translation and Compilation (NICT). Through this process it was argued that the ruling political party could use textbooks to control and mold students' thoughts to meet its political interests and assert political legitimacy (GIBC, 2016). Sensitive and controversial political and cultural issues were often removed from the textbooks. To promote a strong Chinese national identity, Taiwanese dialects were once banned in schools (Chou & Ching, 2012).

Textbook reforms were intended to reduce the government's ideologies, to improve textbook quality through free competition, to respond to social and cultural diversity, to provide choices to teachers and students to meet individual needs, and to promote textbook research (Chou, 2003). The textbook publication system was revised in 1996; private publishers could develop and publish textbooks after they were reviewed, screened and approved by the MOE. In 2002, the NICT was completely out of the textbook editing market. The MOE gives private publishers and schools more autonomy to design their curriculum; however, it still controls textbooks by providing curriculum guidelines and monitoring the contents (Chou & Ching, 2012). In principle, textbooks are developed by private publishers. Nevertheless, textbooks still need to be approved by the MOE and revised or replaced when necessary (GIBC, 2016). Textbook reform has particular impacts on social studies textbooks. Opinions regarding Taiwan's pursuit of political independence versus unification with China has been polarized since the late 1980s. After the open market textbook reform, China-centered content (such as history and geography) was greatly reduced while

the content of Taiwanese history and geography increased. In addition, local dialects and indigenous languages are included, and Taiwan national identity and local issues are emphasized. Topics such as gender equality and multi-culturalism were promoted and Taiwan became a country with a more open-minded, contemporary, and modern worldview (Chou & Ching, 2012).

However, open textbook markets also create some controversies. The MOE provides curriculum guidelines, and different publishers have different versions of textbooks. Teachers in different schools and different grades might use textbooks from different publishers which might make continuity of curriculum difficult. In order to prepare for entrance exams, some parents would purchase different versions of textbooks and supplementary materials which are costly to disadvantaged families. In addition, controversial contents such as relations with China and gender equality education often generate heated debates.

## INTEGRATED SYSTEM OF EARLY CHILDHOOD EDUCATION (NURSERY SCHOOLS AND KINDERGARTENS)

Early childhood education is the foundation for all levels of schooling. Before 2012, children below 6 years old were cared for mainly in two types of child care centers; namely, nursery schools (Tou Er Suo) and kindergarten (You Er Yuan). Even though both cared for young children, regulation, standards and personnel qualifications were quite different. In addition, they were governed by different central authorized agencies. These different standards and requirements created problems such as double standards and conflicts in supervision and management (Chou & Ching, 2012).

The government spent many years discussing, coordinating, and planning to resolve these inconsistencies by integrating systems of early childhood care and education. On January 1, 2012, Early Childhood Education and Care Act became effective. The Act is intended to ensure young children's (age 2-6) right to appropriate education and care, establish guidelines for education and care, enhance the system of early childhood education and care, and safeguard the children's right to sound physical and psychological development. Child care centers and kindergartens that provided education and care services to young children over the age of 2 and prior to entering elementary school were all re-named "pre-schools." Hence, the pre-school education reached a new milestone.

The MOE is responsible for pre-school education, special education and after-school care; while the Ministry of Health and Welfare is responsible for nursery services centers, family child care, and early intervention programs for developmentally delayed children ("Standards for Establishing Children and Youth Welfare Institutes", 2013.12.31). Prescribed curriculum guidelines are provided. Preschool educators

should provide learning activities to promote children's physical, language, cognition, aesthetic, emotional and social development. Both nursery schools and pre-schools are regularly evaluated to ensure child care and education quality.

In Taiwan, the majority of pre-schools are privately owned. In order to provide affordable quality care and reduce parents' financial burdens, the MOE not only tries to establish more public and non-profit pre-schools, but also contract with qualified private preschools to become quasi-public preschools with lower tuition fees and better caregivers welfare and salaries.

Because teachers and caregivers in public pre-schools have a higher social status, salary and better benefits, every year many teachers and caregivers in private pre-schools try to pass competitive exams, screening interviews, and teaching demonstrations to enter public pre-schools. In turn, private pre-schools suffer from high turnover rates and are constantly in need of qualified educators. Non-profit and quasi-public preschools offer child care workers better salaries and welfares and hopefully will reduce turnover rates. Despite good intention of the quasi-public preschool policy, it encounters some resistance from high-end expensive preschools. The effects of the policy remains to be examined.

# POLICY AND SYSTEM FOR PREPARING TEACHERS

The quality of teacher education affects educational quality which is the foundation of workforce quality and economic development of a nation. In Taiwan, to ensure quality of teacher education programs, there are strict administration guidelines set by the MOE for every phase of teacher education, including pre-service teacher education, practicum, and in-service teacher education.

## TEACHER EDUCATION

The MOE sets admission guidelines for the teacher education programs. Students who complete the first year of academic work in their university with satisfactory grades are eligible to apply for admission. Many programs require applicants to take tests of general educational knowledge and languages, and have interviews and teaching demonstration after the initial screening stage of GPA and written tests. After students are admitted, they need to complete pre-service teacher education curriculum, including general education courses, professional education courses, and areas of specialization courses. General courses are intended to broaden the teachers' knowledge of humanities, and develop their aspirations for a teaching career. Professional education courses aim to equip teachers with pedagogical competencies,

and areas of specialization courses are intended to equip teachers with specialized knowledge and skills in the particular subjects they will teach (Hsieh et al., 2013). To be certified as a teacher, prospective teachers must have a bachelor's or higher degree, a Pre-service Teacher Education Completion Certificate, passed the Teacher Qualification Assessment, and completed the 6-month practicum (Hsieh et al., 2013). Becoming a teacher is a rigorous and competitive process. After getting a teacher's certificate, teachers still need to go through competitive job screening, including a written exam on educational knowledge, interviews and teaching demonstration to get a formal teaching job.

## EVALUATION OF TEACHER EDUCATION PROGRAMS

The public demanded a higher standard of teacher professionalism, thus the MOE established a Teacher Education Review Committee to control teacher education quality, including planning, execution and review of the teacher education policy, program, curriculum, and evaluation (Hsieh et al., 2013). Teacher education programs are regularly evaluated to assure teacher quality. Institutions have to conduct their own self-evaluation. In addition, written reports and field visits are used to better understand internal administration, students' performance, faculty professionalism and commitment, distinct features, promotion of in-service education, and problems to be solved, etc. Assessment indicators and operations are intended to enhance quality and effectiveness of teacher education programs, and nurture high-quality educators with professional standards and skills for the future. The admission quota of pre-service teachers are adjusted according the evaluation results (Hsieh et al., 2013).

## PROFESSIONAL DEVELOPMENT

In order to enhance educational quality, teachers have the right and obligations to participate in in-service education, research, and academic exchange activities. Continuing professional development of teachers is mandatory. Teachers are required to have at least 18 hours of in-service education annually. To promptly provide various in-service education information to teachers, there is a website on which teachers can register on-line. Teachers have their own in-service education e-portfolio which documents their participation in professional development activities. Digital learning courses (e-college, https://ups.moe.edu.tw/mooc/index.php) for teachers are offered to provide multi-channel in-service education (MOE, 2016). Teacher professional development website ( http://teachernet.moe.edu.tw/MAIN/map_a.aspx) and Teacher education for the 12-year basic education website (http://laes.ntcu.edu.tw/welcome.aspx) also provide large quantities of helpful information for teachers.

## DESIRED CHARACTERISTICS OF GOOD /EFFECTIVE TEACHERS

According to Article 4 of Teacher Education Act, "Teacher education shall train and educate teachers to possess knowledge and skills relating to student-learning-centered professional teaching knowledge and skills, a sense of professionalism and moral character, and enhance their respect for diversity and ethnic cultures, concern for society, and international vision." To achieve these goals, the MOE set curriculum guidelines about teachers' professionalism and criteria of pre-service teacher education courses. On February 15, 2016, the MOE issued "guidelines for the professional standards for Teachers of the Republic of China" and described expectations toward teachers' knowledge, skills, and attitudes. The core values of an ideal teacher profile include: dignity of teaching, responsibilities, delicacy and sustainability. Teachers should be equipped with "educational love [insight, care and passion], professionalism [international view, critical thinking, and professionalism], and execution capacities ["innovation, cooperation, and practical wisdom] as goals. The guidelines also listed 10 teacher profession standards and 29 performance indicators to strengthen teacher's professional competence, performance, and images.

Even though teacher education in Taiwan is diversified, there are strict guidelines for pre-service and in-service professional development (Hsieh et al., 2013). Teacher quality is assured through controlling the number of teachers, eliminating unqualified teachers using competitive assessments, evaluating teacher education programs regularly and promoting professional development of teachers to raise teacher quality. This is probably the main reason why teacher education quality assurance (including recruitment and selection, accreditation of programs, and entry to profession) in Taiwan was ranked 1st among 17 countries, with an overall rating of 2.92 on a 3-point scale, higher than that of Canada, Germany, and Singapore etc (Ingvarson & Rowley, 2017).

# GOVERNMENT POLICIES AND GOALS FOR THE 21ST CENTURY WITH RESPECT TO ECONOMIC DEVELOPMENT AND CREATION OF HUMAN CAPITAL /WORKFORCES FOR THE 21ST CENTURY

High quality human capital is the key to the success of economic development of a country. In Taiwan the government is devoted to continuously improve the skills and competences of the labor forces to support economic growth. The popularization and

improvement of Taiwan's educational system provides the country with an excellent pool of human capital and research and development (R&D) capacity. To ensure work force quality, the government actively revises outdated regulations and pedagogical R&D systems, promotes research innovation, and university-industry linkages in tertiary education to meet technical manpower needs for industrial development (National Development Council, 2017). Overall, the MOE has a grand vision for and expectation of education; it is not just a way to cultivate competitive human capital and to achieve economic development, but also provides each citizen access to quality education which motivates students to learn and develop their potentials. The government is fully aware that social justice can be realized mostly through equal distribution of educational resources and exerts all efforts to achieve this goal.

Several innovative educational practices have been implemented to help equip students with knowledge and skills required for the 21st century.

## COOPERATION AMONG INDUSTRY, ACADEME, AND THE GOVERNMENT

To minimize the gap between learning and application as well as talent shortage and skills mismatch, several policies have been implemented. Cooperation among industry, academe, and the government is strongly encouraged. Vocational education professionals can take leave with pay to learn and acquire new knowledge and skills needed in industries. Teachers at school are encouraged to cooperate with expert instructors from industries for team teaching. The MOE established internship platform (http://iotintern.ntust.edu.tw/about) and match industry needs and students' interest and expertise. Industries provide internship opportunities; schools cultivate related knowledge and skills, and students have internships in industries to gain practical experiences. This policy helps improve the students' professional skills and work attitude, enable students to understand industry needs, and learn how to cooperate with others. All these policies help equip students with the skills needed in industries and enhance their competitiveness in the job market.

## DIGITAL TECHNOLOGY AND EDUCATION

Diverse learning channels are possible due to advances in digital technology which provides many possibilities for innovative and creative education, and cultivates students' abilities to meet future needs. People can learn and earn qualifications from the internet or through distance learning. E-learning systems are widely used in all levels of education; teachers upload instructional materials and interact with students. Students can participate in e-learning according to their schedules. Technology is also used to tutor children in remote areas through the internet (Lee, 2016). Administration and professional learning networks also make good use of technology to enhance

efficiency. The MOE established many websites of professional learning communities which help teachers enhance their professional knowledge and practical skills in effective teaching. Teachers tried out innovative instructional methods, exchanged ideas, and brain-stormed to improve curriculum and instructional quality.

## INTERNATIONAL EXCHANGE PROGRAMS

To face the challenges of globalization and to enhance national competitiveness, internationalization in education is very important. To raise overall academic standards, the MOE encouraged institutions to invite outstanding overseas scholars and students to visit Taiwan and develop international education cooperation and exchange programs. In addition, the government offers grants for students to study abroad every year. Students are sent to different countries to receive education in different professions. Each year, the number of full scholarships was over 100 (http://stats.moe.gov.tw). In addition, many short-term scholar or student international exchange programs sponsored by the government are available. Government also provides low-interest study-abroad loan to reduce financial burden of students to study abroad for Master's or doctoral degree (MOE, 2016).

## SUPPORT FOR DISADVANTAGED CHILDREN:

To balance urban and rural development and help disadvantaged children in remote areas, the MOE has launched the "Innovative Development Program for Rural Education" and the "Stabilizing Program for Education in Rural Schools" with the intention of offering an enriched educational environment, stabilizing teacher quality, and bringing resources to ensure students' learning rights. Through the scheme dormitories are improved; financial assistance schemes are provided; and study coaches are promoted (MOE, 2016). Universities are encouraged to admit excellent disadvantaged students through the "star project admission" scheme.

# STRENGTHS OF THE EXISTING EDUCATIONAL SYSTEM

The existing educational system in Taiwan has strengths as well as shortcomings. The successes of the educational system are reflected on the good performance in the international comparisons of student achievements, global competitiveness, and quality of life.

## STUDENT ACHIEVEMENTS:

Taiwan has outstanding records of educational quality based on student achievements. Educational liberalization and reforms had made the younger generation more articulate, creative, curious, adventurous, and daring (GIBC, 2016). Taiwanese students demonstrated good performance in international competitions, such as the Program for International Student Assessment (PISA, 2015), Trends in International Mathematics and Science Study (TIMSS, 2015) and the International Olympiads on mathematics, sciences, computers, robotics, etc. (Chou & Ching, 2012). Taiwanese students were often at the top of the list of high achievers compared to other countries. Taiwanese students performed well academically, especially in the area of math and science. The high achievement is closely related to the performance of teachers and teacher education quality in Taiwan (Yang & Huang, 2016).

## GLOBAL COMPETITIVENESS

Taiwan education system offers qualified workers and highly trained human resources to the labor market and has positive impacts for industry innovation and global competitiveness. The Global Competitiveness Report 2019 (Schwab, 2019), the World Competitiveness Yearbook (IMD World Competitiveness Center, 2019), the World Digital Competitiveness YearBook, and Global Entrepreneurship index rankings found that Taiwan has good rankings in competitiveness (Acs, Szerb, & Lloyd, 2018). Taiwan is adaptive and agile with technological changes. Stewart (2018) found that Taiwan has ample educated labor force. Taiwanese employees are praised with characters of "hard-working, very trustworthy, good team-players, extremely well-educated, very loyal, easy to develop or train, highly productive, easy to retain, showing a high degree of emotional intelligence quotient (EQ), and generally well-rounded." These international comparisons demonstrate that Taiwan has economic competitiveness and strength, especially in the area of innovation. Overall, workforce in Taiwan is well educated, and doing business in Taiwan is quite easy and low in risks (World Bank Group, 2018).

# WEAKNESSES OF THE EXISTING EDUCATIONAL SYSTEM

However, despite its successes, several studies also pointed out some down sides of the Taiwan educational system as briefly discussed below.

# OVER-EMPHASIS ON ACADEMIC ACHIEVEMENTS OF STUDENTS

Despite the implementation of multi-channel admission policy, academic achievements are still highly valued in Taiwan society, while other aspects of development such as personality, social development, aesthetics, physical and mental health, interpersonal communication, life education, and multi-culture, etc. might be overlooked (Tu, 2017). TIMSS (2015) found that despite the good performance of Taiwanese students in Math and Science, their attitudes towards these two subjects tended to be negative, not interested, not confident, and did not consider them important. These results suggested that the educational system should pay more attention to other areas of development besides academic achievements alone.

## LOW LIFE SATISFACTION AND HIGH STRESS

Many studies describe the overwhelming exam pressure on students and teachers at the expense of teenagers' physical and psychological health in Taiwan (Chou & Ching, 2012). PISA 2015 (OECD, 2017) studied the students' well-being, such as satisfaction with life, relationships with others, and after school activities. Results indicated that Taiwanese students had relatively lower self-reported satisfaction with life than the OECD average, and that they suffered higher schoolwork-related anxiety despite their good performance in Science and Math. Taiwanese students are encouraged early on to compete with each other constantly; how to balance between motivating students to learn without generating excessive anxiety of failure is a challenge for both teachers and parents.

To alleviate students' exam-related stress, the MOE launched several educational reforms such as the 12-year basic education and multi-channel admission programs (Chou & Ching, 2012). However, studies indicated that students and parents were still stressed and dissatisfied with the education system. Yen and Vun (2016) reported that after the implementation of the 12-year basic education, the goal of reduction of students' study stress was not evident. Liu, Luoh, and Yi (2017) found that after the implementation of the multi-channel admission policy, junior high school students' entrance-exam-related stress and time spent on study both increased. They had a busier schedule and participated in more extracurricular activities (such as competition, club, art, and talent performance etc. Advantaged students were more likely to attend talent lessons and participated in extracurricular activities, which also meant that they had better chances of getting admission to better schools. Family background and resources continue to be a major factor in determining children's educational opportunities (Chou & Ching, 2012). This eventually leads to the issue of social inequality.

## SOCIAL INEQUITY

Education is intended to promote social mobility. However, PISA consistently found that disadvantaged students performed worse than advantaged students. Rich parents may use their wealth to provide better education for their children (OECD, 2017). Studies examining impacts of multi-channel admission program (Lin, 2010) suggested that students with higher SES background, with better academic performance, and extra-curricular performance were more likely to get admission to top-ranking, reputable, and higher quality schools through the channels of recommendation and application channels. Students from lower SES were more likely to fail in recommendation and application channels, and were most likely to be assigned to a school according to their entrance exam scores. The issue of inequality of access to higher education has attracted attentions from scholars. Wang (2014) found students with higher SES backgrounds were more likely to attend good universities. Students attending public universities had higher SES family backgrounds than students attending private universities; and students attending private academic universities had higher SES family backgrounds than students attending private technical universities. Students attending public universities through recommendation and application channel had higher SES than students from test placement channel. Multi-channel admission policy appears to be beneficial for advantageous students.

In Taiwan, public institutions received more educational funding (about 75%) from the government, had better resources and reputation, and their tuition fees are lower. Advantaged students have more resources and better academic performance; they attend public universities, pay lower tuition fees, and enjoy higher educational quality. On the contrary, disadvantaged students attend private universities and pay higher tuition fees. In contrast to promoting social mobility, government's multi-channel admission policy might worsen the vicious cycle of inequity (Luoh, 2002; Wang, 2014). The issues of fairness and inequality of educational opportunities and resources continue to be questioned.

## DEGREE DEVALUATION AND BRAIN DRAIN

Because of the low birth rate and a large number of higher education institutions, almost all high school graduates can attend higher education institutions. However, the over expansion of higher education creates degree deflation and a crisis in the sector. College graduates are less willing to work in blue-collar jobs, and thus there is shortage of talents in many fields. Also, there is a large surplus in the supply of college graduates in relation to the needs of the job market (Chou & Ching, 2012). Low wages of the youth even for graduates from top universities in Taiwan had pushed people to work abroad. Low salaries not only deter foreign talents to work in Taiwan, but cause

a serious brain drain which might seriously affect the competitiveness of Taiwan in the longer term.

Taiwan faces challenges of recruiting and retaining talents. The Taiwanese government has implemented the Act for the Recruitment and Employment of Foreign Professionals. A flexible salaries policy is applied to high-level professionals to attract them to work in Taiwan. In addition, the government actively tries to raise basic salaries of local laborers. Still a balance between protection of local labors' rights and economic development is a challenge the government struggles to overcome.

# RECOMMENDATIONS TO IMPROVE THE QUALITY OF EDUCATION FOR THE 21ST CENTURY

Factors affecting educational outcome are complicated and intertwined. It is difficult to propose a single clear cut solution. To enhance education quality in Taiwan, we propose the following directions.

## IMPROVING GOVERNMENT EFFICIENCY

Stewart (2018) surveyed foreign corporate executives regarding problems which have a negative impact on businesses in Taiwan. They reported complicated bureaucracy, vote-led policymaking, and frequent changes of government officials. Policies were often planned to appease voters rather than to consider sustainable development for future growth. Unsustainable policies resulting from political turmoil and constant changes in official position are also hurting Taiwan's educational system and competitiveness.

The MOE is the central authority responsible for managing educational affairs, organizations, and staff of the educational system at all levels. Chou and Ching (2012) suggested that the mixed results of educational reform outcomes might be attributed to frequent changes of the education ministers who might not share consensus or consistent policies of education. Ministers are appointed by the ruling political party. Their office tenure is often short which has negative impacts on educational policies. It takes time to implement policies consistently and successfully. With frequent changes of ministers, policies could not be consistently followed. The frequent change of ministers has been a key factor in the unsatisfactory results of education reform (Chou, 2018). Policies were sometimes proposed in a rush without consensus, and did not gain the people's support. In addition, Chou and Ching also suggested that government administrative workers at the MOE often treat each educational policy as a standard administrative case. Officers in the MOE were criticized as bureaucratic; a

market mechanism is implemented, and schools have to provide yearly KPI regularly. Teachers are often exhausted with piles of paperwork. Institutions might also lose their individual uniqueness and depth as a result (Chou & Ching, 2012).

In addition, the government often relies on institutions and scholars to deliver public services through outsourcing. These prevalent practices of outsourcing had created problems of inconsistent implementation of policies. The same projects or policies might be outsourced to different institutions and scholars in different years. Well-run websites stop updating and disconnect services due to the end of projects and a new website is created for the same project. Information of the same policies is located in different websites, and is confusing to users to search for information. The new elected government is actively trying to improve government efficiency.

## INCREASE EDUCATIONAL BUDGET

Over the past decade, the overall educational budget appeared to be growing (Lee, 2016), despite the decrease of student population. However, inadequate educational funding is still a problem. Compulsory education faces the problem of insufficient funding because most educational funds have been invested in higher education. Over-expansion of higher education has an influence on the allocation of educational resources. In the past, only a relatively small number of students entered higher education, thus they possess a bigger share of resources and educational expenditures. After the expansion of higher education in the 1990s, almost all high school graduates can attend higher education. The student population in higher education increased rapidly; however, resources are unable to respond accordingly. In order to reduce the government's financial burden, Taiwan has adopted the policy of market mechanism, hoping that through deregulation and liberalization, educational institutions will become more competitive and accountable and education quality will improve. Public funding decreases while private investment increases (Chou & Ching, 2012).

Educational expenditure of the MOE is unevenly distributed; the higher a university's ranking, the higher the average expenditure per student. Top public schools with good reputations in city areas often receive more funding and donation from the government and the private sector. Private universities, especially technical universities, have the lowest expenditures per student. Inadequate financial support has negative impacts on teaching and research at these institutions (Chou & Ching, 2012)

In addition, basic education also suffers from insufficient funding which is threatening educational quality and school operation. According to Chou and Ching (2012), funding in both primary schools and junior high schools (average education funding per student) is less than the average of the OECD countries in 2009. Other funding for education, such as facility maintenance fees, also runs short in Taiwan. In the

OECD countries, the staff cost is about 75 percent of educational expenditure, while it reaches 83 percent to 93 percent in Taiwan. An excessive proportion of personnel costs necessitate a trade-off in the other budget needs and results in poor teaching facilities and supplies, such as the failure to purchase library books, to contract for utility repairs, and so forth.

The government's insufficient funding in basic education is partly due to the situation that the retirement pension of faculty and staff was calculated as part of educational expenditure in Taiwan. Retirement pension system for teachers and government employees in Taiwan was designed to compensate them for a below-average salary during the 1960-1980s to recruit more talent to join the profession. As the social context changed and teacher salaries became competitive, the subsidized pension income plus 18 percent interest system aroused social criticism. Teachers who reached their early fifties after working twenty-five years take early retirement and then collect their lifetime monthly retirement pension (around 75-95 percent of their salary before retirement). Pension of mass teacher retirement accounted for a big share of annual education expenditure. The government's attempt to reform pension system was a difficult task and encountered protests from people affected (Chou & Ching, 2012). The pension reform to gradually cut pension of teachers, government employees, and military personnel was launched on July 1st 2018. It is understandable that retired government employees' pension cut arouses anger and strong reactions; however, for sustainable development of the country, some modifications and reforms are necessary.

The government should improve its efficiency and better management of government budgets to ensure educational quality, especially for students in remote areas, students with disabilities, and those from disadvantaged family backgrounds. If political party conflicts and infighting among people with different interests and views continue, and the government efficiency does not improve, Taiwan's competitiveness will decrease and most people will suffer consequently.

## BETTER COMMUNICATION WITH PARENTS AND THE PUBLIC

The family plays an important role in human development. To enhance the students' development, relying mainly on schools and the government is not enough. Parents who are not involved in their children's education or who lack parenting knowledge and skills often have negative impacts on children. To successfully implement educational reforms, family education and better communication with parents are important. When parents have more understanding of multiple intelligence and more diverse values toward success, are involved in their children's education, educational reforms are more likely to succeed (Yen & Vun, 2016).

Many educational policies are designed by elite scholars or imported from other countries without considering the context, value,s and beliefs in the society. Policies without people's support are likely to encounter resistance and fail to achieve the original goals. Thus, listening to people's voices and building consensus through open communication is important. Policies should be well-planned for sustainable development and piloted before they are implemented. Once policies are implemented, they should be regularly checked to ensure its efficacy; and when mistakes occur, they should be properly and promptly resolved.

# CONCLUSIONS

There are some lessons and experiences from Taiwan that other countries can learn and take into consideration when planning educational policies for their country. Firstly, early child care and education is the foundation of all education; thus, the government should make sure that affordable high-quality child care services are available to all children. Early child care and educational policy affects parents' willingness to have children, children's development, and a nation's future development. Government subsidies to provide affordable qualiy child care and to improve salaries and welfare of preschool educators are important. When young children have quality care and development, their later achievements and development will be enhanced. Only a nation with a healthy and quality human capital will grow stronger. Secondly, teacher education has a great impact on teaching quality and children's development. Thus, ensuring high quality teacher education programs and continuous professional development is very important because they play an important role in education future generations of the country. Thirdly, special attention should be paid to the education of disadvantaged children and social equity issues. Wrong educational policies are likely to promote social replication instead of social mobility. Fourthly, more budgets should be invested in educational infrastructure and digital technology which make many innovative and creative instructional methods possible, such as e-portfolio, flipped classroom, Moocs, distance learning, etc. In addition, it can be used for documentation, communication, and administration of the education system at all levels. Finally, well-planned and implemented educational policies and government efficiency are important to ensure that the directions of educational policies are appropriate for the country . Policies developed or implemented by other countries should not be blindly imported and adopted without considering local people's culture and beliefs. It is important to listen to educators', parents', and students' voices, and to have open communications with the public before a new policy is implemented.

Huang (2014) indicated that educational investment is the best policy because it enhances manpower quality and when people have good jobs, the government need not spend on social welfare. Education is the key to the success of the future. The government in Taiwan has continued to improve educational quality at all levels and

enhance student achievements in all areas. However, there seems to be no perfect policies which satisfy all stakeholders. Every policy comes with its strong and weak points and all policies elicit criticisms one way or the other. Every educational policy is a result of choice and compromise. It takes time to plan and implement sustainable policies and sometimes periods of chaos happen. Policies need to be modified to correct mistakes or avoid negative impacts. However, constant changes due to political upheavals and inconsistent policies are detrimental to national development.

Planning and implementation of educational policies should take into consideration social contexts of a country. Policies that work well in another culture or country might not necessarily work well in our culture. Policy makers should not simply transplant educational policies from other countries. The government especially policy makers have to assess the pros and cons and make decisions carefully and thoughtfully with long-term vision and planning. At present Taiwan enjoys good economic development, infrastructures, technology, and quality workforce with universal college education. Quality of teacher education is high, and education is highly valued. People work hard to make Taiwan a better place to live and raise the next generation. Despite the challenges, risks can be perceived as opportunities for the country to continue to work on, and with the belief that with improved government efficiency and people's united efforts, the goal to assure sustainable educational development and maintain national competitiveness is not beyond its reach.

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# INTERNATIONAL HIGHER EDUCATION IN THE 21ST CENTURY

Dr. Saqlain F. Halim

*The chapter discusses the 21st century postsecondary education landscape by highlighting the current and persistent challenges, implications for higher education in the 21st century and beyond, type of knowledge and skills higher education students will need for employment and to be successful in the 21st century, teaching and learning in higher education institutions in the 21st century, imperatives of higher education institutions for meeting the demands of the 21st century students and their employment needs, recommendations for government and policy makers as well as for university leaders on how best to develop an ideal higher education institution that is capable of meeting the needs of the students of the 21st century.*

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2. Knowledge and Skills Necessary for Success in the 21st Century Labor Environment
3. Recommendations for Governments and Education Policy Makers
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5. Conclusion
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## BACKGROUND

The world is rapidly changing and this has a direct implication for postsecondary education the world over. The needs of all educational stakeholders are similarly changing and, therefore, accordingly pose ever changing challenges for educational institutions. In global knowledge economies, higher education institutions are more important than ever as mediums for a wide range of cross-border relationships and continuous global flows of people, information, knowledge, technologies, products and financial capital. (OECD, Volume 2, 2009).

As the 21st century brings new ideas, generates new demands, and shapes the future of education, higher education institutions face many challenges that require new thinking, new approaches, and new strategies in order to compete and survive in the new environment. Demands of changing times are many and institutions of higher education would have to be prepared to adapt, innovate, and excel to be relevant. Some of the pressing and persistent challenges are the following:

## INCREASED COMPETITION

As a consequence of globalization and market forces, all educational institutions especially at tertiary level face increasing competition to remain relevant and to survive. Adaptation and adjustments in organizational arrangements and program offerings are necessary for the institutions to maintain their clients and credibility. Some opt to offer more flexibility and increase more institutional and program choices in several jurisdictions as opposed to be one institution with one campus. This development provides both an opportunity and a risk for the institutions themselves.

## INTERNATIONALIZATION OF HIGHER EDUCATION

While student enrolment is decreasing in the developed world, an expanding global middle class and growing young adult populations in the developing world are increasingly demanding quality higher education both at home and abroad. This growing demand is pushing many educational institutions to increasingly tap into the international pool of students who are willing to pay to get what they need for employment and to cope with the demand of the 21st century.

## LACK OF CLEAR DIRECTION AND MANDATE TO COPE WITH THE NEW DEMAND

Confronted with multiple challenges, many a higher education institutions seem to have lost direction as they struggle to navigate the uncharted waters. As a result, they are increasingly mimicking their competition in terms of program offerings, online delivery, and internationalization without giving it much thought. Without a clear direction and mandate, it will be very difficult for institutions to survive or effectively compete in the international education market.

## RELIANCE MAINLY ON PUBLIC FUNDING

Higher educational institutions have traditionally relied heavily on government funding to sustain their operations and maintain status quo. Such heavy reliance on public funding has made institutions stagnant, inefficient, and complacent. However,

given the global financial turmoil, the governments, especially that of UK and the USA, have been reducing public funding to educational institutions which result in stiff competition among universities which have traditionally enjoyed generous funding support from the government. And since institutions have relied on such funding mechanism for years, many are now struggling to shake off their financial woes and to survive on their own efforts and initiatives. The fact of the matter is that they have no choice but to find ways to generate additional revenue in order to improve profitability and sustainability.

## INCREASING FEES AFFECT STUDENT ENROLLMENTS

To offset the impact of public funding cuts, many institutions have resorted to increasing the program fees thus shifting the financial burden to students. This move has in turn reduced the number of students interested in pursuing higher education because of two primary reasons: increased cost of higher education and lack of job opportunities. Also, the increased cost coupled with stricter visa regulations has turned many potential students away from western universities. An example of this would be an ever increasing number of Pakistani students pursuing higher education at Chinese universities because they are welcomed and treated nicely by the Chinese, low tuition and fees, easy to acquire student visas, and the possibility of working with Pakistani or Chinese companies doing business collectively on China-Pakistan Economic Corridor (CPEC) which is a collection of infrastructure projects worth $62 billion currently under construction all over Pakistan with Chinese investments

## IMPACT OF TECHNOLOGY

Although technological advancements are fast changing the higher education landscape and although many universities have rushed to add online contents to their programs, still many institutions have failed to find the right balance between online and in-class teaching. Massive Open Online Courses (MOOCs) have been attractive to many but the true results have yet to be seen as the sustainability of such courses is still in question. Higher education institutions must learn to adjust and cope with the challenges of adopting and applying technologies in order to remain relevant and can compete in the international markets.

## FOCUS ON THEORY WITH LITTLE OR NO PRACTICAL APPLICATIONS OF KNOWLEDGE IN THE REAL WORLD

Generally speaking, teaching and learning methods and approach at most institutions of higher learning remain focused on theoretical learning with no or very little applied contents. As a result, students are continuing to graduate with degrees but without the

abilities to apply what they have acquired from their programs or courses of studies in real life. As a consequence, a large number of university graduates find it difficult to secure jobs as businesses and industries expect graduates to be able to function effectively in meeting their demands.

## OVEREMPHASIS ON SPECIALIZATION WHICH CONSTRAINS CREATIVITY AND RESTRICTS ABILITIES TO TRANSCEND ACROSS NARROW DISCIPLINES

For years, institutions of higher education have been placing overemphasis on specializations which is evident from the varieties offered within a particular degree program. For example, business programs are made available with a wide range of specializations and a culture has been created by higher education institutions which make students feel that they are masters of the subjects when they specialize in a particular area.

The drawback of overemphasis on specialization has resulted in most students graduating without a broader understanding or view of the field of business administration as a whole. In other words, while the graduates may feel competent operating within their chosen area of specialization, they lack the overall management knowledge and skills to analyze the organization as a whole and make sound decisions for solving organizational problems and helping the organizations expand and grow.

## LACK OF INTERNATIONAL RECOGNITION OF ACADEMIC CREDENTIALS ACROSS BORDERS

We live in a globalized world with ever more individuals crossing international boundaries for work and studies. Although institutions are increasingly asking potential students to provide an equivalency for their academic credentials, the institutions have failed on their shared responsibility to help develop a system that takes such variances in to account. As a result, these institutions have given rise to private businesses that are in the business of assessing academic credentials for equivalency and individuals are required to pay fees to get their documents assessed.

The lack of a framework or a system to give recognition of diplomas and certificates as well as the problems concerning credit time for study or internships taken abroad discourages students from taking courses at certain institutions and causes delays in their studies. Students run the risk of losing credits within their curriculum or they may have to redo equal or similar courses already taken abroad. (UNESCO,2018). For example, over the years thousands of medical doctors who obtained their degrees from abroad have migrated to Canada only to discover that their academic credentials from

their respective countries of origin are not considered equivalent to the credentials obtained by graduates of Canadian universities and, therefore, are not allowed to work as doctors in the country. There exists a way through which such doctors might secure local approvals to practice medicines but the process involved is quite restrictive and time consuming.

## LAGGING REGULATORY ENVIRONMENT

A disconnect has been evident for years between how institutions have been operating on ground and how the higher education regulatory environment has always been trying to catch up. A growing number of institutions start to operate from more than one campus locally, regionally, and internationally, combined with multiple delivery mechanisms involving distance education, in-class instruction, and online education. This growing trend poses a more serious governance and regulatory challenge for bureaucratic and policymaking legislative structures in any given country. It is, therefore, evident that this whole area of regulation and accreditation needs a serious re-assessment and a more practical and realistic makeover.

## AGING POPULATION

The world population is not only aging but people are living longer which means people will be able to work long after their traditional retirement age. The governments in many countries have already started to consider increasing retirement age as is the case in United Kingdom where the state pension age is expected to increase to 67 by 2028 for both men and women. As a result, these longer living working people will need additional education and skills to keep them competitive and relevant with the changes in the marketplace. Education institutions have an important role to play to develop and deliver appropriate programs for these groups.

## TECHNOLOGICAL ADVANCEMENTS

Rapid technological advancements are putting increased pressure on educational institutions of higher learning to constantly evolve and grow. It is through technology that education has literally been made available to anyone anywhere as long as access to internet is possible. As an ever increasing number of institutions are blindly trying to offer their programs online, the real issue remains unaddressed; that is, the institutions now need to first figure out the right balance between the content of their programs as well as the delivery method for those programs.

## INCREASED WORKFORCE MIGRATION

A globalized world has resulted in an increased workforce migration not only between different countries but also within countries such as from rural to urban centers. This migrating workforce not only needs the professional skills but also need other skills such as linguistic, cultural, ethical, and change management skills to be successful in a new environment. This situation poses challenges as well as opportunities for educational institutions to adjust and adapt to meet the ever changing demand of their clients.

## INCREASED SAFETY AND SECURITY THREAT

In many countries educational institutions have increasingly become fertile grounds for gun violence, rapes, sexual harassment, etc. In view of these increased threats, each institution would need to have a carefully thought out safety and security plan for protecting all its students, staff, faculty, and its property.

# KNOWLEDGE AND SKILLS NECESSARY FOR SUCCESS IN THE 21st CENTURY LABOR ENVIRONMENT

With rapid technological advancements and demands of job markets, new skills and knowledge are required for graduates to be competitive in the world markets. Some of the skills university graduates will need to be successful in the 21st century are discussed below.

## GLOBAL CITIZENSHIP AND ETHICAL SKILLS

In an increasingly global environment, the students would need to be equipped with the knowledge and understanding of global citizenship and how to behave ethically across the countries. The students would need to learn, understand, and accept their rights, responsibilities, and duties as a global citizen, and they will also need to develop the much needed critical global ethical skills in order for them to make contributions and impact on communities, regions, and countries where they choose to live and work.

# MULTILINGUALISM

In the 21st century students would need to be multilingual to secure local and international employment as more and more businesses interact with foreign as well as local but diverse populations. For example, given China's rise as an economic superpower and expected to be the superpower of the world in the future, it is becoming increasingly important for students of higher education to learn Mandarin in addition to their native language and English. For instance, in cosmopolitan cities such as Vancouver, Canada, there are already three clearly marked languages that are sought by employers as they need professionals with English, Mandarin, and Urdu/ Punjabi capabilities to effectively operate in those specific markets. Another example is that of China-Pakistan Economic Corridor (CPEC), a multibillion dollar project that is prompting an ever increasing number of Pakistani students to learn Mandarin at institutions in Pakistan and China, hoping to work directly for Chinese companies doing business in Pakistan or working for Pakistani companies doing business with Chinese firms operating in Pakistan.

# MULTICULTURALISM

We are all individuals who do things differently in different parts of the world where we live. If we were to work or do business in another country, which has already become common and will only become more common in the future, we would first need to learn, understand, and appreciate other cultures in order to avoid multicultural pitfalls. This is also true for operating within a city as well where we have to work or do business with an ever increasing multicultural workforce. Therefore, students would have to learn, understand, appreciate, accept, and respect other cultures to be able to function effectively in an ever increasingly multicultural world.

# MANDATORY APPLICATION OF THEORETICAL AND APPLIED KNOWLEDGE

Students in the twenty first century would need not only theoretical knowledge to understand their chosen respective fields of study but they would also need to develop an ability to effectively apply the knowledge they have acquired. As a matter of fact, the industry will demand it from future graduates to successfully apply knowledge gained in the marketplace right from the 'get-go'. Students would need to fully understand and apply theories and concepts to be able to use those concepts across a broad range of situations and environments. Higher education institutions must redesign their curriculum, programs and course offerings to ensure the proper balance between theoretical knowledge and its application in a wide range of disciplines and subject matters.

## KNOWLEDGE AND SKILLS NEEDED TO MAXIMIZE THE BENEFITS OF INFORMATION TECHNOLOGY

In the 21st century all of us have to adjust to the many changes brought about by technological developments in our daily life. The future will bring ever greater technological changes and would, therefore, require students and professionals to adapt to such changes. This will be true for both students and their institutions of higher education to adapt quickly and use technology to their advantage in teaching, learning, research, development, management, etc. Otherwise, they will be left behind and will not be able to survive let alone complete with other institutions.

## PEOPLE SKILLS

In today's world, we find ever more people communicating with each other by texting and ever more businesses doing business online. As a result, one very important aspect of the human experience is being neglected and that is people skills. If the current trend continues, it is clear that there will be a whole generation which will lack people skills and those who possess such skills would be at an advantage. It is imperative that people skills must be effectively taught and students must acquire these skills as part of the requirements for graduation in whatever fields of studies they choose.

## ENTREPRENEURIAL SKILLS

In the 21st century there will be a need for students to acquire valuable entrepreneurial skills as individuals would be required to use entrepreneurial abilities in their daily work environments which prize and reward creativity and innovations for organizations and businesses to become effective and agile. These skills will also equip students with Effective use of technology in teaching and learning abilities to start their own businesses for greater financial rewards and to create wealth for their communities and country. Educational institutions must develop and offer entrepreneurial programs to their students as well as people who want to start their own businesses but lack the knowledge and skills needed to become successful entrepreneurs.

## EFFECTIVE COMMUNICATION SKILLS

Effective communication skills would be required on all fronts including speaking, listening, writing, and asking and answering questions, enquiries, or even business conversations in a variety of cultural contexts. With ever more texting and the use of information and communication technology (ICT), a lot of people are losing the formal writing skills as they use more and more informal form of writing. So, the

students would truly have to re-learn the art of effective communications and sharpen their skills to be effective communicators in the 21st century.

## TEACHING AND LEARNING IN HIGHER EDUCATION INSTITUTIONS IN THE 21ST CENTURY

Both teaching and learning go hand in hand; if one changes, the other must change as well to remain relevant. Higher education institutions have already changed over the years but would need to change even more dramatically to accommodate the ever changing needs of students and clients in the 21st century. Some of the key issues and suggestions for further considerations are discussed in the following sections.

## APPLIED TEACHING AND LEARNING OF SUBJECT MATTERS AND ACADEMIC DISCIPLINES

Higher education institutions must put an emphasis on applied teaching and learning because theoretical knowledge alone will not be adequate to equip students with the skills they would need. The institutions would need to ensure that applied contents are added to all programs they offer. Hence, they need to bring on board a faculty who possess not only academic credentials to teach but also real world practical experiences. They not only would have to teach their students the theoretical aspects but would need to also show them how best to apply the theories and concepts learned in classrooms in the real world - work places, business environments, and marketplaces. For this to happen, collaborative arrangements between academia and business and industry would have to be developed implemented, and institutionalized for the benefits of all.

## CONDUCIVE, STIMULATING, AND SAFE TEACHING AND LEARNING ENVIRONMENT

An ever increasing number of violent incidents are taking place at education institutions around the world. All students deserve a safe learning environment. All teachers deserve a safe teaching environment. And it is the responsibility of each institution to ensure a safe teaching and learning environment. Senior management teams at educational institutions would have to make safe teaching and learning environment a part of their strategic and operational plans.

## MARKET RELEVANT PROGRAMS AND TEACHING AND LEARNING PRACTICES

There has to be a connection between academia and the industry because in the absence of a strong understanding between the two, the academia will keep teaching irrelevant stuff thus shortchanging students because they would be graduating without acquiring market relevant knowledge and skills. A good collaboration between the two sides will keep academia informed of changing dynamics of the marketplace which then in turn could be used to modify programs and teaching thus resulting in learning by students that would be practical and relevant to their future employment needs.

While use of technology in higher education is a welcome development, many institutions are going about it in a rush to adopt technology without properly paying attention as to how much and to what extent of the technology is required. For example, while graduate students could undertake their business degree programs online, they will not benefit from such a program as much as another program that requires them to also attend classes and participate in class discussions with other students and executives. The knowledge and understanding gained through such discussions and friendships and partnerships forged through such interactions are simply priceless. Hence, the use of technology to enhance teaching and learning must take into consideration the needs of the learners as well as social, behavioral, and cultural aspects of teaching and learning as well.

## FAIR ASSESSMENTS OF COGNITIVE AND NON-COGNITIVE ASPECTS OF LEARNING

Each of cognitive and non-cognitive skills assessments captures distinctly different sets of competencies and thus presents a more comprehensive and a better picture of a student's abilities and competency across a broad range of factors. Therefore, a well-rounded model of fair assessments must be developed and put in place to fully appreciate each individual student's strengths. This could comprise of assessment across a wide range of elements such as tests, general level of motivation, integrity, interpersonal interaction, class participation, research papers, class presentations, internships, group discussions, etc.

## LIFELONG LEARNING AND TEACHING

With people living longer, it is essential to inculcate the spirit and essence of lifelong learning and teaching in institutions of higher educations. New programs need to be developed and new ways of teaching would have to be employed to offer opportunities

for lifelong learning programs that are relevant to the needs of adult populations and enable them to acquire knowledge and skills they need in an interesting or even entertaining manner. This means that teaching and learning methods and environment must be used to keep the adult student population interested and motivated to acquire the skills they need.

# RECOMMENDATIONS FOR GOVERNMENTS AND EDUCATION POLICY MAKERS

In order to help institutions become better in coping with the demand of the 21st century and to enhance the value of education and degrees awarded in order to increase benefit s of their education graduates, it is essential that governments and policy makers adopt the following strategies both at institutional and national levels: Adopt International Platform for Recognition of Academic Credentials

Academic recognition is a major problem for many students especially those graduating from developing countries. For instance, a large number of doctors, from developing countries, who have been immigrating to Canada over the years, discovered that their respective medical degrees were not acceptable in Canada. As a result, many have given up their medical profession because they considered it very difficult to meet local requirements in the absence of any clearly regulated path. This is such a waste of talent, time, energy, and resources.

Moreover, increased mobility of staff and students is now a common trend with ever more students moving abroad to obtain and enhance their academic credentials. As a consequence, the comparability, recognition and quality assurance of qualifications has become a growing area of concern, in particular in countries where administrative systems are weak. At the same time, mobility in tertiary education is an asset and an opportunity and should be enhanced to develop students' competencies and global competitiveness. (UNESCO, May 21, 2015)

It is therefore essential that all degree programs and degree requirements of educational institutions in various parts the world are standardized in such a manner that they are fully compatible with other institutions of higher education around the world. This will ensure that degrees awarded in one country become academically compatible with degrees awarded elsewhere in the world. For instance, the benefit of studies abroad is widened with the evolution of the European Credit Transfer System (ECTS), as students find it easier to have courses fully recognized in their degree.

Still, the lack of bilateral and multilateral agreements on the issue of recognition of qualifications appears to be of crucial importance for the validation of Eastern

European diplomas in Western Europe. Great effort should be put into solving this urgent problem. (UNESCO, 2018). Given the fact that educational institutions are becoming internationalized, it is recommended that degree standardization takes place at the international level perhaps under the aegis of United Nations Educational, Scientific and Cultural Organization (UNESCO). This will ensure that all university programs meet the same standardized criteria and, therefore, carry the standard acceptance as an internationally compatible program.

## INSTITUTIONAL REGISTRATION AND ACCREDITATION

In many countries registration and accreditation are considered separate functions which create a dilemma for both students and institutions. For instance, one can register a university in California and start awarding degrees but the degrees would not be considered accredited and, therefore, not accepted by many others. In this case, one needs to seek accreditation from an accrediting body that is registered with the department of education of the concerned states and/or countries.

In order to facilitate the matters, a two-part recommendation may be considered. As a first step, it would be prudent, to establish one regulatory body in a country and/or in a province/state that registers and accredits all institutions of higher education. For example, New Zealand Qualifications Authority is a regulatory body in New Zealand that is responsible for approval, registration, and accreditation of all tertiary education institutions. Similarly, the Degree Quality Assessment Board in the province of British Columbia, Canada, operates within policy direction set by the Ministry of Advanced Education and oversees the quality assurance process for degree level programs within British Columbia.

## INTERNATIONALIZATION OF ACCREDITATION

As a second step, it is recommended that the whole area of institutional registration and accreditation should be made at the international level perhaps under the aegis of UNESCO with respective education departments of each country acting as the eyes and ears of UNESCO on ground. The world is fast changing and educational institutions are quickly going international and although they are registered and accredited in their home countries, they end up operating in different regulatory environments by going international. It is for reason why it is recommended that institutional registration and accreditation work be made international. The purpose is not to create a new bureaucratic set-up but to establish a global regulatory body with a simple, straightforward process which clearly spells out the criteria and then ensures that the same is met by each applicant institution before a stamp of approval is granted. An arrangement such as this will forever remove the problem of international recognition and acceptance of academic credentials.

Moreover, the whole registration and accreditation process should be combined into one package. In other words, when someone applies for establishing a postsecondary institution, the regulatory body must evaluate the proposed institution simultaneously on both fronts, that is, registration and accreditation. In doing so, the newly established institutions will be both registered and accredited thus providing the much needed recognition to all degrees offered. This will be the best way to provide consumer protection from 'Day One' which, in turn, would greatly help students and graduates with their academic credentials recognition. All institutional and accreditation rules must be applied to all public and private institutions for consistency.

Given the rapidly changing dynamics of the education environment, it is important that the regulatory body remains in constant touch with all stakeholders in order to understand and to keep pace with the emerging trends in postsecondary institutions especially with regards to how the delivery of programs takes place and where it takes place. It is important to know this because only then the regulatory bodies can innovate and come up with systems and processes to register and accredit institutions and programs with delivery through multiple channels and at multiple locations around the world.

## HIGHER EDUCATION INSTITUTIONS AS SAFE AND SECURE PLACES OF LEARNING

There are an ever increasing number of incidents taking place at institutions around the world that involve sexual harassment and violence. In order to counter such a negative and dangerous trend, it is recommended that safety and security of learning places and all its stakeholders must be made a part of the whole institutional registration and accreditation process. In other words, the regulatory bodies will provide directions and institution heads will lay down the instructions and specific steps and protocols in place to ensure safety and security of all students and other institutional stakeholders at all times.

It is recommended that a zero-tolerance policy must be exercised by regulatory bodies and institutions must adhere to the same. All complaints involving sexual harassment, rape, or other violent behavior must be taken very seriously and the moment a complaint is received against a student for committing such an offense, the student in question must be immediately removed from the campus and kept out until a thorough investigation by the relevant law enforcement authority is completed and necessary legal actions taken. It is imperative that safety and security of all institutional stakeholders and its assets is ensured.

Moreover, in conflict zones around the world, the safety and security issue takes on a whole different meaning. Stakeholders should make every effort to ensure that education institutions are protected as zones of peace, free from violence, including school-related gender-based violence. Special measures should be put in place to protect women and girls in conflict zones. Schools and educational institutions – and the routes to and from them – must be free from attack, forced recruitment, kidnapping and sexual violence. Actions must be taken to end impunity for persons and armed groups that attack education institutions (UNESCO, May 21, 2015). It is evident that governments and institutions would need to work hand in hand to ensure safety of all stakeholders.

## SIMPLIFIED STUDENT AND FACULTY VISA PROTOCOLS

In order to develop and implement well thought out simplified student and faculty visa protocols, it is recommended that:

- The visa application and approval process should be simplified not only for foreign students and international faculty. Educational institutions should also actively interact with their counterparts in other countries and encourage them to do the same so that the citizens of one country benefit from the simplified process when they go abroad for further studies or for working in a new country.
- Countries should introduce post-study work visa so that the graduates can gain valuable work experience while actively learning and applying global citizenship skills. It will also help each country with valuable additional workforce that is well educated, competent, and broad experiences obtained from other countries.
- Countries may consider offering a viable path to permanent residency and citizenship to international students and faculty. In doing so, it will make a country a magnet for well-educated and competent young and experienced workforce.

# RECOMMENDATIONS FOR UNIVERSITY LEADERS AND ADMINISTRATORS FOR THE DEVELOPMENT OF AN IDEAL INSTITUTION OF HIGHER EDUCATION

In order to develop an ideal institution of higher education that not only meets but exceeds the expectations of all its stakeholders, there are a series of factors that must be addressed in an effective manner by university leaders and administrators. In order

to facilitate such matters, a framework is discussed below for an ideal higher education institution that lays out specific steps that should be taken to get to the desired level along with a rationale for accomplishing the desired objective.

## VISION AND ACTION

The 21st century requires bold and strategic vision, leadership, and actions. This requires leaders to recognize the need for constant change, create a new bold vision, and rally everyone around it. Leaders should not be afraid of current challenges; instead, they should embrace them courageously and be inspired by them to rise up and deliver required solutions. Leaders must give meaning to their institutions and develop a bold vision for the future for their institution that leverages all of the available resources while deploying intellectual strength and capacity for the benefit of humanity.

Leaders must create an institutional brand that highlights their institutional optimism against all odds, continued resilience against all challenges, becoming an institution bursting with confidence, initiative, and boldly delivering quality education that is relevant while actively encouraging not just knowledge generation but also the application of knowledge across the board. The institution must be a living organization that is filled with contagious energy and promise, embraces in true letter and spirit diversity including women and minorities, where everyone is respected for who they are and the minds are made to think freely, critically, innovatively, and become liberated while students are transformed into responsible, respectful, and ethical global citizens and leaders.

True leaders must shun the obvious short-term temptations and instead have the courage to continue to evolve, develop, and grow while taking the long-term view. They need to bring everyone to the table; help them see the institutional big picture, and inspire them for action. Leaders must initiate change, bring about an organization wide behavioral change, and then make this change permanent by making it a part of your institutional culture. Such a change will lead your institution to its full potential for all times to come.

## COST EFFICIENCY

Always find ways to increase cost efficiency. In most cases there is a lot of waste which most institutions do not even realize that they are taking valuable funds and scarce resources away from other more important areas. The simplest way forward is to take a good hard look at everything an institution does and uses starting from human capital to simple office stationery in order to identify hidden and problematic waste areas.

A case in point: Cornell University in the United States has been working to lower its operational costs. It is doing so by negotiating with suppliers for better deals and has already successfully renegotiated business deals on ordinary items of daily use such as bulk paper and printing supplies including toner, and copy paper. The university expects to save $30 million from its efforts in the area of procurement alone.

Another example is that of University of California at Berkeley. In its effort to secure major cost savings, the university has opted to reorganize its administrative structure. After a systematic analysis and thorough assessment, the university has successfully eliminated about 300 administrative positions from its organizational structure. It is expected that the overall institution wide change will save the university $20 million a year.

As leaders undertake reorganization of administrative structures, they should pay close attention to the number of direct reports each of the supervisors oversees as it is a widespread phenomenon where a large number of supervisors across universities oversee only a very few direct reports thus adding unnecessary financial burden to the institution.

Apart from reorganization of administrative structures and cost savings through effective procurement, there are still a wide range of other options that enable leaders to save costs and improve institutional profitability simultaneously. Some common but effective cost savings include the use campus during summer to generate additional income, making curriculum more efficient by offering carefully chosen fewer program and course choices, using faculty resources effectively while utilizing each member's strengths judiciously, reducing redundancies in operations, and improving operational efficiency and effectiveness through automation of daily institutional operations such as admission applications, registration for classes, submitting expense reports, and purchasing supplies, etc.

It is important for leaders to stay focused on cost efficiency but not at the expense of quality. In other words, do not overdo it. Leaders must not forget that cost efficiency is an important step towards keeping their institution profitable and self-reliant.

## LOWER TUITION FEES

There is always a temptation to increase tuition fees to improve profitability; however, instead of increasing tuition fees, an ideal institution of the future should be lowering tuition fees in order to make higher education accessible to ever more desirous students. This can be easily achieved by managing the institution in an effective manner as discussed in this Chapter.

Most public universities generally follow a varying tuition fee structure that offers the lowest tuition rate to the local state/province residents, a little higher rate to the national students, and then international students are charged the highest tuition rate that is several times more than the rates charged under the other two categories. For example, international students pay $34,847 per year for an undergraduate arts degree at the University of British Columbia (UBC) which is almost seven times higher than the tuitions fee of $5,189 per year charged from a domestic student. Keeping the stated fact in mind, many universities are now turning to international students to make up for the decline in public funding.

However, it should be noted that there are more than 130,000 international students studying in the province of British Columbia in Canada. These students are estimated to contribute over $3.5 billion to the provincial economy and creating 29,300 jobs as a result. It is estimated that international education is considered to add $11 billion annually to the national economy. In other words, international students are not only helping universities generate money but they are actually making a huge impact on local economy as well.

Although it is very tempting to charge very high tuition fees from international students, the fact is that it is not only a form of discrimination but it also unnecessarily creates a financial hurdle which many desirous and capable international students cannot overcome. It should be kept in mind that most international students are funded by their parents and in many cases, the parents end up selling their property or other valuable possessions to fund their children's education abroad. Higher education institutions should realize that by charging inflated tuition fees from international students, they are actually hurting not only the students but their whole families as well.

It is, therefore, recommended that institutions should charge a standard, reasonable tuition rate from all students irrespective of them being local, national, or international students. There are a number of advantages in pursuing this strategy. The institution will be considered ethical and fair and this will go a long way towards establishing its brand both locally and internationally.

It will make higher education accessible to a large number of students who otherwise may not be able to afford higher education that eventually will contribute to the global economy.

The institution will attract a lot more international students than what it currently has and this increased volume will help it generate more funds than what it is currently generating. The increased number of international students will enhance their financial impact on local, province/state, and national economies by billions of

dollars more while creating thousands of additional jobs. It will improve and solidify the multicultural component in the classrooms thus providing the institution with a better opportunity and an environment conducive to teaching global citizenship skills.

## INNOVATIVE REVENUE GENERATION

There are always ways to generate additional revenue streams apart from the traditional tuition fees alone. Leaders must be creative and always consider a wide range of any number of options that give the institution a chance to generate additional funds for institutional self-reliance, growth, and expansion.

It is imperative that in the 21st century higher education institutions must come up with multiple additional revenue generating streams such as consulting, special training and consulting package for family owned businesses (especially SMEs) that require management assistance, international partnerships and direct investments in international education markets, market relevant research, business incubators, innovative programs for lifelong learners, business partnership with students (in their business ventures), and technology development and taking it to the market, etc. Leaders must transform their institutions into entrepreneurial juggernauts that creatively generate increased profitability while delivering quality education in a win-win and ethical environment for all stakeholders.

## ROBUST AND AGILE

Given the very fast changing international education scene in the 21st century, it would be prudent for the institution to remain flexible and quick to change the number and types of programs offered or how, when, and where they are offered. Leaders can achieve this by remaining in close contact with industry on an ongoing basis, securing feedback from students on their changing learning needs, learning from industry on changing needs of the workplace, continuously developing market relevant programs, and then making these programs available to meet the need of clients in the most effective manner.

Leaders must bring about a university wide behavioral change that creates an environment conducive for constant change, adjustment, and growth, and then maintain this change by making it an integral part of the institutional culture. Each and every member of the institution must become a change agent, always thinking of innovative ideas to help grow the institution while meeting the needs of students and employers alike. Leaders must be bold and courageous and develop a mechanism within their institutional structure that is free of bureaucratic hurdles and allows fast

tracking of all new ideas from inception to discussion, from making a decision to bringing about a rapid organizational change, and finally, the swift implementation of the desired change. There must not be any room left for procrastination.

## QUALITY ASSURANCE

Quality is the cornerstone of any educational program and institution of higher learning and, therefore, every effort must be made to develop and deliver quality programs that exceed requirements and expectations of the 21st century clients. This means that effective quality assurance mechanisms must be developed and effectively deployed. Many institutions in both developing and the developed countries are simply giving passing grades to students to move them along with the hope of attracting more students. This practice must end and institutions must instead develop support mechanisms for students requiring additional help to bring them to the desired achievement level without compromising quality and integrity of the institution.

The quality assurance system must extend not only to program coursework but teaching, learning, and the outcomes both in terms of learning achievement as well as applied achievement in the shape of securing jobs or starting own enterprises upon graduation. Leaders must create an institutional culture which prides itself in quality in all aspects and does not pursue quality only to meet the requirements established by respective regulatory and accrediting bodies. Students, as the main participants in higher education, are experts in comparing different sorts of education, the use of teaching materials, and didactics employed by faculty. As the institution benefits directly from high quality education, it is in its own interest to expand its activities in the field of quality review. Students need to play an important role in the quality review and should therefore be part of the different official evaluation committees (UNESCO, 2018). This practice will ensure quality assurance across the institution and will make it a sustainable commodity as well.

## INTERNATIONALIZING PROGRAMS AND SERVICES

For institutions to be effective and prosperous, it is absolutely necessary for them to internationalize their programs and services. Recognizing the need and significance of international higher education, there are many countries that have made it easier for international institutions to establish their operations.

For instance, Dubai International Academic City (DIAC) is a Free Zone dedicated exclusively to higher education, covering an area of 25 million square foot. It currently hosts 25 international universities, serving an international community of over 24,000 students representing 145 nationalities. DIAC based institutions enjoy a range of special

privileges such as 100% foreign ownership, 100% tax free income, 100% repatriation of profits, and simple and straightforward visa issuance protocol for students, faculty, and staff. DIAC offers a self-contained environment offering restaurants, cinemas, gyms, sports grounds, and hostel accommodation. Setting up their operations at DIAC is considered to be a seamless and simple process as it allows the institutions the option of establishing a Free Zone Limited Liability Company (FZ-LLC), Branch of a Foreign/UAE Company, or as a Freelancer.

As an ideal institution of the 21st century, the institution must have a solid international footprint. Higher education institutions must get over their fear of internationalization and instead get into international markets either through direct investment or through international partnerships and delivery of programs. Not just that, the institutions must offer a streamlined process for international students who may wish to study in several countries before earning their academic degrees. This could be achieved through satellite campus presence in several countries either through direct involvement or through partnerships with local partners. Students would pay fees prevalent at the local campus in any given country thus providing students with a cost advantage which in turn will attract more students to enroll at their institutions.

## GLOBAL RECOGNITION

As educationists and administrators, leaders owe it to their students that not only their institution is internationally recognized but also when they graduate, they walk away with an academic degree which has global recognition. It is, therefore, highly recommended that the institution ensure that every single program offered is globally recognized through active representation, quality assurance mechanisms, and effective placement of graduates in the global marketplace. This should be ensured and achieved by acquiring all the relevant registration and accreditation approvals along with direct contacts with foreign governments, international institutions, and the employers of graduates.

## INFORMATION TECHNOLOGY

Within a higher education context, there are two distinct areas where information technology will play a critical role. Firstly, institutional interest in using technology to further its mission and its business where technology is used as a tool to stay competitive, cost effective, responsive, and to deliver tangible results.

Secondly, there is an ongoing change that is being felt by everyone in the society overall. In the 21st century rapid developments in technology will make future students to

enter universities with specific expectations relating to how best the institutions will integrate technology in learning so that they can continue to live and work within their technology driven lives in the global society.

An ideal institution of the 21st century will strike a harmonious balance in the use of technology on all fronts across the whole organization. It is, therefore, pivotal for leaders to take all efforts to fully understand the role and scope of information technology in both contexts and appropriate actions must then be taken on multiple fronts to gain maximum advantage for all stakeholders.

It would be prudent to improve digital literacy by creating an institutional culture where all stakeholders treat technology as a useful tool. It is recommended that the institution helps its students to develop a deeper understanding of digital environment with all its possibilities, educate them on safety and digital citizenship including responsible use of technology, guide them on proper and respectful online communication etiquette, and teach them to learn and understand their digital rights and responsibilities in all learning settings.

With appropriate use of technology, leaders can transform their institutions into learning environments that promote curiosity of mind, creativity through imagination, experimentation through bold moves while challenging status quo, and team work that transcends national boundaries. Institutions must bring together formal and informal learning, develop flexible programs that provide credit for prior learning and competencies gained through work, life, or extracurricular experiences, and encourage lifelong learning.

While technology has made it easier for student groups defined by socioeconomic status, race, ethnicity, or gender to have access to education, there exists an achievement gap between enrolment and academic performance. Also, significant issues of access to education and technology, and equity remain. It is highly desirable that every effort must be made to overcome these issues of achievement gap, equal access, and equity. Institutions can advance digital equity by ensuring equal access to technology. Perhaps as a matter of policy, the institution can and should provide a laptop to each and every student at the time of enrolment. This feat can be achieved at a minimal cost by dealing directly with a supplier thus gaining a considerable price advantage based on volume. Moreover, it can also make use of open educational resources that could provide cost savings to students. One option is developing and offering online and blended programs with personalized and adaptive learning strategies that will help improve retention.

In the face of technological changes that are coming about at a very rapid pace and consistently impacting educational needs of students and software and device

requirements, it is important for higher education institutions stay organized and current with ever changing and ongoing developments. While it is an established fact that technology helps both the quality of learning as well as institutional operations, the swiftly changing technological landscape makes it difficult to keep up. It is, therefore, essential that leaders carefully think through their institutional technology policy while ensuring that their institutions have a good set of back-up plans before making any large scale investments.

Leaders need to rethink the role of educators especially in view of the fact that learning is shifting towards students being in greater control thus dramatically changing the role of educators to that of guides and facilitators of education. It is, therefore, recommended that leaders help educators and faculty transform their teaching practices with creative use of technology.

## GLOBAL CITIZENSHIP

In order to be a well-educated global citizen in the 21st century, one must first learn and understand the opportunities and responsibilities that come with it. Higher education institutions have an important role to play to promote global mindset and openness to accept and learn from citizens of the world. One way to achieve this goal is to increase the number of international students at their institutions especially in multinational and multi lingual classrooms so that students from different cultures and different parts of the world can learn from each other. Higher education institutions must cherish opportunities to prepare their students for global citizenship by teaching them about other cultures, languages, customs, traditions, ethics, and belief systems. This can be achieved by employing competent, open-minded, and flexible faculty that must undergo a specific training for teaching global citizenship skills.

The trained faculty then must engage students, teach them critical thinking skills, and help them understand differences among culturally diverse student population. They must initiate awareness among their students about being a part of the global community and what it means to be a global citizen with all its opportunities, responsibilities, and ethics across borders. The faculty must instill in their students a sense of self-respect and respect for others and their differing perspectives. It would be prudent and desirable to create an exciting teaching and learning environment where global aspect is added to every course offered so that students acquire the much needed global citizenship mentality and skills and also learn how best to employ these skills in the international marketplace as global citizens.

## GENDER EQUALITY

According to a study conducted by UNESCO, women make up the majority within the tertiary student count in two-thirds of countries with available data. However, men have a distinct lead in doctorate degree level education and research. Based on the data available, 56% of PhD graduates and 71% of researchers are all men. Although there are many women who have taken up teaching positions at universities, women's presence in senior leadership positions at institutions of higher education remains disproportionately low as compared to their male counterparts.

In order to develop an ideal institution of higher learning where everyone is represented and treated equally and fairly, it is highly recommended that higher education institutions not only aggressively promote gender equality in student enrolment but also in faculty and staff. Appointing more women to institutional leadership positions will go a long way in encouraging an even greater number of women to choose an academic career. It is highly desirable that higher education institutions develop an institutional culture that recognizes the stated fact. This will enable the institutions to transform themselves into an institution that believes in and ensures gender equality in every sense of the word while providing a respectful learning environment for all.

## SUSTAINABILITY

Higher education institutions must make sustainability a part of their curriculum and methodically engage the students, staff, and the communities. In this respect it is recommended that the institutions help their students develop a better understanding and then encourage a behavioral change to develop better habits. For instance, throwing a challenge at them by sharing with them the challenges facing the university and the wider world and asking them to propose solutions. Higher education institutions must also understand the power of social media and use it as an effective tool to keep everyone engaged. They must also create their own environmental message which accurately depicts their institutional aspirations and achievements.

## SAFE TEACHING AND LEARNING ENVIRONMENT

An ever increasing number of violent incidents are taking place at institutions around the world. All students deserve a safe learning environment and all teachers deserve a safe teaching environment. And it is the responsibility of each institution to ensure a safe teaching and learning environment for its students and personnel. The senior management teams at educational institutions need to make safe teaching and learning

environment a part of their strategic and operational plans. Leaders should involve all institutional stakeholders and make safe teaching and learning environment a part of their institutional culture while providing private and secure mechanisms for everyone to report a crime without any embarrassment or fear.

It would be prudent to create trust and pride within the institutional culture, develop and implement proper protocols, and exercise a zero-tolerance policy towards all those who violate or threaten students, faculty, and staff in particular, or the overall teaching and learning environment in general. Higher education institutions must make everyone including students, administrators, staff, and faculty a part of this effort so they can all work collectively to identify a situation before it becomes problematic. Identify and report immediately as and when an unwanted activity takes place. Everyone must feel confident that once a crime has been reported, an effective, prompt, and swift action will be taken by institutional administration to hold the culprit accountable as per the existing rules, regulations, and the law while fully protecting the victim.

# CONCLUSION

Changes are sweeping the 21st century in all spheres of lives. For higher education institutions constant change must not be viewed as an obstacle; instead, it should be taken as an opportunity to continue to innovate and compete in the global market while delivering higher education that is both relevant and quality focused. Although, at times, the challenges an institution confronts might seem insurmountable, far sightedness, persistence, and resilience coupled with flexibility and adaptability can help institutions easily overcome all these obstacles.

The best way forward would be to transform institutional culture into a lively force where change is viewed as part of daily life and not something extraordinary. So, leaders take all institutional stakeholders onboard, bring about an institution wide change, embed it for permanence, and then reinforce it every day by keeping a watchful and critical eye on latest developments all around. This will ensure that the institution operates as an ideal international institution of higher education in the 21st century and all times to come.

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# INDIAN EDUCATION SYSTEM: STATUS, CHALLENGES AND WAY FORWARD

Prof. Rajesh P. Khambayat, Ph.D.

*This chapter primarily focuses on India's evolving education system and present demographic trends followed by an analysis of the issues, challenges in education. It, discusses the new policy initiatives, and approaches to education development and entrepreneurship for youth at both national and state levels. India is taking necessary initiatives to enhance the status of the education system in preparing its youth for the future. It is formulating the new national policy for education to bring more clarity to edifying reforms, which is highly desirable given the multidisciplinary nature of the education agenda and to meet the challenges of the future.*

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# BACKGROUND

The essence of national growth and development requires a sound foundation of education, as it plays a significant role in balancing the socio-economic fabric of the country. As people are most valuable resources, the billion-strong nation needs the nurture and care in the form of basic education to achieve a better quality of life. This warrants an all-round development of people, which can be achieved by building a good quality education that elicits growth and prosperity of the individual as well as that of a nation.

Currently, with more than 1.4 million schools and more than 230 million enrollments, the Indian school education system is one of the largest and most complex in the world. The intricacy of the system stems from India's need to maintain standard and equality, while giving scope for its diverse culture and heritage to grow and flourish across the length and breadth of the country. The best thing about the education system in India is that it prepares the foundation of a child's education very neatly by giving equal importance to the basics of all subjects in the early stages of education. After becoming independent India has worked hard to provide access to almost all its young people, but it has only just begun to focus on aspects of quality and seek to improve learning outcomes.

To create competitive advantage, investment in improving the quality of education will be the key to build a pool of the abundant competent workforce to be sustainable over the long term. With a new demographic profile and over 3.5 million graduates and postgraduates that are added annually to the talent base no other country offers a similar mix and scale of human resources. For this, there is a need to make curriculum and pedagogy relevant to the needs of society and the economy. There is a need to nurture the qualities of problem solving and creative thinking, learning-by-doing, greater engagement with the present context, and confident self-expression from a young age. The entire education system is under by the Ministry of Human Resource Development (MHRD) which works through two departments: The Department of School Education and Literacy and Department of Higher Education.

In recent years, the ministry has taken many initiatives and adopted fresh approaches to meet the challenges it faces. The initiatives are expected to ensure that all the goals with the right value system, sensitivity and responsibility are achieved. The various policies and programs of the ministry have successfully enabled the access to quality, inclusive, affordable and meaningful education to children and the people across the country.

# OVERVIEW OF INDIAN EDUCATION SYSTEM

The Indian education system has a long and rich history. The country has a diverse culture and one of the largest democratic entities and is equally vast. Receiving contributions from both public and private sector players, the system is complex, and in many an aspect, superficial. Moreover, like its culture, the Indian system of education dates back many a century. In the post-independence era, the education system in India was divided into the various subsystems - pre-primary, primary, elementary, secondary, undergraduate and postgraduate. Both the central and the state governments manage the overall control of the system.

The Indian school education system is one of the biggest and most multifaceted in the world. Given below is an overview of the Indian School Education System. The overall structure of India's education system mainly comprises of three distinguishing stages as shown below.
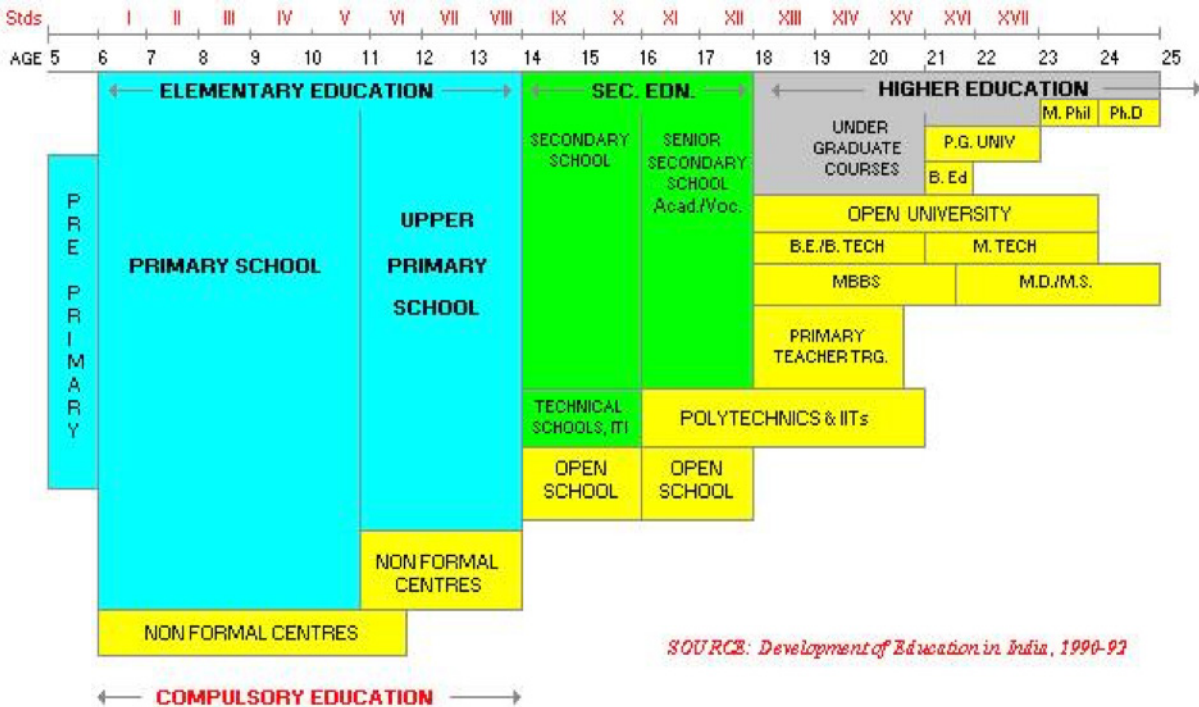


*Figure 1. Indian Education System. Note: Diagram from India Times (n.d). Retrieved from: https://www.indiatimes. com/news/world/indian-education-systems-291688.html#2*

*Table 1. Stages in Indian Education System*

| Education | School/Level | Grade From | Grade To | Age From | Age To | Years |
|-----------|--------------|------------|----------|----------|--------|-------|
| Primary | Elementary School | 1 | 8 | 6 | 14 | 8 |
| Secondary* | Secondary School | 9 | 12 | 14 | 18 | 4 |
| Tertiary | First University Degree (Bachelor's) | 12 | 15 | | | 3 |
| Tertiary | First University Degree (Engineering & Technology) | 12 | 16 | | | 4 |
| Tertiary | Second University Degree (Master's) | 15 | 17 | | | 2 |
| Tertiary | Doctoral Degree | 17 | 22 | | | 5 |

*\* Includes Standard X and XII - Secondary School or Senior Secondary School*

According to the 'BRIC' report, released by Goldman Sachs, India is projected to become one of the leading economies in the world . Education was identified as a key enabler for India to achieve these projections. However, lack of an education system may have a debilitating impact on India's efforts to achieve the anticipated growth. Demand-driven education and training, both in the formal and informal sectors can become a driving force for an effective contribution in the national development of the country.

## PRIMARY EDUCATION

Primary and Middle (lower primary (Standards I to V) and Upper primary (Standards VI to VIII)) education is compulsory and free in India. Primary education begins at age six with Middle/Upper Primary school education ending at age 14. Schooling is offered at state-run and private schools however, private schools often have poorer facilities and infrastructure than government schools. The regional language is the medium of instruction for most primary schools and English as a second language generally begins by grade 3.

## SECONDARY EDUCATION

Secondary education begins in grade 9 and lasts until grade 12. The secondary stage is broken into two, two-year cycles generally referred to as General/Lower Secondary School, or 'Standard X', and Upper/Senior Secondary School, or 'Standard XII'. Education continues to be free at government schools, although private education is more common at the secondary level. Public examinations are held at the end of both cycles and grant access to grade 11 and university level study, respectively. General curriculum for lower secondary school in India consists of three languages (including the regional language, an elective, and English language), Mathematics, Science and Technology, Social Sciences, Work/Pre-Vocational Education, Art, and Physical Education. Secondary schools are affiliated with Central or State boards which administer the Secondary School Certificate at the end of grade 10.

Based upon performance in the first two years of secondary school, and upon the SSC results, students may enter Senior/Upper Secondary School. Upper Secondary School offers the students a chance to select a 'stream' or concentration of study, offering science, commerce, and arts/humanities. Secondary education is administered either in schools or in two-year junior colleges, which are often affiliated with degree-granting universities or colleges. The respective boards of secondary education (at present there are 31) determine the curriculum for the Higher Secondary Certificate Examination. Although the HSCE is the most common Standard XII examination, the All India Senior School Certificate (CBSE), Indian School Certificate, Certificate of Vocational Education (CISCE), Senior Secondary Certification (NIOS), Intermediate Certificate and the Pre-University Certificate are also offered.

## VOCATIONAL EDUCATION

Young people who do not wish to go on to tertiary education, or who fail to complete secondary school often enroll in privately owned vocational schools that specialize in just one or only a few courses. Unlike in the other developed countries, vocational and technical education is not highly specialized and is rather a broad overview of knowledge applicable to employment. The curriculum offered is composed of a language course, foundation courses, and electives, of which half of the electives are practical in nature. The Sector skills councils and State Boards of Vocational Education conduct examinations for vocational education at the end of the year.

## TERTIARY EDUCATION

India's higher education system is highly centralized and undergoing large changes since its inception in 1947. Largely based upon the British system of education,

educational policy is ever evolving. University education is overseen by the University Grants Commission (UGC), which is responsible for the development of higher education, allocating funds, and recognition of institutions in India. The National Accreditation and Assessment Council (NAAC) was established by the UGC to assess universities and college based upon an alphabetical ranking system ranging from A++ to C. The assessment and Accreditation is broadly used for understanding the Quality Status of an institution and indicates that the particular institution meets the standards of quality as set by the NAAC. Participation in the accreditation process of NAAC is voluntary.

The All-India Council of Technical Education (AICTE) was also established to oversee quality control of technical education and regulate the establishment of new private professional colleges. All recognized universities are members of the Association of Indian Universities (AIU), which is integral to the dissemination of information and serves as an advisor to the government, UGC, and the institutions themselves.

There are various types of tertiary institutions in India, namely Universities (Central, State, Open), Universities of National Importance, and Deemed universities. Instruction of the majority of students, almost 80%, is completed at affiliated colleges with the curriculum, examinations, and final degree being designed and granted by the university. Constituent and Autonomous colleges also exist, though less common, although they do enjoy greater autonomy in regards to curriculum development and assessment.

Access to undergraduate courses generally requires completion of the Standard XII years of schooling and admittance to university depends almost exclusively upon performance on the examination. Bachelor's degrees in the fields of arts, science, social studies, and commerce are almost exclusively three-year programs. Diploma programs exist and range from 2 – 3 years in length and are provided at polytechnics, usually in a specialized engineering or technological field, and culminating in an Advanced or Post Diploma. Professional Bachelor's degrees, in the fields of Medicine, Architecture, Law, etc., vary from 4 – 5.5 years, depending upon the discipline.

Admission to graduate (Master, Post Graduate Diplomas, MBA, etc.) programs are dependent upon completion of a bachelor's degree (3 or 4 years, depending upon the subject) with a Second Class pass or higher. Non-university education in Management is popular in India, with many institutions offering Post Graduate Diplomas in Management, lasting 2 years and generally equivalent to an MBA. Doctoral level degrees require a minimum of two or three years and consist of research and a thesis or dissertation.

Beginning in 2015, the Choice Based Credit System (CBCS) was introduced by the UGC in attempts to encourage a more interdisciplinary approach to education and offer more flexibility and choice to students. The reform also introduced a standardized assessment and grading plan based on a 10-point scale. Since its inception, the system has faced scrutiny by students and administrators, noting that although the system promises choice and flexibility, the infrastructure of the educational system now requires special attention to bring reforms with the changing needs of the labour market.

# OVERVIEW OF THE K-12 EDUCATION SYSTEM IN INDIA

The increasing globalisation and advancement in the information and communication technology (ICT) has revolutionized the education sector and has given birth to new ways of offering education. One of the fresh modes that have changed the way education is imparted is the K-12 education. K-12 education is a scholastic concept that is widely gaining in popularity in countries like The United States of America, Canada and India as well, among other countries. This form of educational system is dissimilar from the conventional method of teaching and involves a more teacher-student communication than the conventional form.

The K-12 education is the term used to signify the education taught in the primary and secondary stages of a school life, including kindergarten to XII, which stands for the XII standard. This system covers the education from kindergarten until the XII grade. The concept is slowly gaining its importance in India with the government introducing new educational schemes like free compulsory primary education throughout the country.

Teaching and learning in the K-12 education system comprise a lot of teacher-student collaboration with the teacher encouraging a lot of question-answer sessions, assignments that would promote the formation of learning habits in students. Individual attention is another key factor of this education system. This method of teaching is beneficial and let the pupils develop learning and understanding capabilities on their own. The teacher plays a significant role in the student's success. One of the main points that sets this system apart from its conventional counterpart is the fact that, other than the typical classroom activity of students preparing and submitting assignments, they are also encouraged to add value to their assignments in the form of personal views and ideas. They are also encouraged to take part in various discussion clubs and forums to exchange ideas and opinions.
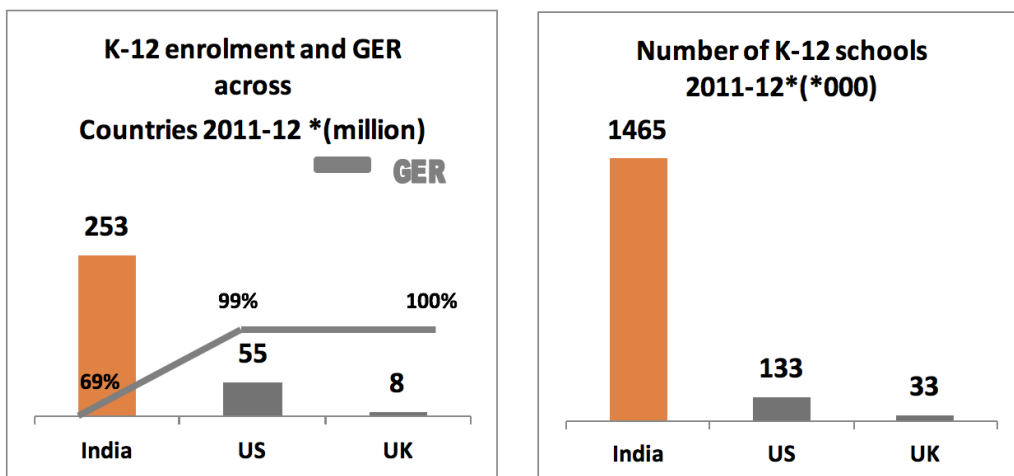
*Figure 2. Growth of K-12 System in India. Note: Data Reprinted from EY (n.d.). Retrieved from: http://www.ey.com/in/en/industries/india-sectors/education/ey-role-of-private-sector-on-k-12-education-in-india*

The introduction and rising popularity of the K-12 education system in India itself stands witness to the transformed education system in the country. The mode of teaching as well as the content and resources, has transformed largely to facilitate more participation of learners. Schools nowadays devote a good amount of time and money to create the best infrastructural facilities for their students. Students, on their part, must take the advantage of such facilities and available resources offered for the optimum learning.

The K-12 helps more teacher-student harmony and more self-reliable, independent individual who can create a difference, not just for the school, but for the society as a whole is what this new educational revolution has to advocate.

The current K-12 school system in India is one of the largest in the world with more than 1.4 million schools with 250+ million students enrolled, reveals EY-FICCI report on the education sector in India. Schools have grown at a CAGR of 2.5% from 1.2 million in 2005 to 1.4 million in 2011 and enrolment has grown at a CAGR of 2.2% to reach 253 million students in 2011.
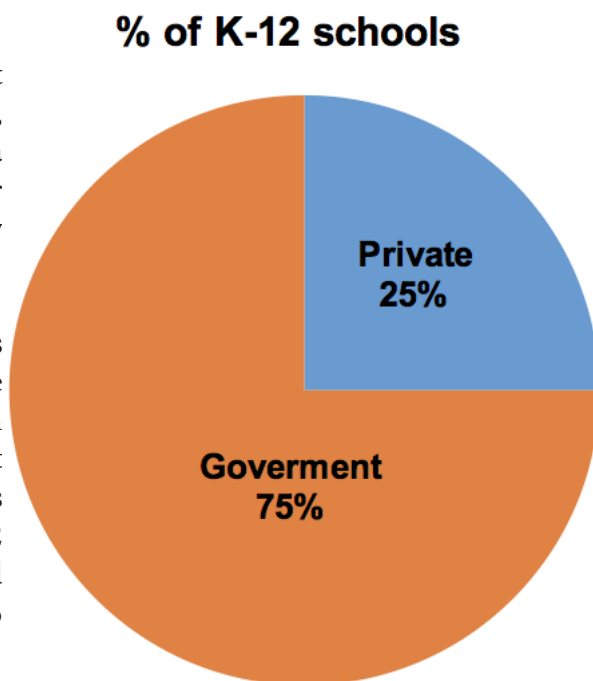


*Figure 3. Percentage of Share of K-12 schools in India. Note: Data Reprinted from EY (n.d.). Retrieved from: http://www.ey.com/in/en/industries/india-sectors/education/percentage-k-12-education-in-india*

# HIGHLIGHTS OF THE K-12 EDUCATION SECTOR IN INDIA

- The K-12 system in India can be segmented by ownership, level of education and board of affiliation.
- 25% of all K-12 schools in India are private schools, accounting for 40% share in student enrolment.
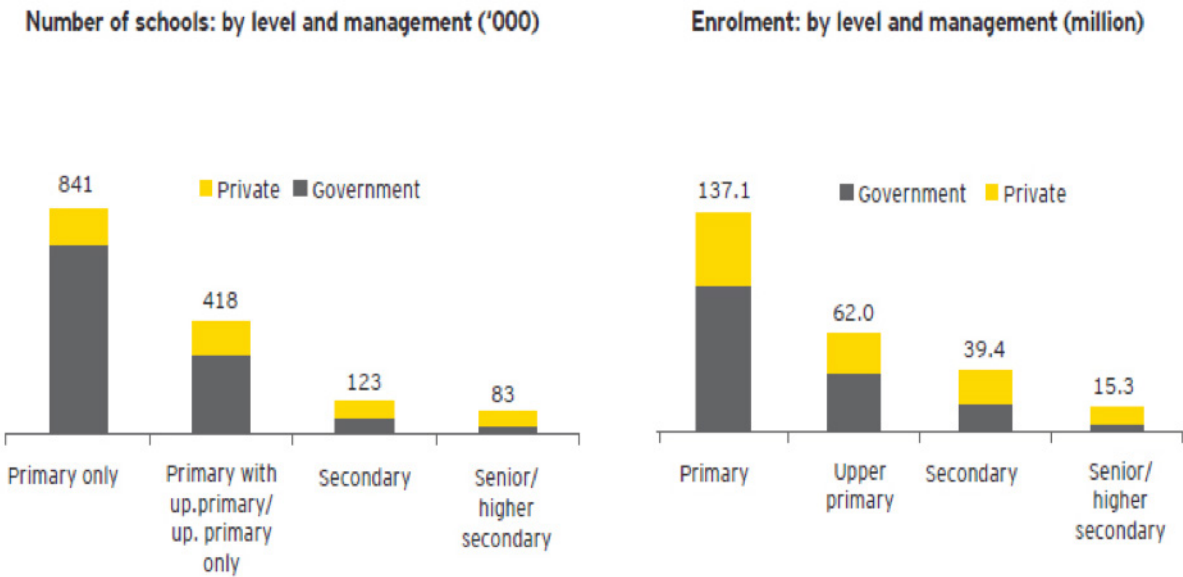- Private schools account for 25% of the total number of K-12 schools in India

**Number of schools: by level and management ('000)**

**Enrolment: by level and management (million)**



*Figure 4. Status of Schools and Enrollment in Indian Schools (Government vs. Private). Note: Data Reprinted from EY (n.d.). Retrieved from: http://www.ey.com/in/en/industries/india-sectors/education/ey-role-of-private-sector-level of management-k-12-education-in-india*

  i. 54% of all 1.46 million K-12 schools in India are managed by the Central Government/ state governments and 21% is managed by local bodies/municipal corporations.
  ii. The number of schools and student enrolment declines drastically with increase in level.
- Although the share of all secondary/higher secondary schools is only 14%, the share of enrollment is much higher at 22%.
- Primary Schools constitute 57% of all schools; upper primary schools form 10%; primary with upper primary form 19% while secondary/ higher secondary form 14%.
- 137 million students enrolled in primary level, which constitute 54% of all students enrolled in K-12 schools.
  iii. 96% of K-12 schools in India are affiliated to state boards, 1% in CBSE, 0.1% to CISCE and 2% are unrecognized.
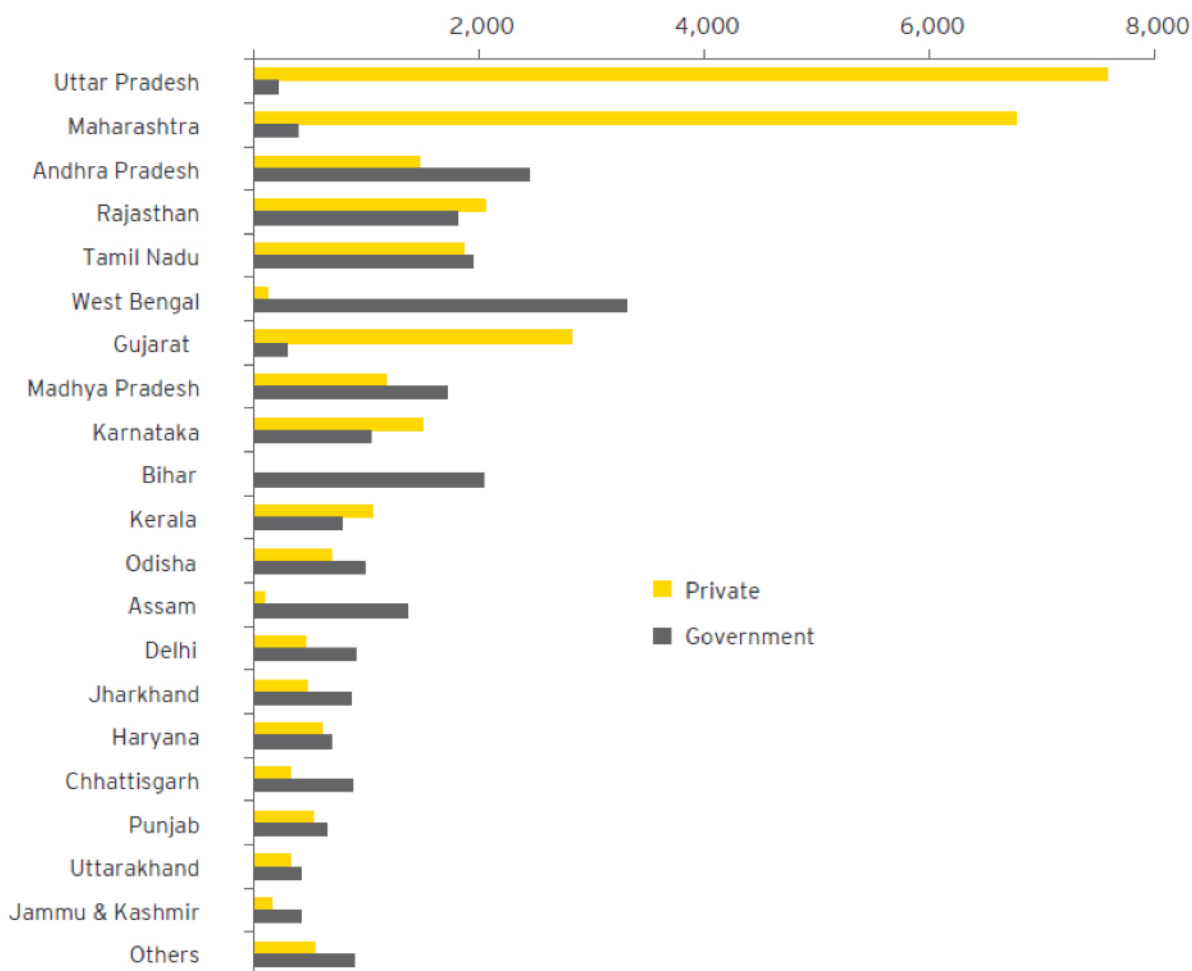  iv. In addition to the Indian boards, a large number of schools across India tie up with International Boards.

*Figure 5. State wise Enrolment at the Secondary/Higher Secondary Level. Note: Data Reprinted from EY (n.d.). Retrieved from: http://www.ey.com/in/en/industries/india-sectors/education/ey-role-of-private-sector-level of management-k-12-education-in-india*

## CONTRIBUTION OF THE PRIVATE SECTOR TO THE K-12 EDUCATION IN INDIA

- India has ~100 million enrolments compared to the US or the UK that have 5.1 million and 504,000 private school students respectively.
- There is strong evidence of increasing enrolment in the private schools of rural India- from 18.7% in 2006 to 25.6% in 2011 and declining enrolment in government schools.
- The shares of private school's enrolments in the lower and upper primary levels are 30.6% and 37.1% respectively. Secondary education enrollments account for 54.4% in the junior secondary level and 60.3% in the senior/higher secondary level.
- 69 million students study in 247,843 private schools at the elementary level, making the average number of students per school at 280.

- India has more than 339,000 private K-12 schools, which has been growing in the last five years at a CAGR of 4%.
- Private school's enrolments in the top 20 states accounts for nearly 55% of enrolment at the secondary/higher secondary level.

Role of the Private Sector on K-12 Education in India

- Low enrolment across senior classes remains a key challenge in the K-12 education system.
- The dropout rate of girls at the primary and secondary level has increased in comparison to that of boys.
- The population of out-of-school children is significantly higher in certain social groups and rural areas.
- The achievement of learning outcomes at expected level poses serious questions over the quality of education schoolchildren opting for paid supplemental help.
- Inadequate infrastructure, poor facilities and the shortage of quality resources influence the quality of education.
- High teacher vacancies, lack of training and high pupil-teacher ratio affect the quality of delivery.

Key concerns faced by the Private Sector in K-12 Education in India

- Inflexible and complex regulatory norms
- Inadequate compensation by the government for 25% EWS
- Schools facing closure due to RTE norms and scale
- High capital cost
- Inability to access equity funding
- The high upfront cost in the initial years

# MAJOR CHALLENGES AND ISSUES IN THE EDUCATION SECTOR

There are numerous challenges being faced by the Indian education system. Some of the constraints identified by the NITI Aayog of India are as follows.

Key Constraints in Education in India
- Inadequate public funding in the sector.
- Disproportionate focus on school infrastructure as opposed to learning outcomes.
- Challenges in governance and monitoring mechanisms for learning outcomes.

- Accountability systems in government schools.
- Inadequate teacher training, large number of teaching vacancies and rampant absenteeism.
- Limited options for vocational education in the school system.
- Inadequate support and counseling given to children in schools.

In addition, there are various challenges that need immediate attention as outlined below.

## LIMITED PRACTICAL KNOWLEDGE AND OVEREMPHASIS ON ACADEMIC AND BOOK LEARNING

In schools and colleges, in general, lots of attention is devoted to theory and book learning and practical knowledge is relatively disregarded. When these students pass the exam, they forget all the information and knowledge they have studied because of lack of practical experience. In India, parents and teachers expect their students to score high on the exams rather than acquiring practical and useable knowledge. Hence, education becomes a rat race. Practical knowledge and skills-based education requires fortification to reach all the students studying in schools, colleges and universities.

Lack of research or critical analysis of problems-solving skill is one of the most important things that are required when students complete their studies and look for jobs to earn money and build their career. This can be overcome by participating in problem solving projects with the use of creative and critical thinking. In India, despite the fact that the country has the highest number of engineering graduates, it still, lacks technological innovations. Schools and colleges must pay attention to case studies research-based assignments and problem solving projects so that students can get fresh ideas about their surroundings and can effectively solve the problems they face.

## INADEQUATE ATTENTION TO PERSONALITY DEVELOPMENT OF LEARNERS

Schools and colleges in India demand students' performance in terms of marks and hence students are not well exposed to the external world. When students complete their studies and enter the job market, many face problems of getting a job as simply because they do not meet the criteria and skills required for the job. It is highly essential to start a personality development program in schools and colleges to improve the quality of graduates with well-rounded personality.

## THE ABSENCE OF ENTREPRENEURSHIP DEVELOPMENT IN THE SCHOOL PROGRAM AND CURRICULUM

T

he majority of the students want to get a job after finishing their education. These students do not want to start their own business. Hence, the absence of entrepreneurship abilities is halting the progress of the country in several fields. Our education system should be such that it should generate enthusiasm to become entrepreneurs and it should also produce first rate scientists, writers, thinkers, designers, etc. so that India can become a knowledge-based economy.

## INEQUALITY AND LIMITED ACCESS DUE TO CAST RESERVATION AND PAID SEAT

In the Indian education system, seats are reserved for reserved caste and rich students. This practice hampers social and economic development of the country. In principle, the education system should give equal opportunities to all students irrespective of their caste and creed. The child of a rich family gets a good education because of ample money, whereas the child of a poor family hardly gets a primary education. The data show that only one child out of seven born in India goes to school. This problem should be taken into notice immediately and steps should be taken to change the situation as soon as possible.

## OUTDATED COURSE CURRICULUM ESPECIALLY AT TERTIARY LEVEL

Due to slow changes in the education system students are getting the knowledge from outdated syllabus. Lots of scientific and technological improvements are taking place almost every day and therefore the courses at the graduate and postgraduate levels must be updated as per the advance of industrial and technological development.

# MAJOR INITIATIVES TAKEN TO IMPROVE TEACHING STANDARDS IN INDIA

Ever since the draft Education Policy has been introduced, the HRD ministry has been working over improving the education system in the country. There have been several initiatives taken by the ministry to assess and improve the quality of teaching in the country.

## SUBJECT WISE LEARNING

In order to focus on quality education, the Central rules to the Right of Children to Free and Compulsory Education (RTE) Act, 2009 have been amended to include reference on class-wise, subject-wise learning outcomes. The learning outcomes for each class in languages (Hindi, English and Urdu), mathematics, environmental studies, science and social science up to the elementary stage have, accordingly, been finalized and shared with all states and UTs. These would serve as a guideline for state and UTs to ensure that all children acquire an appropriate learning level.

## NATIONAL ACHIEVEMENT SURVEY (NAS)

The National Council of Educational Research and Training (NCERT) conducts periodic national surveys of learning achievement of children in classes 3, 5, 8 and 10. Four rounds of National Achievement Survey (NAS) have been conducted so far for class 5 and three rounds for classes 3 and 8. These reveal improvements in learning achievement levels of pupils, in identified subjects from the first round to the fourth round.

Further, a National Achievement Survey based on learning outcomes was conducted for classes 3, 5 and 8 on November 13, 2017 with a sample frame upto district level to enable states/UTs to identify gaps in learning outcomes at district level and design strategies to address those gaps.

Similarly, NAS for Class 10 was conducted on February 5, 2018. NAS Reports show students' learning levels against the expected learning outcomes of a particular grade and are used to provide feedback to the districts for further improvement.

## MINIMUM QUALIFICATION OF TEACHERS

The 3rd. Section 23 (2) of the RTE Act has been amended to extend the period of in-service training for untrained elementary teachers to March 31, 2019 in all the states and UTs.

As per the above amendment, all untrained in-service teachers working in government, government- aided, and private un-aided schools should acquire minimum qualification as laid down by an academic authority, authorized by the Central Government, by March 31, 2019.

The National Institute of Open Schooling (NIOS) was entrusted to conduct this training through ODL (Open Distance Learning) mode. The online D.El.Ed. course has been started from October 3, 2017 and completed on March 31, 2019.

## B.ED. DEGREE STRUCTURE

A four-year B.Ed. integrated course to bring about qualitative improvement in teacher education programs in India has been conceptualized and regulations for this course have been published in the official gazette on March 29, 2019 and applications have been invited w.e.f. June 31, 2019.

The model curriculum prepared for this course includes crucial aspects like gender, inclusive education, ICT, yoga, Global Citizenship Education (GCED) and Health & Sanitation. The teaching specialization would primarily be for the primary levels and the secondary level.

## QUALITY EDUCATION

The Right of Children to Free and Compulsory Education (Amendment) Act, 2018 has been notified on January 11, 2019. The said Act empowers the appropriate government to take a decision as to whether to hold back a child in class 5 or in class 8 or in both the classes, or not to hold back a child in any class till the completion of elementary education. The Act seeks to improve the learning levels of children and will lead to greater accountability and improvement in the quality of education.

## EQUALITY IN EDUCATION

The Central Government has launched an integrated scheme for school education named as Samagra Shiksha, w.e.f. 2018-19, which subsumes the three erstwhile Centrally Sponsored schemes of school education i.e Sarva Shiksha Abhiyan (SSA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA), and Centrally Sponsored Scheme on Teacher Education (CSSTE).

The common objectives of all these schemes were to enhance access, to promote equity through the inclusion of disadvantaged groups and weaker sections and to improve the quality of education. The new integrated scheme envisages school education as a continuum from pre-school to senior secondary level and aims to ensure inclusive and equitable quality education at all levels.

## INTERNATIONAL EXPOSURE

Government of India has decided to participate in the Program for International Students Assessment (PISA) conducted by the Organization for Economic Cooperation and Development (OECD) in 2021.

PISA is a competency-based assessment, which, unlike content-based assessment, measures the extent to which students have acquired key competencies that are essential for full participation in modern societies.

Learning from participation in PISA will help to introduce competency based examination reforms in the school system and help move away from rote learning. The Central Board of Secondary Education (CBSE) and NCERT are a part of the process and involved in activities leading to the actual test.

## CULTURAL FESTIVALS

In order to experience and celebrate the rich cultural diversity of India, Rangotsav was held from December 7 to 21, 2018 in schools, with participation of students, teachers and other stakeholders.

Rangotsav is focused on creating a non-judgmental platform for the participants to explore and express their artistic minds through dance, music, theatre, painting craft making, etc.

The fortnight-long event promoted a joyful learning environment with no restriction on expression of different forms of arts. It is a gateway for each state to be exposed to the cultures, arts and languages of other States and UTs, enrich the minds of students, and enhance their thirst for knowledge.

## GRADING SYSTEM

In order to evaluate objectively the performance of the school education system in the states/UTs, MHRD has designed a 70 indicators based matrix called Performance Grading Index (PGI) to grade the states and UTs. The indicators have been chosen after detailed stakeholder consultation and the information on these indicators is drawn from the inputs provided by the respective states and UTs. This grading system will assist the states and UTs to identify the gap and design appropriate interventions to bridge them.

## INTEGRATED DATA

Timely and accurate data are the basis of sound and effective planning and decision making. Towards this end, the establishment of a well-functioning and sustainable Educational Management Information System is of utmost importance today. In 2018-19, the UDISE+ (i.e. UDISE plus) application has been launched to collect data from all schools, so that it becomes an effective tool for decision-making.

## E-LEARNING MATERIALS FOR TEACHERS AND STUDENTS

In order to provide supplementary learning material for students and for upgrading the skills of teachers, MHRD has developed a dedicated Digital Infrastructure for Knowledge Sharing (DIKSHA) platform. The high quality e-learning material both for students and teachers are uploaded by the ministry and states/UTs on this portal. This is expected to substantially augment the knowledge base of the students and technical skills of teachers at no additional cost.

## INNOVATIONS IN CLASSROOM STUDY

The Government has launched Rashtriya Aavishkar Abhiyan (RAA) program on 09.07.2015, to motivate and engage children of the age group of 6-18 years in science, mathematics and technology through observation, experimentation, inference drawing, model building, etc. through both inside and outside classroom activities.

The Central Government also supports states and UTs on early grade reading, writing, and comprehension, and early mathematics programs through a sub-program, namely 'Padhe Bharat Badhe Bharat' (PBBB) in the foundational years of schooling.

## INTERACTIVE CONTENT FOR STUDENTS

A single point repository of e resources called e- PATHSHALA containing NCERT textbooks and various other learning resources has been developed for showcasing and disseminating all educational resources, including textbooks, audio, video, periodicals, and a variety of other print and non-print materials.

## MASSIVE OPEN ONLINE COURSES (MOOCS)

MHRD has launched a Massive Open Online Courses (MOOCs) platform popularly known as SWAYAM (Study Webs of Active learning for Young Aspiring Minds) on July 9, 2017. The portal is offering various online courses for school education and higher education. NCERT is developing course modules for the MOOCs for school education system in 12 subject areas (accountancy, business studies, biology, chemistry, economic, history, geography, mathematics, physics, political science, psychology and sociology) for classes 9-12. Twelve and twenty-one courses have been completed in the first cycle and second cycle until November 30, 2018 on SWAYAM platform (https://swayam.gov.in/) respectively. Nearly 22,000 students and 30,000 students were registered in the first cycle and second cycle respectively.

## EDUCATION CHANNELS

A program for utilization of satellite communication technologies for transmission of educational e-contents through 32 National Channels i.e. SWAYAM PRABHA DTH-TV has been launched. Central Institute of Educational Technology (CIET) - NCERT is the national coordinator for one-DTH TV channel i.e., Kishore Manch (#31) and has started feeding a 24x7 educational TV channel by July 9, 2018. Besides, NIOS is running five channels for teachers, for secondary and senior secondary levels and for sign language.

# TEACHER EDUCATION IN INDIA

Across the world, teaching has always been considered a noble work. In this regard, teacher education is perceived as the key to quality teacher preparation for all aspects of internal transformation and social change enabling the country to push forward at least market and enhancing the national stature with the help of scientific development and technological advancement. The American Commission on Teacher Education rightly observes, "The quality of a nation depends upon the quality of its citizens. The quality of its citizens depends not exclusively, but in critical measure upon the quality of their education, the quality of their education depends more than upon any single factor, upon the quality of their teachers."

Teacher education refers to the policies and procedures designed to equip prospective teachers with the knowledge, attitudes, behaviours and skills they require to perform their tasks effectively in the classrooms, schools and the wider community. According to the National Council for Teacher Education, it is a program of education, research and training of persons to teach from pre-primary to higher education level. Teacher education encompasses teaching skills, sound pedagogical theory and professional skills (W.H. Kilpatrick ).

Several universities, affiliated colleges, private and open universities, provide teacher education in India. The Teacher Education Policy in India has evolved over time and is based on recommendations contained in various Reports of Committees/ Commissions on Education: – the Kothari Commission (1966) – the Chattopadyay Committee (1985) – the National Policy on Education (NPE 1986/92) – Acharya Ramamurthi Committee (1990) – Yashpal Committee (1993) – and the National Curriculum Framework (NCF, 2005). The Right of Children to Free and Compulsory Education (RTE) Act 2009, which became operational from 1st April 2010, has important implications for teacher education in the country.

# TYPES OF TEACHER EDUCATION PROGRAMMES

1.  Pre-primary teacher education [higher secondary, one year]
2.  Primary teacher education [higher secondary, two years]
3.  Secondary teacher education [graduation, one year]
4.  Higher education programmes [One-year M.Ed. Course, Two-year M.A. in Education, Two-year Ph.D. course after M.Ed./M.A.]
5.  Vocational Teachers Training [One-year Diploma in Physical Education (DPE), Training courses to prepare teachers of Music, Dancing, Painting and Fine Arts, One-year training course to prepare teachers for Home Science, Certificate courses in Arts & Crafts]

National Council for Teacher Education (NCTE) is a statutory body of Indian government set up under the National Council for Teacher Education Act, 1993 (#73, 1993) in 1995. Its main mandate is to formally oversee standards, procedures, and processes in the Indian education system. This council functions for the centre as well as state governments on all matters concerning the Teacher Education and its Secretariat is located in the Department of Teacher Education and National Council of Educational Research and Training (NCERT). However, despite the successful functioning in the educational field, it is facing difficulties in ensuring the maintenance of the standards of teacher education and preventing the increase in the number of substandard teacher education institutions in the country.

The Ministry of Human Resource Department (HRD), Department of Social Education and Literacy has authorized National Council of Educational Research & Training to lay down the curriculum and evaluation procedure for elementary education and to develop a framework of national curriculum under Clause A of Sub-Section 6 of Section 7 of the Act vide its Gazette Notification.

# OBJECTIVES OF TEACHER EDUCATION

The Education Commission (1964-66) stated. "A sound programme of professional education of teachers is essential for the qualitative improvement o/l education. As per Nirav S, broad objectives of the teacher education includes the following:

## *BETTER UNDERSTANDING OF THE STUDENT*

Teacher training is necessary as it enables the potential teacher to understand the students better. The knowledge of educational psychology helps him a lot in dealing with children scientifically. Untrained teachers not familiar with the subject may create problem for children in the school.

## BUILDING CONFIDENCE

Teacher training builds confidence in the potential of teachers. A trained teacher can essentially face the class with confidence. He is not timid or shy. He can tackle many odd situations and he does not run away from problem situations.

## USING METHODOLOGY OF TEACHING

Through training, the future teacher becomes familiar with methodology of teaching. He also gets essential knowledge of methods required for a particular subject. He teaches with flair and not in a routine way.

## BUILDING FAVOURABLE ATTITUDE

A sort of brainwash is also done through training. It helps in building favourable towards the teaching profession. During the course of training, many doubts of the teacher trainee's stand is removed. It results in creation of love and respect for the teaching profession.

## FAMILIARIZING WITH THE LATEST IN EDUCATION

Teacher training programmes familiarize the future teachers with all that is the latest in education. An attitude of research and experimentation is attempted to be created in them.

## MAKING FAMILIARITY WITH SCHOOL ORGANISATION

During the course of teacher training, the aim is to familiarize the teacher trainees with the organisation and administration of the schools. It is of immense use to them in later life.

## CREATING SOCIAL INSIGHT

Teacher training is a must, as it is required to teach the teachers to live a community life. Training is essential to create social insight in them.

## IMPROVING STANDARDS

The education commission is interested in raising the standards or the quality of education. A trained teacher can be a great help in improving the quality of education and in checking wastage.

*TRAINING FOR DEMOCRACY*

Training is required not only with the sole aim of making one a good teacher but also making him a good citizen.

Unprecedented expansion of teacher education institutions and programs during the past few years, characterizes the teacher education scenario of today. With increasing school enrolments and the launch of Pan-Indian primary education development programmes like Operation Blackboard, District Primary Education Programme, Sarva Shiksha Abhiyan and Universalization of Elementary Education, there was a natural increase in the demand for teachers. Added to this, the backlog of untrained teachers in the system and the essential requirement of pre-service teacher certification for appointment as a teacher led to mounting pressure on existing institutional capacity. The demand far exceeding supply, market forces have taken over an unprecedented rise in the number of teacher education institutions in most parts of the country.

# NATURE OF THE TEACHER EDUCATION SYSTEM

The education of teachers is a continuous process, broad and comprehensive and always ever evolving and dynamic. The basis of the entire process of teacher education lies in its curriculum, design, structure, organization and transaction modes. The teacher education is primarily categorized in the following areas:

*FOR PRE-SERVICE TRAINING:*

- The National Council of Teacher Education (NCTE), a statutory body of the Central Government, is responsible for planning and coordinating development of teacher education in the country.
- The NCTE lays down norms and standards for various teacher education courses, minimum qualifications for teacher educators, courses, contents, and duration and minimum qualification for entry of student- teachers for the various courses.
- It also grants recognition to institutions (government, government-aided and self-financing) interested in undertaking such courses and have inbuilt mechanism to regulate and monitor their standards and quality.

*FOR IN-SERVICE TRAINING:*

The country has a large network of government-owned teacher training institutions (TTIs), which provide in-service training to schoolteachers. The spread of these TTIs is both vertical and horizontal as shown below.
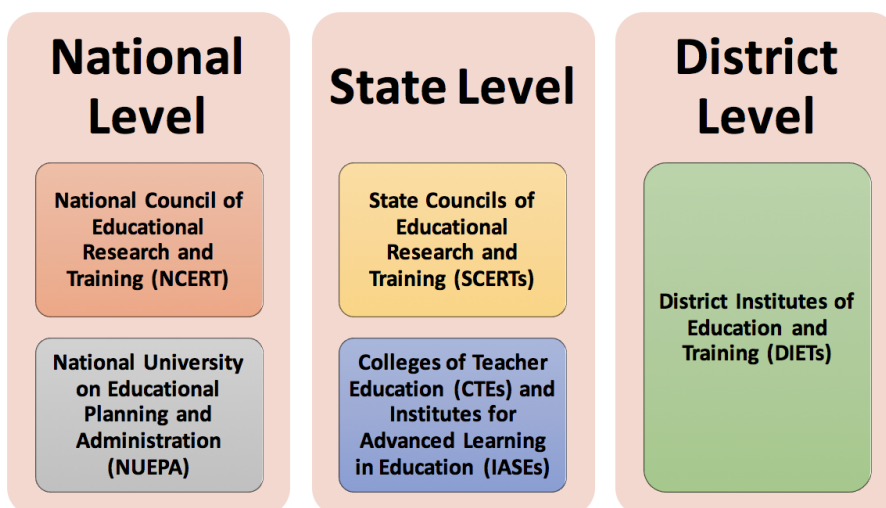
*Figure No. 7: Organisational Set-up for In-service Teacher Education and Training*

## FINANCING OF PROGRAMS AND ACTIVITIES

For pre-service training, the government and government-aided teacher education institutions are financially supported by the respective State Governments.

Under the Centrally Sponsored Scheme on Teacher Education, the Central Government also supports over 930 institutions, including the DIETs, CTEs, IASEs and the BITEs.

- For in-service training, financial support is largely provided by the Central Government under the Sarva Shiksha Abhiyan (SSA).
- Under the SSA, 20 days of in-service training is provided to schoolteachers, 60 days refresher course for untrained teachers and a 30-day orientation for freshly trained recruits.
- State Governments also financially support in- service programmes.
- Several NGOs support various interventions of in-service training activities.
- The Centrally Sponsored Scheme for Teacher Education has been revised for the XII Plan with an approved outlay of Rs. 6308.45 crore.

## CENTRALLY SPONSORED SCHEME ON TEACHER EDUCATION

As envisaged in the National Policy on Education (NPE), 1986, and its Program of Action (POA), a Centrally-Sponsored Scheme of Restructuring and Reorganization of teacher education was launched in 1987: to create a sound institutional infrastructure for pre-service and in-service training of elementary & secondary school teachers and

for the provision of academic resource support to elementary and secondary schools. The Scheme had the following components:

- Setting up of District Institutes of Education and Training (DIETs).
- Strengthening of Secondary Teachers Education Institutions to become Colleges of Teacher Education (CTEs) and Institutes of Advanced Study in Education (IASEs).
- Strengthening of State Councils of Educational Research and Training (SCERTs).
- Establishment of Block Institute of Teacher Education (BITEs).

Under the Scheme, central assistance is provided to the State Governments as resource support to the DIETs, CTEs, IASEs, BIETs and SCERTs.

# REFORMS IN TEACHER EDUCATION

Despite some successes, teacher education as a whole needs urgent and comprehensive reforms. There is a growing need to bring greater union between professional preparation and continuing professional development of teachers at all stages of the career in terms of level, duration and structure. Considering the complexity and significance of teaching as a professional practice, it is imperative that the entire professional development system needs to be suitably enhanced and enriched using technology. In this regard, some of the initiatives, which have been introduced, are discussed below:

*REVISION OF THE CENTRALLY SPONSORED SCHEME OF TEACHER EDUCATION*

i. Modification in Centre-State financial sharing pattern, from the existing 100% central assistance to sharing pattern in the ratio of 75:25 for all States/UTs (90:10 for the North Eastern States)
ii. Continuation of support to SCERTs/SIEs
  - Strengthening and re-structuring of SCERTs,
  - Training for Educational Administrators, including Head Teachers.
  - Orientation / Induction Training for Teacher Educators
i. Continuation of support to CTEs and establishment of new CTEs
ii. Continuation of support to IASEs and establishment of new IASEs
iii. Continuation of support to and restructuring of DIETs
iv. Establishment of Block Institutes of Teacher Education (BITEs) for augmenting Teacher Education capacity in SC/ST and minority concentration areas

v. Professional Development of Teacher Educators
vi. Technology in Teacher Education
vii. Public-Private Partnership (PPP) in teacher education

*NATIONAL CURRICULUM FRAMEWORK FOR TEACHER EDUCATION*

i. Highlighted specific objectives, broad areas of study in terms of theoretical and practical learning, and curricular transaction and assessment strategies for the various initial teacher education programmes.
ii. Outlines the basic issues that should guide the formulation of all programmes of these courses.
iii. Recommendations on the approach and methodology of in-service teacher training programmes
iv. Outlined a strategy for implementation of the framework.

The Framework has some important dimensions of the new approach to teacher education:

v. Reflective practice to be the central aim of teacher education
vi. Student-teachers should be provided opportunities for self- learning, reflection, assimilation and articulation of new ideas
vii. Developing capacities for self-directed learning and ability to think, be critical and to work in groups
viii. Providing opportunities for student teachers to observe and engage with children, communicate with, and relate to children.

# TEACHER EDUCATION IN THE 21ST CENTURY

Considerable efforts on planning and providing resources have been spent on education in India and at the same time in improving the quality of education. A good demand is given for a teacher-training course in India; unfortunately, there are several gaps in the system and many times incompetent teachers are recruited.

*NEWLY VISUALIZED TEACHER EDUCATION PROGRAM*

- Emphasizes learning as a self-learning, participatory process-taking place in the social context of the learner as well as the wider social context of the community to the nation as a whole.
- Puts full faith in the self-learning capacity of schoolchildren and the student teacher and evolving proper educative programme for education.

- Views the learner as an active, participative person in learning. His/her capabilities or potentials are seen not as fixed, but capable of development through experiences.
- Views the teacher as a facilitator, supporting, encouraging learner learning.
- Does not treat knowledge as fixed, static or confined in books, but as something being constructed through various types of experiences. It is created through discussion, evaluate, explain, compare and contrasts i.e., through interaction.
- Emphasizes that appraisal in such an educative process will be continuous, will be self-appraisal, will be peer appraisal, will be done by teacher educators, and formal type too.

Hence, there would be a major shift from teacher centric to learner centric.

| From | To |
| --- | --- |
| Teacher centric, stable designs | Learner centric, flexible process |
| Teacher direction and decisions | Learner autonomy |
| Teacher guidance and monitoring | Facilitates, support and encourages learning |
| Passive reception in learning | Active participation in learning |
| Learning within the four walls of the classroom | Learning in the wider social context the classroom |
| Knowledge as "given" and fixed | Knowledge as it evolves and created |
| Disciplinary focus | Multidisciplinary, educational focus |
| Linear exposure | Multiple and divergent exposure |
| Appraisal, short, few | Multifarious, continuous |

No education system in the world has excelled without making a significant investment in building a cadre of quality teachers. Yet, teacher education is one of the weakest links in the education system. Shireen Vakil (05 Sept 2016) . As the government of India (GoI) frames the New Education Policy (NEP), it will be critical to focus on teachers and teacher education to ensure quality education.

Key challenges that need to be addressed relate to both a shortage of teachers and their training. For instance, as of March 2016, a total of 500,000 approved teaching posts are vacant countrywide. As a result, several schools have the pupil-to-teacher ratio of 80:1 and single-teacher schools account for 8 per cent of elementary schools in the country. A recent report reveals that 660,000 teachers currently in the system lack the requisite qualifications, and only 1% of teachers nationally passed the Teacher's Eligibility Test (TET) conducted in 2012.

There is a great need for professional standards and regulation of pre-service teacher training institutes, 90% of which are in the private sector and are largely sub-standard and unregulated. Even the state-run institutes suffer from multiple deficiencies and most of them are far from being effective. Therefore, developing institutional mechanisms for periodic monitoring of teacher training institutes and strict adherence to quality parameters is vital. Additionally, clear selection criteria for testing aptitude needs to be in place before accepting students into teacher training colleges.

The framing of the NEP provides India with an opportunity to review and redesign the current teacher education programmes. Teachers need to be viewed as professionals who require multiple skills to do their job, and accordingly professional standards need to be built into all teacher education programmes. These programs must focus on building on both an essential knowledge base, as well as the skill sets required for making a difference in the classroom. Importantly, they must locate the professional development of teachers within the larger socio-cultural, economic and political context of contemporary India.

As the teacher is the pivot of the entire educational system and is the main catalytic agent for introducing desirable changes in the teaching-learning process, every attempt needs to be made for motivating teachers to become innovative and creative. A self-motivated and industrious teacher can utilize his/her own resources to keep oneself updated with new knowledge and skills.

# PLANNED INITIATIVES FOR STRENGTHENING QUALITY EDUCATION IN INDIA

Currently, there are well-organized efforts in drafting the new National Education Policy. Based on the various inputs received from various sections of the society, some of the salient features likely to be addressed in the policy are summarized as follows;

## STRENGTHENING PRE-SCHOOL EDUCATION

Pre-school education needs to receive the necessary attention. To this effect government schools will be involved to provide pre-primary education.

## CURRICULUM RENEWAL AND EXAMINATION REFORMS

The curricular reforms will be carried out to meet the emerging aspirations and align with national goals of social cohesion, religious amity and national integration. A common national curriculum will be designed for science, mathematics, and English subjects. It will be mandatory for the students to take the Class X Board Examination

conducted by the Board to which their school is affiliated. Procedural reforms will be undertaken, such as doing away with migration certificate, school leaving certificate, etc. in order to encourage mobility of students from one institution to another.

## EMPHASIS ON LEARNING OUTCOMES IN SCHOOL EDUCATION

For improving the quality of school education, norms for learning outcomes will be developed and applied uniformly to both private and government schools. The provision of non-detention policy has been amended, as it has seriously affected the academic performance of students. The no detention policy will be limited up to class V and the system of detention is restored at the upper primary stage. In addition, effective steps will be taken to improve teaching standards in schools. (The Right of Children to Free and Compulsory Education (second amendment) Bill, 2017).

## SCHOOL MAPPING

Each State will be undertaking a detailed exercise of school mapping to identify schools with low enrolment and inadequate infrastructure. Minimum standards for the provision of facilities will be expanded and upgraded for improving the student outcomes across all levels in school education.

## PROTECTION OF RIGHTS OF THE CHILD & ADOLESCENT EDUCATION

Comprehensive framework and guidelines for ensuring school safety and security of children will be developed. Adolescent Education will be included in the school curriculum, including the pre- and in-service training programs for secondary school teachers. Services of trained counselors in schools will be made available to address the adolescence problems faced by growing boys and girls.

## INCLUSIVE EDUCATION AND STUDENT SUPPORT

Curriculum will cover the issues of social justice and harmony and legal measures in order to avoid social discrimination. A zero tolerance approach to gender discrimination and violence will be adopted. Dedicated funds for R&D to strengthen disability studies in higher education will be made available.

## LITERACY AND LIFELONG LEARNING

The existing initiatives will be strengthened and curricula revamped with multi-pronged strategies involving Self Help Groups, NGOs, Government, etc. An apex body of experts will look after the strengthening of programs and develop scientific criteria for assessing the learning outcomes of adults in literacy, skill development, prior learning and equivalency for certification, which may also facilitate entry into the formal education system. The adult literacy program will integrate skill development and digital, financial and legal literacy.

## SKILLS IN EDUCATION AND EMPLOYABILITY

The skills development programs in school and higher education system will be reoriented by developing a detailed plan for the creation of skills schools for improving employment opportunities for secondary school students. A joint certificate by the Sector Skill Council and the School/College authorities to help students take up wage-employment or start their own enterprise.

## USE OF ICT IN EDUCATION

A concerted effort will be made to make ICT an integral part of education across all levels and domains of learning. Online maintenance of all records of a child from the time of admission until the time of leaving the school will be made mandatory. Use of IT reporting systems will be a powerful tool to better school management and performance.

## TEACHER DEVELOPMENT AND MANAGEMENT

A transparent and merit-based norms and guidelines for the recruitment of teachers will be formulated in consultation with the state governments. All vacancies in teacher education institutions and all positions of head teachers and principals will be filled up. At the National level, a Teacher Education University will be set up covering various aspects of teacher education and faculty development.

## LANGUAGE AND CULTURE IN EDUCATION

Indian culture, local and traditional knowledge will be given adequate space in the school education in mother tongue, local or regional language as the medium of instruction. This will instill among students' civic sense, discipline, punctuality, cleanliness, good conduct, empathy towards the elderly. Considering the importance

of the growth and development of Indian languages, facilities will be made available for offering Sanskrit at the school and university.

## SELF -DEVELOPMENT THROUGH EDUCATION

Funds will be earmarked by the government/ school management for all co-scholastic activities in schools such as physical education, yoga, games and sports, NCC, NSS, art education, Bal Sansad, covering local art, craft, literature and skills, and will be made an integral part of the curriculum and daily routine in schools for the holistic development of children.

## SCHOOL ASSESSMENT AND GOVERNANCE

The framework of school standards with various parameters and indicators to measure school quality, professional competence of teachers, school leadership and the school management, as well as, self-appraisal and performance assessment will be used throughout the country. In addition, the accreditation mechanism of school boards will be put in place.

## REGULATION IN HIGHER EDUCATION

A Central Educational Statistics Agency (CESA) will be established as the central data collection, compilation and consolidation agency with high-quality statistical expertise and management information system, which will be, used for predictive analysis, manpower planning and future course corrections. An independent mechanism for administering the National Higher Education Fellowship Program will also be put in place.

## OPEN AND DISTANCE LEARNING & MOOCS

The National Institute of Open Schooling (NIOS), in collaboration with the Ministry of Skill Development & Entrepreneurship, will redefine itself to address the large potential demand for vocational education. The issues of management, monitoring and oversight of NIOS will be addressed appropriately. Likewise, a quality assurance mechanism for accreditation of all universities/institutions offering ODL / MOOCs will be put in place to ensure quality, promote innovation, reshape, and modernize the ODL / MOOCs courses and programs.

## INTERNATIONALIZATION OF EDUCATION

Internationalization will be encouraged as one of the components for allocating additional financial resources to government-funded institutions. Selected foreign universities, from the top 200 in the world, will be encouraged to establish their presence in India through collaboration with Indian universities. This will help to work towards internationalization of curricula aligned with international levels to make it globally compatible with the best-ranked institutions of the world.

## FACULTY DEVELOPMENT IN EDUCATION

A task force of experts will be set up to study the recruitment, promotion and retention procedures, followed by internationally renowned universities and institutions and suggest measures to promote intellectual and academic excellence in education. A mechanism for assessment of academic performance of faculty, including peer review, will be put in place so as to ensure academic accountability of public-funded institutions.

## RESEARCH, INNOVATION, AND NEW KNOWLEDGE

Steps will be taken to promote the generation of new knowledge and their applications and introduction of these new domains into the curricula of higher education to consolidate and strengthen India's position as a soft power. International collaborations and networks will be promoted in developing the human resources required to sustain new knowledge with a special focus on interdisciplinary research and studies.

## FINANCING SCHOOL EDUCATION

The government will take steps for reaching the long pending goal of raising the investment in the education sector to at least 6% of GDP as a priority. The priority will have to expand the capacity of existing institutions. In order to encourage excellence and efficiency, performance-linked funding of educational institutions will have to be implemented.

# THE WAY FORWARD

India faces complex and enormous challenges in fostering education for several reasons: the size of the youth population and the hierarchical and the segmented nature of both the labour market and society as a whole. Indeed, Indian young people fall into two major groups. Tiny fractions of economically well-off middle classes get a good education and training and well-paid jobs in the organized sector. Meanwhile,

the majority of youth from economically and socially disadvantaged groups get a very limited education and little access to education and training. They work in the unorganized sector. The majority of Indian youth enters the labour market without adequate basic education or vocational skills, leading to unstable, informal, low-wage employment, such as casual labour and various forms of self-employment. Given the highly stratified and segmented nature of the society and labour market, Indian youth needs to acquire education, training, and skills if they are to find decent jobs and experience any social mobility. With rapid economic growth, demand for education and skills training is likely to grow further at all levels in coming years. There is a need to improve the access to education and skills training to youth with diverse socioeconomic backgrounds, gender, and geographic locations in the country.

There is a need to have a holistic approach to education development by having a defined approach for both short-term and long-term perspective to meet the demand of the growing Indian economy. To sum it up, the goal can only be achieved by staying on the track and making sure that all these plans are executed successfully to the minute detail. The future of education in India looks very promising indeed.

# CONCLUSION

To sum up, India needs to recognize that the knowledge, skills and proficiency of its growing young and dynamic workforce forms the pillar of the national economy. To reap the benefits of such a young work force, it needs to implement the reforms in the education system and also bring forth new ways of offering access to quality education, including the use of technologies, which have the ability to unleash the productive frontiers of the economy in the most efficient and dynamic way.

India has recognized that a well-crafted national education development policy is critical for its sustainable and balanced growth. Most significantly, the new policy will offer direction and focus of the education system for the changing world of work. The key principles anchored by the Indian education system include shared responsibility; integration into growth, employment and other development strategies; providing support for lifelong learning; and, promoting equal opportunities for education and training. There are continuing efforts to develop a new and comprehensive national policy to bring coherence to the system, facilitating coordinated reforms, and strengthening institutional arrangements.

Nevertheless, a policy is only as effective as its implementation. Setting achievement targets and developing clear implementation plans are important steps taken by the government. As education and skills are fundamental for individual growth, employability, and national competitiveness, a sound and well-balanced education system is expected to lead India in realizing those objectives.

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# TECHNICAL AND VOCATIONAL EDUCATION SYSTEM IN NEPAL: GEARING TOWARDS 21ST CENTURY CHALLENGES

Dr. Ramhari Lamichhane

*This chapter provides an overview on the Government's efforts to develop and implement technical and vocational education (TVET) system in Nepal, one of the developing countries in the South Asian region. It discusses the reforms that were implemented through the years, as well as the different strategies the Council for Technical and Vocational Education and Training(CTEVT) has adopted to make TVET accessible and relevant for the Nepalese socio-economic development. The chapter also provides an insight regarding the different challenges that the Nepalese TVET sector faces and future directions for TVET sector*

Contents
1. Background
2. TVET Laws and Policy
3. Structure of the TVET Education System
4. Major Challenges and Issues in the TVET System of Nepal
5. Conclusions and Recommendations
6. References

## BACKGROUND

Nepal is a landlocked country in South Asia, located in between China and India. With an estimated population of 29.6 million, it is the 48th largest country by population and 93rd largest country by area. Nepal has a diverse geography, including fertile plains, subalpine forested hills, and eight of the world's ten tallest mountains, including Mount Everest, the highest point on Earth. Kathmandu is the nation's capital and largest city. Nepal is a multiethnic nation with Nepali as the official language. There are 125 ethnic groups and 123 native languages in practice in Nepal.

Nepal is an ancient country. Based on the written history, there are evidences of 3300 BC where Nepalese people settled in Siwalik Mountain (Present Dang area). Therefore, the is considered as more than 5000 years old. The founder of Buddhism, Siddhartha Gautama or Gautama Buddha was born in 544 BC in Nepal based on 2562nd anniversary of Buddha in AD 2018. The most popular and recorded ruler dynasties of Nepal are, Gopal or Avir, Kirant, Lichhabi, Malla, Shah and present Federal Republic Nepal.

Every era has its own importance in social, cultural and economic aspects. After the Gopal Dynasty, the Kirant Dynasty ruled Nepal for about 1500 through 32 generations, until they were overthrown by the Lichchhavi (kings) around the middle of the first century CE. The first Kiranti king was Yalambar (Rai, 2010). There are many evidences which show that many temples and buildings were constructed during the Kirant period. The Lichhabi period is considered a golden era in the Nepalese history. There are authentic evidences that prove development and promotion of arts and crafts, construction of palace, temples, and other infrastructure. They initiated trade with China and India. Some of the examples are Kailashkut Bhawan, Changunarayan Temple, Pashupati Temple, Manaka (Money) of Mandev, Ashoka Chaitya and Pillar in Lumbini.

Malla Era was another good period in Nepal's socio economic development. They started to construct planned city with parks, ponds, temples, chowk and so on. They ruled in different cities by different kings. However, they were mostly concentrated in Kathmandu Valley.

After Malla, the Shah Dynasty ruled Nepal for almost 256 years. During this period modern infrastructure, buildings and educational programs were initiated. From AD 2005, Nepal became Federal Republic and is moving ahead to make modern Nepal. Generally, there was the presence of technical and vocational education and training (TVET) system in every period of Nepal. During the Kirant period, the economy was mostly based on traditional agriculture and hunting. Except some evidences of craftsmanship to construct temples, we do not have other strong evidences. Lichhabi era has strong evidences of skills education because there were well crafted wood, stones, and metals used in construction. After the Malla era, gradually skills and craftsmanship had developed. Before the modern era, most of the skills programs were based on learning by doing. The training venues were working places. It was a kind of real apprenticeship program. Formal TVET programs were initiated in modern Nepal period. In 1989, Council for Technical Education and Vocational Training Act was approved and formally the apex institute established. After this important milestone, expansion of TVET programs was initiated and both public and private providers have been offering TVET programs.

# TVET LAWS AND POLICY

## TVET POLICY 2012

Nepal government has been implementing TVET activities on the basis of TVET policy 2012, which is the modification of Technical and Vocational Skill Development Policy, 2007. This policy has five major objectives as discussed below.

### EXPANSION OF TVET PROGRAMS

The policy has identified expansion of TVET programs as an instrument to increase the equal distribution of TVET programs throughout the country. To achieve this, different measures are suggested such as public investment, private investment, and PPP (Public Private Partnership) model.

### INCLUSION AND ACCESS

The second objective of the policy is to provide access and equity to all citizens; more specifically for the socially and economically deprived groups or disadvantaged groups.

### INTEGRATION OF TVET PROGRAMS

The third objective is about the integration of the training programs. Recognition and integration of prior learning through skills testing and the establishment of National Vocational Qualifications Framework (NVQF) and National Vocational Quality Authority (NVQA) is the key systemic envisioned for the integration of TVET programs.

### RELEVANCY

The training program will be relevant if it responds to the demand of the labor market properly. Efficient and effective labor market information system must be operated for channeling information. This policy has paid sufficient attention on establishing Labor Market Information System (LMIS). Similarly, the policy has highlighted the industry institute linkages (IIL) to ensure demand driven programs and competencies of TVET.

## SUSTAINABLE FINANCING

The fifth objective of the policy is about the funding of TVET. Obviously the funding is the primary requirement of any program or project or policy; therefore, it is a welcome effort to include this issue in the policy. The TVET Policy (2012) has envisioned establishing a high level TVET fund chaired by the Minister of Education with the representation of the major stakeholders. A technical assistance team has submitted its report on fund options to the Ministry of Education. This TVET fund has a provision of including and working with the private sector, financial institutions, micro-enterprises and employers to provide training and soft loans to targeted individuals, and also to ensure post-training support services such as linking with financial Institutions, including placement support for employment or self-employment in businesses and industries.

The government needs to develop strategic plan for the TVET fund operation jointly with other ministries and align funding channels accordingly for TVET programs.

With regard to the vocational career path and technical and vocational education equivalency, a policy reform proposes that training providers under different ministries follow the National Vocational Qualification System and it subsequently recommended the national qualifications and guidelines.

## COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING (CTEVT) ACT 1989

CTEVT was constituted in 1989 by a special Act with a mandate of coordination and facilitation of overall development of the TEVT to perform the following key responsibilities:

1. Provide advice to the Government of Nepal regarding TEVT policy and programs.
2. Determine scope and standards of TEVT programs.
3. Arrange for and conduct of TEVT Programs from basic level to higher education.
4. Liaison and maintain coordination with national and international TEVT agencies for quality education and training.
5. Grant recognition and provide accreditation services to programs and institutes run by government, non-government, and private sector.
6. Coordinate and maintain the standard of training by providing curriculum and learning materials.
7. Conduct monitoring and supervision of TEVT programs and activities of government and non-government institutions.

8.  Make necessary arrangements for the operation of polytechnics, short-term vocational training, apprenticeship trainings and mobile training programs.
9.  Establish and operate all kinds and levels of skilled development training programs to produce skilled human resources through technical schools, mobile training and other methods of technical and vocational training programs as recommended by the council.
10. Carry out research activities in the field of TEVT including training needs assessments/ job market analysis and follow up studies.
11. Conduct technical instructors and management training programs to improve quality of TEVT programs of institutions.
12. Classify the skills/occupations, develop skill standards, administer skill tests and provide certificates.
13. Explore, obtain, and mobilize national and international assistance needed for the development of TEVT sector
14. Establish institutional linkage with national and international agencies/ universities for recognition of the TEVT programs
15. Enter into agreements or contracts with national and international organizations and agencies regarding TEVT Programs.

The CTVET Act 1989 has covered most of the areas for the quality TVET system. However, to address the integration of TVET programs and the federal political structure of present Nepal, it should be revised or need to bring a new act.

According to the present governing constitution of Nepal (2015), management of basic education and TVET programs are under local level of NQF.

# STRUCTURE OF TVET IN THE EDUCATION SYSTEM

TVET programs are considered as one of the alternative paths of education system by policy and laws. However, if we see the structure of TVET in the overall education system, it hasn't integrated well in the mainstream structure. Nepal doesn't have national qualification framework (NQF) and national vocational qualification framework (NVQF). Both are in a draft stage and expected to be approved by 2020.

In general education, there are four levels: basic, secondary, higher secondary, and higher education. Similarly, there are three categories of TVET programs: occupational skills standard (OSS) or national competency standard (NCS) level I to IV, Technical School Leaving Certificate (TSLC) as a secondary level and Diploma Programs as a higher secondary level. According to the report (MoE, 2016 ), about 8.6 million children enrolled in grade one and about 75 percent of them completed basic level

education. The enrollment status of secondary level shows that only 17 percent of the students who enrolled in grade one have enrolled in secondary level. Similarly, four percent of students who enrolled in grade one has enrolled in higher secondary level. Finally, only about two percent of grade one students continued to higher education. In TVET path, only 0.5 percent of the grade one students has enrolled in both technical school leaving certificate (TSLC) as a Secondary Level and diploma (Higher Secondary Level) programs. Figure 1 shows that many children and youths are out of the education system and there are not ample provisions in TVET as well. Although there are non-formal skills training programs, most of them are project based. They are known as vocational skills training (VST).

Thus, the present education structure and system is not fully geared towards integration of the education system and accord flexibility to horizontal and vertical movements from one path to another. Similarly, in the absence of NQF and NVQF, there is confusion about qualification levels and credit transfer.



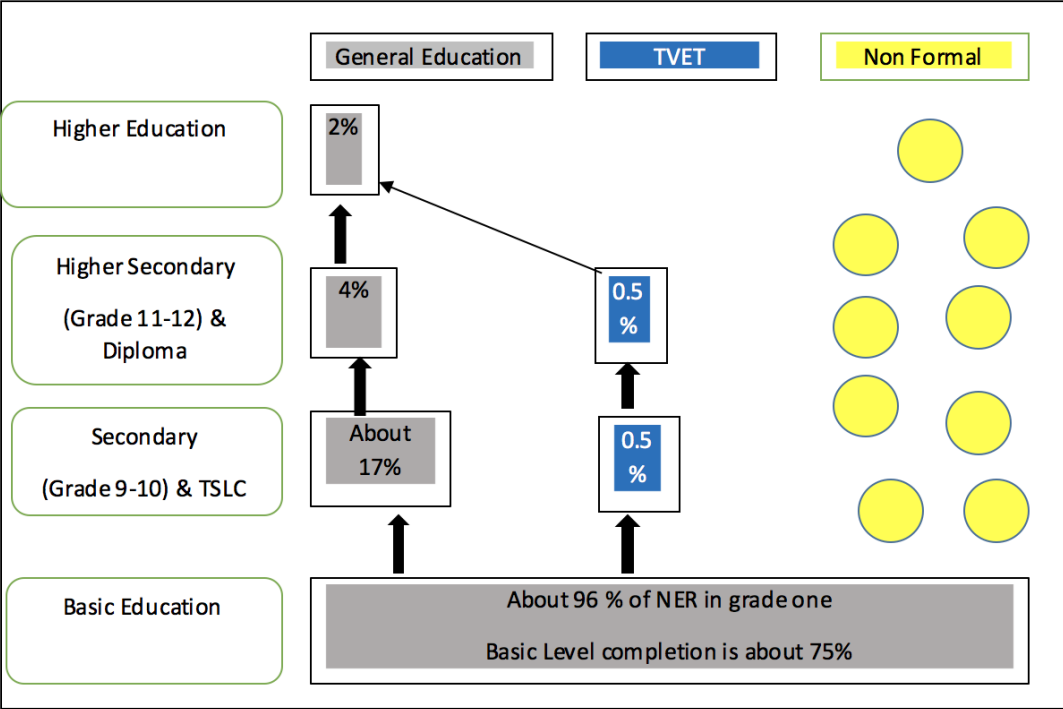*Figure 1: Educational System and enrollment rate in different level based on Basic Education enrollment of 2016.*

## TVET PROVIDING INSTITUTIONS

There are many TVET providing organizations in Nepal. There are different ministries, CTEVT, Community Schools, Private Providers, Non-Governmental Organizations (NGOs), hospitals, industries, and local government. Table 1 below shows the providers and the nature of TVET programs.

*Table 1. TVET Providers in Nepal*

| S. N | Providers | Programs | Remarks |
|------|-----------|----------|---------|
| 1 | CTEVT, MoEST | Diploma, TSLC, VST | Apex Body |
| 2 | Private Providers | Diploma, TSLC, VST | CTEVT Affiliated |
| 3 | Community Schools (Public) | Diploma, TSLC, VST | CTEVT Affiliated |
| 4 | NATHAM, Ministry of Tourism | Bachelor, VST | • Own Curricula • Hospitality Sector |
| 5 | Ministry of Industry | VST | Own Curricula |
| 6 | Ministry of Labour and Employment | VST | Own Curricula |
| 7 | Ministry of Education, Science and Technology | TSSE, Higher Secondary | Own Curricula |
| 8 | Ministry of Agriculture | VST | Own Curricula |
| 9 | Ministry of Transportation | VST | Own Curricula |
| 10 | Ministry of Youth and Sports | VST | Own Curricula |
| 11 | Ministry of Women and Social Welfare | VST | CTEVT Curricula |
| 12 | Ministry of Communication | VST | Own Curricula |
| 13 | NGOs | Diploma, TSLC, VST | CTEVT affiliated |
| 14 | Hospitals and Medical Colleges | Bachelor, Diploma, TSLC and VST | Own and CTEVT Curricula |
| 15 | Industries | VST | Own Curricula |
| 16 | Local Government (Municipality) | VST | Own and CTEVT Curricula |
| 17 | INGOs | VST | Own and CTEVT Curricula |

There were only 5 technical schools and colleges before 1990. According to CTEVT, in 2004 there were 18 Technical Schools and Institutes under CTEVT, 107 private technical schools (TSLC level) affiliated with CTEVT, 20 Annex programs in secondary schools, 71 private institutes affiliated to diploma programs and 34 training institutes affiliated to conduct short-term vocational training As a result of focusing on access and expansion, there are 45 public TVET institutes, 429 private institutes, 397 community schools offering TVET, and 1081 vocational training providers affiliated to CTEVT which was none in 1990 and only 34 were in 2004. The status of the TVET programs is stated in Table 2 below.

*Table 2: Status of TVET Providers in Nepal (Source: CTEVT Annual reports (1989, 2004 & 2019). Ministry of Finance (2019). Budget red book)*

| S. N | Particulars | Unit | 1989 | 2004 | 2019 |
|---|---|---|---|---|---|
| 1 | Public Technical School/ Polytechnic | Nos | 5 | 18 | 66 |
| 2 | Polytechnic Institute (Public & Trust Partnership) | Nos | - | - | 6 |
| 3 | Public College (Diploma Program) | Nos | 8 | 5 | 3 |
| 4 | Affiliated Private Institute (TSLC and Diploma) | Nos | - | 178 | 429 |
| 5 | Community School (TSLC and Diploma) | Nos | - | 20 | 560 |
| 6 | Vocational Training Providers (Affiliated to CTEVT) | Nos | - | 34 | 1081 |
| 7 | Vocational Training Provider Ministry | Nos | 12 | 12 | 12 |
| 8 | Grade 10 (Technical Wing) General School | Nos | - | - | 434 |

There is no standardization of program quality and certification system among the providers. CTEVT is following its own system and other ministries and organizations which are not conducting CTEVT affiliated courses following their own. There is no coordination between different providers. As a result, the system is characterized by resource duplication, lacking quality standards and standardized certification.

# TVET PROGRAMS IN NEPAL

There are different types of TVET programs in Nepal. Recognition of prior learning (RPL), vocational skills training, Technical School Leaving Certificate (TSLC), and Diploma programs are the main program categories. Table 2 shows the details of the TVET programs.

*Table 3: TVET Programs in Nepal*

| S. N | Programs | Duration | Remarks |
|---|---|---|---|
| 1 | Non-formal skills training | 1 week -2 months | |
| 2 | National Skills Testing Certificate/RPL | | Level I-IV |
| 3 | Vocational Skills Training | 3 – 6 months (390 -780 hrs) | |
| 4 | Vocational Skills Training (Professional) | One Year (1560 hrs) | |
| 5 | TSLC | 18 months | |
| 6 | Diploma | 3 years | |

Based on the above mentioned program levels, there are many course offerings. The number of courses in different levels are presented in Figure 2 below (CTEVT, 2019).
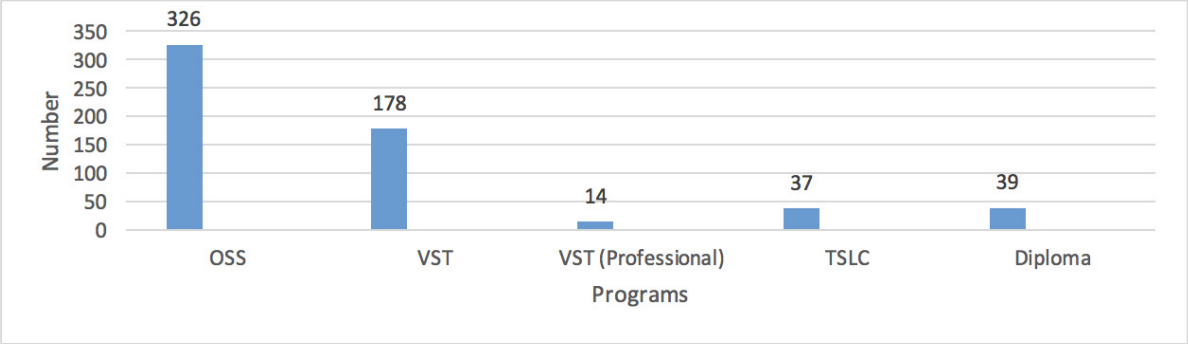


*Figure 2: Number of TVET programs in Nepal*

The National Skills Testing Board has developed 326 occupational skills standard (OSS) in the duration of three and half decades. The standards are from elementary to level IV. Similarly, there are 178 vocational skills training programs curriculum and 14 professional vocational skills training curriculum of almost one year duration. There are 37 TSLC and 39 Diploma programs in the Nepal TVET system. Considering the available programs, quantity wise programs development part is satisfactory. However, there are a couple of questions regarding the relevancy and standard of the courses. Similarly, the Nepalese TVET system has a well vision to capacity development of teaching staff. Therefore, Training Institute for Technical Instruction (TITI) was established in 1991 with the aim of developing TVET teachers' competencies through different training programs. It has been offering training programs on instructional skills, DACUM process, TVET management skills, entrepreneurship development, ICT in TVET, instructional materials development etc.

## MAJOR ISSUES AND CHALLENGES IN THE TVET SYSTEM IN NEPAL

Nepal is one the countries which initiated a systematic TVET system in the beginning of 1980s' in South Asia. In the beginning there were few technical schools and the primary concern was the quality of TVET programs for needy groups. The trainees' selection system was very systematic to reach the door of the poor and committed candidates. Similarly, most of the teachers were competent for hands on skills and devoted to teach students. Similarly, on the job training (OJT) was very systematic

and even government offices paid to students based on the cabinet's decision. Before the introduction of the trade school's concept of 1980's, there were many problems in vocational schools for quality programs. The main reasons were lack of competent teacher, inadequate tools and equipment, and teaching materials, and weak practical training that was not attached with enterprises.

Considering the present situation of TVET system, Nepal has developed some good models for quality programs, but the system is not geared towards progressive rather towards regressive. The government practices in 2019 indicated that the quality of TVET is replicating the situation of TVET before 1980s.

Despite its expansion to both public and private institutes with many programs, there are several issues and challenges in the Nepal TVET system. Some of the major challenges are quality, relevancy, human resources, industry institution linkages, coordination, and sustainable funding. In detail, challenges which are described below.

## QUALITY OF TVET PROGRAM

Quality is the key concern of TVET as in other sectors. According to the great Philosopher Aristotle, quality is not an act, it is a habit. There are some public and private institutions which have established an appropriate learning environment. However, there are some public institutions which do not meet minimum requirements to be a TVET institute. Those institutes are recently opened polytechnics in 2019 and most of the community school based TVET programs. Similarly, about fifty percent of the private institutions don't have an appropriate learning environment to meet curriculum requirements.

Similarly, absence of quality management system in TVET institutes is another challenging factor for quality programs. There is no internal and external accreditation system and weak monitoring and evaluation system. In principle, TVET programs are competency - based, but there are not a competency based system in teaching and evaluation. As a result, the majority of the students cannot graduate from their courses. Lack of competency- based evaluation system and theory -based final examinations are evidences for poor quality programs and low graduation rate.

## RELEVANCY OF PROGRAMS

TVET in Nepal is being implementing without any well-thought out plan. Planning is very weak or almost zero especially in geographical mapping, selection of programs, and feasibility study. Programs have been granted for 275 community schools at a

time in 2019 without any study and assessing the capacity of schools. Programs have been running without fulfilling minimum standard. Almost all institutions/schools are running the same programs such as Diploma in Agriculture (plant science and livestock), Diploma in Engineering (civil, electrical, computer), Diploma in health Nursing, Health Assistant, Lab and Pharmacy), and Diploma in Forestry. As a result, most of the community schools have been running under the capacity e.g., less than 15 students. Therefore, institutes are compelled to collect students and not to select qualified applicants.

## HUMAN RESOURCES

There is a scarcity of competent teachers in most of the TVET institutions. The majority of the rural technical schools and community schools are running without qualified teachers. Some of the community schools have been contracting government employees of different departments to complete a one year TVET course within 2 months. While most of the institutions do not have competent teachers the turnover rate is very high.

## INDUSTRY INSTITUTE LINKAGES (IIL)

Industry institute linkage is a key element to ensure quality and relevancy of TVET programs. It is very important to have a pre-program stage to post program stage. This is very weak in Nepal. Only few institutes have strong linkages with industries such as Butwal Technical Institute (BTI) and hotel management institutes. Nepal is the only country where either students or institutes have to pay to industries for the on the job training especially in hospitality and health sectors. Industries involvement in planning, curriculum development, program delivery and post program support is not effective.

## COORDINATION AND NETWORKING

Coordination and networking with stakeholders is also a major issue in the TVET system. There are different levels of coordination problems. There is no coordination between government ministries, development partners, TVET projects and programs and other stakeholders as well. CTEVT was established as an Apex Body, but it could not coordinate with other ministries because of structural problem. CTEVT Chairperson is Education Minister, therefore; other ministries are not coordinating with CTEVT. There is mismatch between demand and supply due to poor linkage of the TVET system with labor market.

## SUSTAINABLE FUNDING

TVET programs are practical based and need lots of teaching materials and more capital investments than general education. Therefore, it requires sustainable funding sources. Otherwise, quality and relevancy remain questionable always. This is the real situation of the TVET system in Nepal. Due to inadequate funding and uncertainty of sustainable sources, TVET in Nepal always suffers from quality and relevancy. There are many TVET projects funded by development partners. There are normally issues regarding resource and program duplication issues with in projects. About 36 budget heads of twelve ministries have allocated budget for TVET, but this has not contributed to improving quality and relevancy of TVET (MoF, 2015). There are also resource duplication and spending to meet quantitative targets rather than quality.

## SOCIO-CULTURAL STIGMA

Nepalese society still considers TVET as a second option. The image of TVET graduates and skilled workers have not changed in order to be considered as a first class citizen. Blue collar workers are still not recognized well for their social status. As a result, parents and students prefer to take general education. However, trends have been increasing for students to enroll in TVET. The trend of university graduates enrolling in skills training has been increasing due to increased employability. The society is still influenced by traditional concept due to low level education and less exposure to development initiatives and progress in other developed countries. Therefore, TVET is still not considered as a priority area in the education system.

# CONCLUSIONS AND RECOMMENDATIONS

In Nepal, formal TVET system does not have a long history. Nepalese TVET system was one of the good examples in the decade of 1980s'-1990'. Nepal established apprenticeship model before 1980 and skills testing system was introduced in 1984. There were many good lessons and innovative practices in TVET such as the trade school model, students selection at their doorsteps, institutes and industries working together e.g., Butwal, Balaju, Patan, and Nepalgunj. There were free TVET programs for poor and disadvantaged groups which were more practical focused and workmanship culture was presence in institutes. Programs were based on need of the market and researched based. Development partners were tied up with one institute to ensure quality programs. Similarly, project based learning was replicated

Nowadays, development partners are independently managing projects and there is no mechanism for replication of project based learning. There are several issues of coordination in different levels such as between government's ministries or departments, development partners, different levels of government, and between industries and institutes.

In the name of expansion and equity, TVET institutions have been established as a mushroom growing since 2018. Most of the public TVET institutions have been established with political interest not with the demand and labor market interest. Research and development component in TVET is very weak in Nepal.

Lack of minimum standards and qualified teachers are the key concerns of the quality TVET programs. Almost all institutions are running similar programs. New programs are rarely introduced to catch up with latest developments in skills training and requirements As a result, most of the institutions could not fulfill their students' quotas. The overall pass rate of the students is about 20 percent except in health sector. Nepal was a pioneer in skills testing in South Asia. The quality of assessors and credibility of certificates were high in the early days. Now, the national skills testing system is running with the number game and not with system improvement and quality assessment. Because of inadequate competency standards, less competent and experienced assessors and lack of NVQF, skills testing system is not supporting for the quality recognition of the competencies through RPL.

There are lots of budget allocated for TVET, but it has been spread out in different organizations and projects. Therefore, financing in TVET is always problems for quality programs. There is absence of sustainable funding and a one door approach to coordinate TVET financing.

Thus, to enhance the quality of TVET and image of TVET in Nepal, the following initiations need to be in place.

1. Considering the new political structure of the federal system, all local level and provincial level government should have a human resource (HR) plan. Based on this need a National HR plan needs to be developed for 5 to 10 years.
2. There are many TVET providers and a duplication of the programs as well. Institutional and program mapping may be required to initiate merging and affiliation of new programs.
3. At present most of the institutions are operating without minimum standards and requirements of the program. Therefore, it is necessary to evaluate institutions to fulfill minimum requirements for quality programs.

4. Most of the programs are traditional. Based on the market needs, country's economic priority sectors, and technologies, there should be new programs and innovations in TVET such as high tech agriculture farming, food & fruits processing, automotive, mechatronics, digital technology etc.

5. Teachers are inadequate and competencies of available teachers are very weak. The teachers' competency development programs such as training (re-skilling and up skilling), industry exposure, and technology friendly courses are required with long term HRD plan.

6. Government has spent more money but in a scattered way. It may be useful to allocate budget for TVET through one door mechanism in a coordinated way.

7. There is a provision of accreditation system in the prevailing laws and policies, but it has not been implemented yet. Internal and external accreditation system of TVET programs and institutions should be in place for quality assurance of TVET.

8. National skills testing system has been supported to recognize prior learning and skills of the people. Due to the inadequate competent assessors and very old skills standards, most of the skills certificate holders are not recognized well. Therefore, NVQF should be developed and the present skills standard should convert to national competency standard with core, transversal and technical competencies. Similarly, qualification and standard for assessor should be revised and trained accordingly with renewal provision in every three years.

9. There are many occupational skills standards and curriculum. They are not revised systematically. Therefore, there should be linked with occupational skills standard and curriculum and need to be revised as per the need of the market at a time.

10. Many initiatives have been taken to improve TVET system and quality outputs. Most of them were without research or evidence based. As a result, outputs, outcomes and impact of TVET are not positively significant. Therefore, TVET expansion, implementation, development and replication should have research based.

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**Dr. Ramhari Lamichhane** was the first Nepali and the 11th Director General of the Colombo Plan Staff College (CPSC). He was also the President of Asia Pacific Accreditation and Certification Commission (APACC) from 2016-2021.

He has 30 years of experience in TVET starting as an instructor up to becoming the CEO of Council for Technical Education and Vocational Training (CTEVT) in Nepal. He served as Project Manager in ADB projects and Program Coordinator in Swiss Development Cooperation (SDC) funded projects. He was a key member in formulating the TVET Policy of Nepal in 2007 and 2012.

He is a dynamic leader, certified project assessor, strategic planner, experienced project manager, TVET institution quality assessor, TVET expert, and a seasoned manager. These are attested by the awards he has received such as the Prabal Gorkha Dakshin Bahu IV from the Late King Birendra Bira Bikram Shah Dev; Global Educational Leadership Award by the World Education Congress; scholarship from Ryutaro Hashimoto Foundation, Japan; and Humphrey Fellowship from Fullbright Foundation, USA. He has also presented papers in a number of international conferences and meetings on TVET, and has authored and co-authored publications on TVET in various thematic areas: accessibility, greening, entrepreneurship, financing, equality, and image-building.

Dr. Lamichhane earned his Ph.D.  and M.Phil in Education Leadership from Kathmandu University in Nepal. He has a degree in Educational Administration, Planning and Policy from Peabody College/Vanderbilt University in Tennessee, USA.

# ABBREVIATIONS

| B.Ed. | Bachelor of Education |
|---|---|
| BITE | Block Institute of Teacher Education |
| CTE | Colleges of Teacher Education |
| CESA | Central Educational Statistics Agency |
| DIET | District Institutes of Education and Training |
| DPE | Diploma in Physical Education |
| GER | Gross Enrolment Ratio |
| IASE | Institute for Advanced Studies in Education |
| ICT | Information and Communication Technology |
| IT | Information Technology |
| ITes | Information Technology Enabled Services |
| M.A. | Master of Arts |
| M.Ed. | Master of Education |
| MHRD | Ministry of Human Resource Development |
| MOOC | Massive Open Online Courses |
| NCERT | National Council of Educational Research and Training |
| NCC | National Cadet Certificate |
| NCF | National Curriculum Framework |
| NCTE | National Council for Teacher Education |
| NOS | National Occupational Standards |
| NIOS | National Institute of Open Schooling |
| NUEPA | National University on Educational Planning and Administration |
| NGO | Non-Government Organisation |
| NPE | National Policy on Education |
| NSS | National Social Service |
| NSQF | National Skills Qualification Framework |
| NVEQF | National Vocational Education Qualification Framework |
| OBC | Other backward Class |
| ODL | Open and Distance Learning |
| POA | Programme of Action |
| POA | Programme of Action |
| PPP | Public Private Partnership |
| QCI | Quality Council of India |

| RTE | Right to Children to Free and Compulsory Education |
|---|---|
| RMSA | Rashtriya Madhyamik Shiksha Abhiyan |
| SSA | Sarva Shiksha Abhiyaan |
| SCERT | State Council of Educational Research and Training |
| SC | Scheduled Caste |
| ST | Scheduled Tribe |
| TVET | Technical Vocational Education and Training |
| UT | Union Territory |

*Shared Vision 2023*

**The Inter-governmental TVET Leader for Sustainable Development**

*Mission*

**Transforming TVET towards Sustainable Societies through Outcome-Based Quality Training, Accreditation, Research, Innovation, and Image Building for stakeholders**

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