EDUCATIONAL REFORM IN MYANMAR:
A CASE OF TWO TECHNOLOGICAL UNIVERSITIES

BY

MR. MYINT MO TUN

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS (ASIA PACIFIC STUDIES)
THAMMASAT INSTITUTE OF AREA STUDIES
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ENTITLED

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was approved as partial fulfillment of the requirements for
the degree of Master of Arts (Asia-Pacific Studies)

on …….

Chairman _____
(Assistant Professor Tavida Kamolvej, Ph.D.)

Member and Advisor _____
(Assistant Professor Wasan Luangprapat, Ph.D.)

Member _____
(Assistant Professor Gamolporn Sonsri, Ph.D.)

Director _____
(Associate Professor Suphat Suphachalasai, Ph.D.)

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Author	MR. MYINT MO TUN
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Thesis Advisor	Associate Professor Wasan Luangprapat, Ph.D.
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ABSTRACT

Myanmar has been a democratic country since 2011 under President Thein Sein's government. During this period, reforms in social, economic and political sectors have been initiated by the civilian government. Education reform, which includes the development of human capital, is one of the fundamental reforms in Myanmar democratization process. During the fifty years of military rule, education in Myanmar fell far behind international standards, reducing the capacity of the students and teachers to contribute to the development of the human capital.

The purpose of this study is to investigate factors relating to student learning processes in the Information Departments of the Technological University of Mandalay and the Technological University of Kyaukse. The study will analyze key factors of these programs, including the curriculum, pedagogy and infrastructure of these two technological universities. Data was collected by documentary research and in-depth interviews. The documentary research data was taken from journals, scholarly articles and online databases in Thammasat University Library. The researcher conducted interviews with students and teachers in both technological universities. The results show that the curriculum, pedagogy and infrastructure of technological universities are in need of improvement and development in order to produce qualified graduates who can apply their skills and knowledge in the economic sectors as well as to contribute the development of human capital in Myanmar. The

outcomes of this research can be helpful not only for the improvement of technological universities, but also for the whole education system of Myanmar.

Keywords: curriculum, pedagogy, infrastructure, teaching aids, learning resources, skills, knowledge, qualified, graduates, students, teachers, and Information Technology

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Mr. Myint Mo Tun

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LIST OF ABBREVIATIONS

Abbreviations	Terms
ASEAN	Associations of Southeast Asian Nations
DEPT	Department of Education Planning and Training
FESR	Framework for Economic and Social Reform
ICT	Information and Communication Technology
ISO	International Organization for Standardization
IT	Information Technology
KISDI	Korea Information Society Development Institute
KOICA	Korea International Cooperation Agency
MAJA	Myanmar Association of Japan Alumni
MITT	Myanmar Institute of Information Technology
MoE	Ministry of Education
MoH	Ministry of Health
MOST	Ministry of Science and Technology
MPT	Myanmar Posts and Telecommunications
PTD	Posts and Telecommunications Department
QAS	Quality Assurance System
UCSM	University of Computer Studies in Mandalay
UCSY	University of Computer Studies in Yangon
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund

CHAPTER 1
INTRODUCTION

1.1 Background

After fifty year of under military regimes, Myanmar has now begun a democratic transition since 2011, in which. President Thein Sein's government has introduced various political, economic, educational and social reforms. Among them the on-going education reform is most important and essential for the country because the quality of education in has gradually declined since 1962. After the military coup in 1962, students started protesting to express their dissatisfaction with the military regime but were eventually suppressed in 1988. After that, the military regime separated all of the students and scattered all over the country according to the University Law 1973 (Guerrero, 2014).

Most of the universities are administered by the Ministry of Education, but some are administered by various other ministries. According to Ministry of Education (2005), there are 163 universities in Myanmar. Among the universities, the number of the technological university is higher than other types of university that provide specialty program such as medicine, arts, science and foreign languages. There are 56 institutions under the Ministry of Science and Technology in 2015 including the technological universities, the computer universities and the government technical institutions. Of these, thirty three are technological universities.

According to the University Law 1973, universities are to be located outside of urban areas and must be scattered all over the country. Some of the technological universities remained located in the cities while the others were place in rural areas, however most of universities were situated outside of towns. The expenditure for the education declined after the military coup and so did the quality of the pedagogy and the curriculum. The capacity of the students, the teaching staff, the teaching methodology and the resources were limited in the universities since (Hays, 2013).Although the number of universities have increased, the national expenditure for the education sector was only 1.3 percent of national budget. This is a small percentage of a small account, given that Myanmar has been in the list of the Least

Development Countries since 1980 after the military coup and it was described as the poorest country in the world (WorldBank, 2015). The budget allocation and the technical support for the technological universities and the institutions are limited, however quality of technology and the teaching skill of the teachers in the technical universities still should be upgraded especially in Yangon and Mandalay (Waa, 2012).

When universities cannot produce skilled-labors into market, it will certainly affect the economic development of the country. The government cannot provide for the adequate infrastructure for the students such as libraries, workshops, computer rooms and laboratories in the universities. Furthermore, the government cannot support capacity building for university teachers to strengthen the quality of education in the country. There is no interactive learning system in all universities. So students critical, practical and creative skills after they graduate. The quality of higher education has failed due to the government policies and inactivity. Getting the opportunities having brighter future for the young generation is slimmer and slimmer. So the reform of the education system of Myanmar should be in prior to any reform. (Ennew, 2014).

1.2 Problem Statements

There are three main problems facing Information Technology (IT) students in Myanmar. Firstly, Myanmar students have poor skills and knowledge of IT. The major cause of it is that the technological universities have inadequate computer rooms, libraries and the workshops and very poor to internet service as well. Students cannot practice their skills in these computer rooms and workshops and cannot afford to buy their own desktop computers or laptop. Students learn computer programing without a chance to run programs on an actual computer. On top of that, students are week in critical and logical thinking because there is no interactive teaching methodology in the classrooms.

Secondly, the government provides insufficient support and opportunities for students. Due to insufficient government budgets provide the students with adequate teaching staff and sufficient technical support in the universities. The government also has neglected to provide opportunities for the students to work in the

government sector and private sectors as well as to provide students scholarship opportunity to further their studies (Martin Hayden, 2013). These limitations make it almost impossible for graduates to find good jobs fields related to their studies.

Lastly, higher education sector normally produces 180,000 graduates every year, with the number of the graduates is increasing yearly. However most of them were poorly trained and had no relevant skills. Approximately 73% of the graduate students are working in different workplaces rather than working in the relevant field. There is no link between the private sectors and the universities as well as the ministry of labor (Guerrero, 2014).

For the above three cases, this study will provide remedies for the failing technological education sector within universities in Myanmar. This research should be seen as a foundation to reform not only IT department but also other departments and universities as well as the whole education system in Myanmar.

1.3 Research Objectives

The purpose of the research is going to explore what may have caused the low skills in the graduates from the Technological Universities in Myanmar. The objectives of the research are:

1) To identity the key problems of the education system which need to reform in Technological Universities.

2) To review pedagogy, curriculum and infrastructures which are implemented in the IT programs of Technological Universities.

3) To report the policy recommendations for technological universities in Myanmar.

1.4 Research Questions

1) What are the key problems that affect the quality of education in IT department of Technological Universities?

2) How the key factors affect the learning process of IT students in Myanmar?

3) What government should do to improve the skills and knowledge of IT students in Technological University in Myanmar?

This research addresses how developing capacity among students is essential because the students are from the younger generation who will have to undertake the responsibilities of the nation in the future. They are also in integral sector of Myanmar's human capital resource base. However, the greatest challenge is that the students cannot find a job easily after they graduate because they lack of skills and inadequate qualifications to find employment. The government and stakeholders should provide infrastructure such as libraries, good internet service and computer rooms and changes in pedagogy of technological universities in order to better develop student capacities.

1.5 Scope of Research

There are 61 Technological universities and institutions in Myanmar. Some technological institutions and universities were established in cities and some were built in rural areas of the country. Mandalay Technological University and Kyaukse Technological University would be the source of information which this research is based on. The research will cover the information technology department of two technological universities above and study the curricula, the pedagogy and the infrastructure of the information technology department in the two technological universities.

Mandalay technological university was founded in 1995 which is the second senior engineering university in Myanmar. It was located in Mandalay which is the center of Myanmar. Mandalay Technological University offers undergraduate, postgraduate and doctoral program to students every year. It also produces over 3000 graduate students including undergraduate and master programs. Therefore it becomes the second largest technological university in Myanmar. Most of the students and teachers come from upper and other remotes areas. This research has explored student's learning and practicing in the classroom and collected the data from students who have different backgrounds.

Finally the researcher is going to explore the Information Technology department of Kyaukse Technological University which is located in Kyaukse Township, Mandalay division. It was built in 1998 and most of the students are from rural areas. The ranking of Kyaukse Technological University is 90 according to the rank of Myanmar Universities**.** It also provides undergraduate program and postgraduate program for eight departments. The research is going to study the learning process of the students in rural area by comparing Mandalay Technological University with Kyaukse Technological universities. Examining pedagogy and learning system of the students in these technological universities can provide information about how to improve the skills and knowledge of students to become IT professionals after they graduate.

1.6 Organization of The Research

This research is composed of five chapters. Chapter one includes the background of the research, statement of the problem, objective of the research, scope of the research and organization of research.

Chapter two describes the review of literatures, including higher education system and budget allocation of education system in Myanmar, graduates employment and relevant research. Furthermore, it also includes IT sector in Myanmar, IT institution and legal framework, Policy framework of Computer Science Development Council and stakeholder analysis.

Chapter three presents the methodology which includes the data collecting procedures and data analysis.

Chapter four reports the results of study.

Chapter five summarizes the findings of research and also presents the discussion, conclusion and recommendation for further research.

CHAPTER 2
LITERATURE REVIEW

2.1 Higher Education in Myanmar

Education system of Myanmar was firstly recognized in Asian countries after gaining independence in 1948 because of its rising literacy rate and high quality standard education system. In Myanmar, westernized education system was initiated under the British Colonial rule. There was a variety of schools in Myanmar from 1948 to 1962, private schools, Christian missionary and Buddhist monastic schools were popular in the major cities such as Yangon, Mandalay and other cities.

English language teaching was started at the primary level in most of the Christian schools. All of the subjects started being taught in English at the intermediate level in universities. Vocational subjects were introduced in the curriculums of high schools and universities in order to meet the local meets regardless of whether it will be in accord with a knowledge-based system. Among them, Yangon University formerly Rangoon University was the prestigious university in Southeast Asian in 1950s. Myanmar was also awarded by the UNESCO for its high literacy rate in 1970 because the literacy rate was 89.9 percent of the total population. Therefore Myanmar was predicted to become an Asian Tiger in Asian Region before military coup (Alliance).

The higher education system is managed by the Ministry of Education whose responsibilities for management redefined into Upper and Lower Myanmar administrative areas. The institutions and universities are separated by University Education Law 1973.The administration and management of the universities are under related ministries. There are 163 universities and institutions in Myanmar. Sixty-four universities are managed by the Ministry of Education and the rest are supervised by eleven ministries such as the Ministry of Health, the Ministry of Science and Technology and the Ministry of Culture. These institutions and universities offer variety subjects such as engineering, maritime studies, defense, forestry, education, foreign languages, veterinary science, computer science and culture and fine arts. Programs range from undergraduate to doctorate programs under the related ministries.

All of the institutions and universities are under supervision of each ministry, but administration and policy related matters of higher education are governed by the universities' Central Council and the Council of University Academic Bodies which are under the Ministry of Education. The Central Councils of the universities deal with policy issues and coordination of universities and institutions. The responsibilities of Council of University Academic Bodies are to set rules and regulations for academic work of universities and institutions. Short-term trainings and master's degree programs are implemented by Human Resource Development Center in order to develop human resource development under the supervision of the Ministry of education (Education, 2014).

All curricula, syllabi and textbooks to be used in all the institutions and universities are designed and selected by the respective ministries. To prevent the uprising of students, the government scattered the student forces by building all the universities in rural areas outside different cities. The universities in Myanmar lack of resources and skillful teachers. Most of the curriculum and education system were controlled by the military junta and they have become outdated. The following is the table of the universities built under the administration of military regime in Myanmar (Guerrero, 2014).

Table 2.1 Number of Higher Education Institutions under 13 Ministries in 2011-2012

Sr. No	Ministry	Number
1	Education	66
2	Health	15
3	Science and Technology	61
4	Defence	5
5	Culture	2
6	Environmental Conservation and Forestry	1
7	Agriculture and Irrigation	1
8	Livestock Breeding & Fisheries	1
9	Co-operatives	5
10	Union Civil Service Board	1
11	Religious Affairs	1
12	Border Affairs	2
13	Transport	2
	Total	163

Source: Development of Higher Education (Lower Myanmar)

2.2 Budget Allocation in Higher Education Sector

Budget allocation to all sectors is managed by the Ministry of National Planning and Economic Development. The budget allocation system was also centralized and distributed the budget to all sectors in Myanmar but it was slightly decentralized in the age of the new government in 2011. In Education sector, 90% of the budget was allocated to basic education in 2012-13 fiscal year. The Department of Education Planning and Training (DEPT) is responsible for the basic education sector.

Myanmar Times described that the government allocated budget to military three times more than it did to the education and the health sectors combined in Myanmar. Budget spending on military was 12 percent while the education and health sectors were allocated just up to 3 percent. Daw Khin Mhway Lwin, Member of Parliament claimed that the expenditure on the health and education sectors is the lowest in ASEAN countries but the expenditure on military is nearly the same in proportion as of the United States. The allocation of budget to the education sector was increased from 5.2% to 7.5% from 2011 to 2013 under the administration of President Thein Sein government (Lwin, 2014).

Most of the budget allocated was spent on building new universities in rural areas and other regions. The number of the institutions and universities are increased from 32 to 163 during 1988- 2012. The significant problem is that there are inadequacy of skillful teachers, staff and teaching aids in all universities and institutions. The spending on the construction of new universities was 32.8% of the whole budget of the national education (Guerrero, 2014). The higher education in Myanmar could not catch up with the one in other developing countries in the world in terms of educational standard after 1962 military coup. Due to low investment in higher education, the education system has declined over decades.

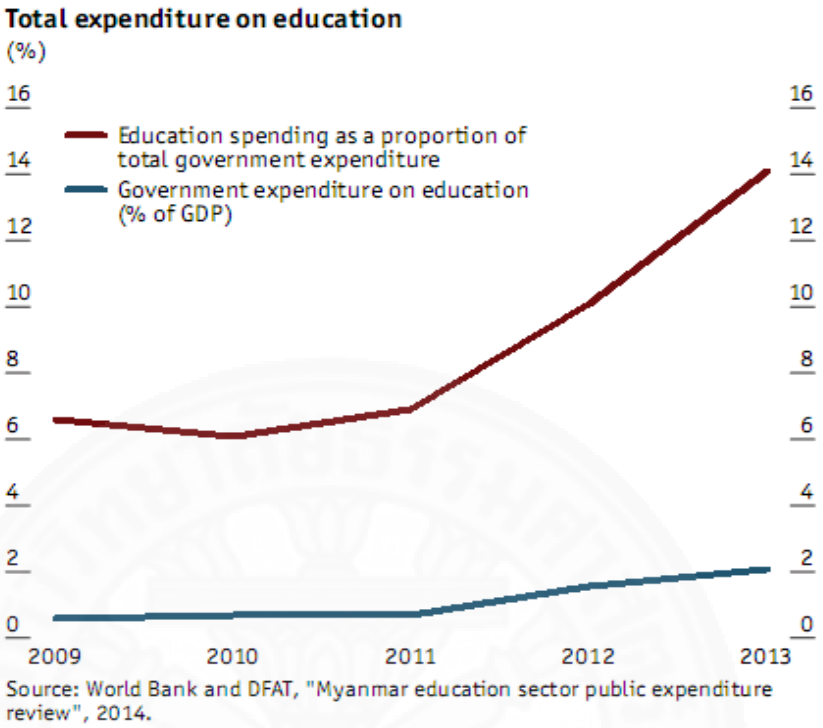
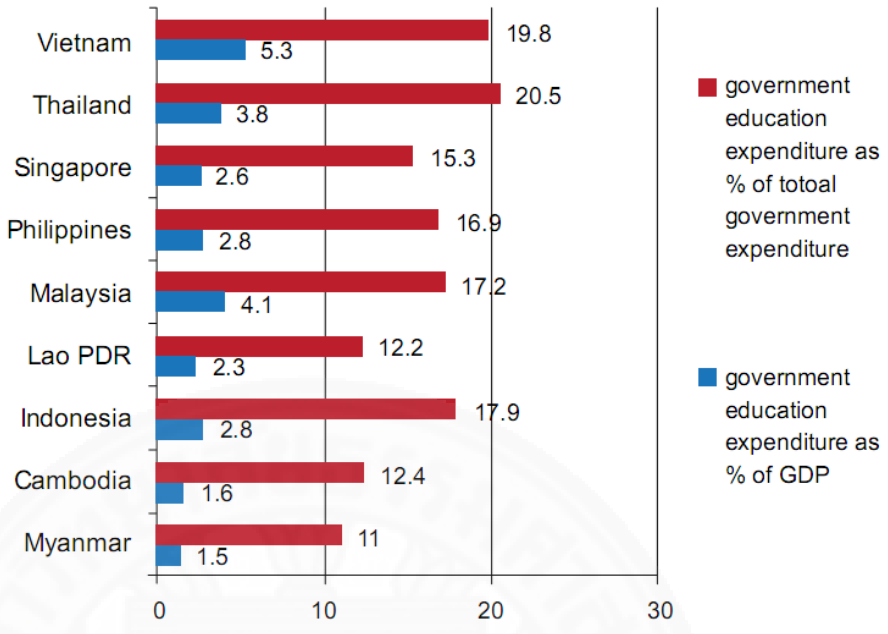


Figure 2.1 Total Expenditure on Education in Myanmar

Compared to other ASEAN countries, the expenditure on Myanmar Education Sector is the lowest in the regions. Budget spending on the education was 0.7% of the GDP and it was 3.5% of the total government expenditures in year 2008. The 20% of government expenditure of Thailand and Vietnam on Education is the highest while 11% on education sector in Myanmar is the lowest in year 2012. In order to improve the education system of Myanmar, the government needs to invest more money in education system so that the people can learn better and higher education and become skillful as in human resource for the economic system in the country in the future. According to UNICE Myanmar's report, budget allocation should be equal in various ministries of Myanmar Education System (UNICEF, 2013).



Source: Myanmar MoFR (2012) and ESCAP Statistical Yearbook 2011

Note: Myanmar figures are for 2012-2012, all other figures are for 2008, except Cambodia which is for 2007.

Figure 2.2 Education Spending in Myanmar – ASEAN Regional Comparison

2.3 Human Resource Development and Management

Even though the government established many universities all over the country but they could only recruit unqualified teachers and did not run teacher training at all. The shortage of skillful teachers in all universities is one of the most important issues. Students' critical thinking and analytical skills are still poor despite their completion of higher education. So the universities could never produce powerful human resources to take part in any field in Myanmar, a developing country, especially in the economic development process.

Goh Chock Tong (Oxrford Business Group, 2016), Emeritus Senior Mister said that Myanmar has rich natural resources but lacks capital, technological and expertise as well as skills for innovative market. Myanmar needs to create friendly environment business by inviting foreign direct investment but institutional frameworks, financial and legal must be strong. It requires investment in human

capital resources such as universities, skill–training institutes and teachers to sustain the economic growth.

The workers will be paid more wages when the development of economy.

Oxford business group described that the historical mismanagement of the Myanmar education system has weaken human resources development especially in Information and Communication Technology. Brilliant students went abroad and have not come back to the homeland yet. Most of the developed countries emphasize on IT education and training as a priority. The number of Myanmar IT graduates may increase with spending on education sector to improve the new political environment.

According to Crook (Crook, 2001), there are five basic resources for human being to survive: Human resources, Social Resource, Natural Resource, Physical Resource and Financial Resource. The proper use and sustenance of all resources plays a key role to the education development in a country. Thereafter, people can manage and make the best use of those resources. Among them, the human resource capital development depends on the educational development of that country which can reduce poverty rate and deal with other issue such as international conflicts, national reconciliation, unemployment and communication to other countries to compete with international. Therefore, the essential and important thing is to reform education system in Myanmar to be recognized in the international society.

2.4 It Sector in Mynamar

Myanmar government is promoting the role of the ICT industries in order to develop the ICT sector in the country. Developing Information Communication Technology contributes to the achievements of the political, economic and social objectives of the country. Cooperation with international ICT industries encourages the development of Myanmar ICT sector, especially in Software industries. Utilization of ICT helps improve the productivity, market penetration, reducing cost in socio-economic of the country that can improve providing services in the global market.

Myanmar government is trying to develop ICT sector by emphasizing on the ICT Infrastructure, ICT Legal Infrastructure, ICT Education, ICT Application, and

ICT Industry. These five areas define the strengths, weaknesses, opportunities and problems of Myanmar ICT sector. Developing Myanmar ICT sector also contributes the implementation of socio-economic development. Therefore IT master plan was formed by collaborating and cooperating with Myanmar Computer Federation and e-National Task under the supervision of Myanmar Computer Science Development Councils.

The core missions of IT master plan were established based on the political, economic and social objectives of Myanmar and current situation of ICT global trends. IT master plans have to assist all of the people in Myanmar to be able to assess ICT applications through state management to improve efficiency and reduce costs. IT is widely used in business organization in order to improve productivity and deliver service to the community. Socio-economic organizations are using IT infrastructure to develop communication and reduce costs. Developing IT industry is one of the essential components of economic sectors. National education system will improve by accessing IT application all over the country. Business organization enters international market by using IT applications. Producing adequate IT professionals to work in the IT industry can also support human resources development (Kywe, 2015).

2.5 National Policy of Myanmar ICT Sector

Five areas were set up to develop IT in Myanmar in 2010. They are (1) IT application (2) IT in Education (3) Foundation for IT industry (4) IT infrastructure and (5) IT legal framework.

Infrastructures are essential not only in urban areas but also in remote areas of the country. People in remote area can have an access to internet easily as people who live in cities. It is necessary to make sure to improve bi-lateral and multi-lateral with international agencies in IT sector. The capacity building of institution is required. Cooperation and coordination with the private companies can help the development of the IT sector in Myanmar.

IT institutes should be established in order to produce IT professionals that contribute the development of human resources in education sector. IT devices

are applied in the research center as well as facilitating in the use of internet at the same time. Students have to learn about the ICT in basic education schools.

The purposes of IT application are to encourage people are widely used in ICT application with better service all over the country. The productivity and the entrance to global market will be improved by accessing to IT in local business organizations. The education level of the people will be improved using IT in education system.

The objectives for ICT industry is that the ICT industry would become one of the important sectors of business and give opportunities to IT professionals to take part in the ICT industry and ICT applications. It is important to develop the software industry and to be able to enter international markets. ICT market should be more liberalized in production and investment in order to distribute goods and services. Knowledge sharing of programmers and IT professionals helps the development of ICT sector in Myanmar (www.myanmar-responsiblebusiness.org, 2015).

2.6 Government Institutions and Legal Framework

The Ministry of Communication and Information Technology mainly perform the responsibilities of ICT sector in Myanmar. MCIT undertakes to develop Myanmar ICT sector, liberalize the development of IT market, serve the lower prices for users, enforcement of worker in ICT sector and widely used inter access throughout the country. MCIT has two portions: Posts and Telecommunications Department (PTD) and Myanmar Posts and Telecommunications (MPT). PTD is responsible for issuing licenses to Telecommunication Companies, installing infrastructures and managing disputes in ICT sector. MPT serves as mobile network operator and pays internet services. MPT is cooperating with KDDI and Sumitomo Corporation for ICT infrastructure, customer service and do the business reform in ICT sector.

There are two components involved in supporting Myanmar ICT sector. Ministry of Science and Technology (MOST) perform the development of ICT human resources and supervise the technological and computer science universities.

According to Computer Science Development Law, the Computer Science Development Council was organized in 1996. Computer Science Development Council is one of the key players setting ICT policy and helps the government in the legislature of ICT sector (www.myanmar-responsiblebusiness.org, 2015).

2.7 Policy Framework of Computer Science Development Council

The Computer Science Development Council adopted the following policies under the 1996 law of Computer Science Development Law. The Council supports the rule and policy of ICT and implements the development of science and technology in ICT sector according to the regulation of Information Technology of the state. It also monitors whether or not the computer organizations and associations in the country are run by the rules and regulations of the computer science law.

Government started implementing the Framework for Economic and Social Reform (FESR) in 2012. The framework was linked to the other reform programs such as political, economic and administrative sectors which are collaborating with the international organizations. The FESR prioritized on upgrading the ICT infrastructure and internet service with two polices. The first one is market liberalization to create competition among commercial IT companies. Therefore, upgrading internet infrastructure, rules and regulation and education programs are involved in priority plan of ICT sector by the government (Bank, 2013).

2.8 Stakeholders Analysis

There are a variety of stake holders in the ICT sector in Myanmar including civil society organization, non-governmental organizations, private sectors and government officials. Most of the civil society organizations perform IT conferences and workshops, trainings, education program and develop rules and regulation of IT. The ICT working group is organized with the agreement of Myanmar government and donor agencies. The working group works to support the transformation of IT sector and service provider in private sector. The working group focuses on E-governance, conducting IT education through the country and helps the

students and worker to be able to have an access with internet. It also performs the coordination with other stakeholders and create platform for ICT development. Non-governmental organizations contribute to the public sector reform program of telecommunication sector and provide capacity development of E-governance in Myanmar. The private sectors encourage the IT students to run IT trainings and distribute technological inventions among markets (Kywe, 2015).

2.9 Teaching and Learning Process in Universities

2.9.1 Examination System

Examinations are one of the education systems in every university of Myanmar. Only examinations can determine qualification of students. Students just focus on passing the exams rather than making themselves fully qualified in respective fields of study. Student performances are not considered in the results of education system. Myanmar Education Research Bureau reported that *"Myanmar's rigid school examination system, which encourages elitism, is a relic of the colonial period that survives Myanmar's gaining independence in 1948 and still dominates the education system".* Therefore culture of examination encourages the Myanmar Education System to practice rote learning method. Teaching and learning processes are based on teacher-center approach because of examination system. Learning process primarily focus on memorizing the facts of the textbooks which are not updated. Most Myanmar students cannot raise questions, think logically and critically and weak in problem solving not only in the classrooms but also their practical life (Sjoholm, Educational Reforms and Challenges in Southeast Asia, 2002).

2.9.2 Learning Methods and Materials

Institute of International Education (April, 2013) reported it is critical to engage with Myanmar. It is essential for Myanmar to produce students who are capable of critical thinking and innovation in higher education system as well as improving infrastructures such as internet, libraries and laboratory facilities. Myanmar higher education system needs international educational cooperation, lack of social capital, lack of capacity to build international ties, curriculum, the centralization for

institutions and universities and decentralization in bureaucracy of education system. The reform of higher education system has to be done a lot in infrastructure and information technology, to the academic curriculum, the upgrading of the quality of faculty, higher education administration and governance and international engagement.

Camilo Guerro (Guerro, 2014) recommended that Myanmar is inclined to develop a service-based economy but unemployment rate has risen because of an ineffective and underfunded education system. Based on the rote learning system, students cannot have practical skills and critical thinking for their capacity development. The courses of universities cannot provide the requirement of the industry. Education budget spending lacks strategic planning. Government does not contribute to improve the quality of university education system instead of building new universities all over the country. The number of universities became 163 universities in 2012 although there is inadequacy of teachers in universities. Teaching system is based on rote learning and the government cannot help support in running workshops, equipment and other infrastructure for all universities. This causes the students to be unable to make the best use of their educational knowledge after they graduate. The quality of Myanmar higher education is getting more and more poor. This is why the employers are hesitant to appoint those graduates as their company staff. There is no cooperative interrelation between universities and business sector. It also causes the graduates to lack the industrial experience and the employers to lack the opportunity to influence course content. As graduates are poorly trained and lack skills, it is also difficult for the employers to hire them in their companies.

2.9.3 System of Evaluation

To be more effective and get the good results of the education system, the education system can be measurable or evaluate itself. The educational reform was started in Myanmar since 2015 under new government but there is no regulation and procedure for the curriculum review and assessment in the performance of teaching and learning system in higher education (UNESCO, 2014). The education system is mainly focused on the memorizing and learning is not effective for application, analysis and evaluation of teaching and labor market. In

addition to this, the Quality Assurance System (QAS) has not been implemented in the higher education system to assess the education system that include teaching system of staff, capacity of the teaching staff and performance of students in the academic year (Win, 2015).

2.9.4 Supporting It Facilities in Universities

The resources of infrastructure and learning aids are scarce and insufficient for students to practice in their academic year. The funding is limited and so is the support in the form of technical equipment, internet and workshops in every universities and institutions, but e-libraries are being implemented in some of the universities in Mandalay and Yangon. Students can access computer with 130,000 digital texts and academic database in the e-libraries. Fiber-optic cables are provided by Open Society Foundation which is based in United States in two universities to support the e-libraries with sufficient bandwidth. This can help provide to get better learning environment in these universities.

2.10 Employment and Graduates

The graduate students are poorly trained and have inadequate capacity to get suitable jobs. There is no engagement between universities and business sectors. The courses of the universities could not provide students with needed skills to meet the industrial requirements. Industry and business sectors would not offer relevant positions for the students. There is no internships and field work in any industry and business sectors for newcomers. The private sector cannot involve in the curriculum development in the universities. Students are unable to learn in their related fields while they are studying in the universities. Students lack field experiences as well as industrial experiences. So the employers do not want to hire graduate students because they believe the higher education cannot produce qualified students with adequate skills and knowledge for the work. The employers have to train the graduates or non-graduates first before they are put in to work. The labor shortages have occurred in every sector especially in telecommunications, manufacturing, oil

and gas, electrical engineering and information technology (IT) services. The well trained employees are highly in demand in all these business zones.

Most young people cannot afford to go to university because there is no financial support for the students and scholarship program provided by the government. It is difficult to get a job which is related to the graduation field. Approximately 50% of graduates are employed in agriculture, tourism, industrial zone, mobile and telecommunication sectors and financial sectors in Myanmar although unemployment rate is 4.04 percent between 1994 and 2013. Nearly 18,000 students are graduated every year from all the universities. The graduates from technological universities were 2.9 percent of the work force of the country while 9.4 percent of the work force from arts and science universities and 6.2 percent of the work force from Ministry of health such as medicine, dentistry and nursing (Guerro, 2014).

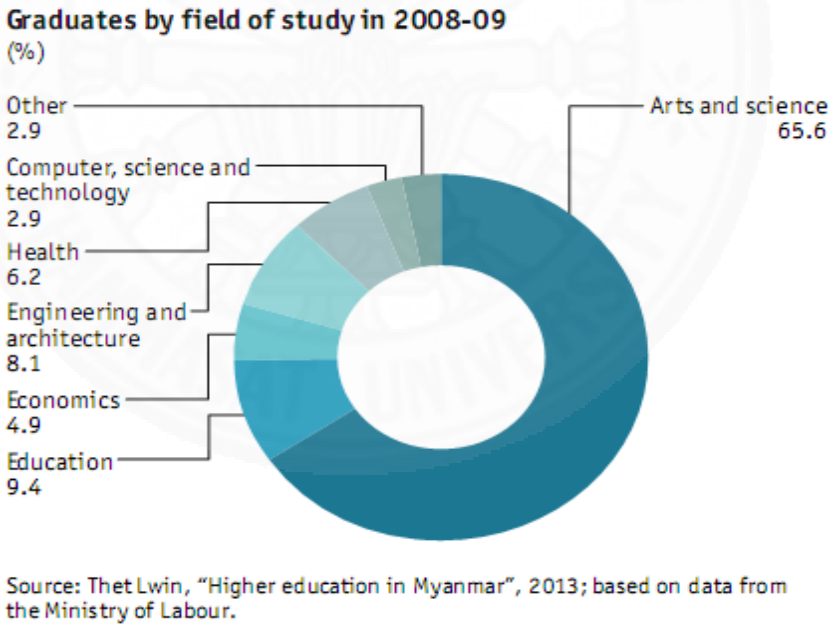


Figure 2.3 Graduates by field of study in 2008-09

2.11 Relevant Research

Krissanapong Kirtikara reported about the reform of higher education in Thailand in the article of “Higher Education in Thailand and the National Reform Roadmap”. Education Reform was a fundamental part in Thailand according to National Education Act 1999. The reform had begun with in-depth analysis of the 1997 Constitution and National Education Act 1999. The implementation was the education system and society of Thailand. One of the achievements in the higher education reform included good administration and management. The administration and management of education system reform was based on the teaching, research, contribution of academic resources served to society and promotion of arts and cultures.

The second reform was to develop human resources of Education system. Universities must produce not only graduates but also those who can continue to learn in the future as a profession. This reform was the development of human resource and the support in the economic development of the country. Finally, formal education program encouraged students to have work experiences in business sectors. Universities were crucial part of the reform of higher education in Thailand. University Councils developed policy on education and research, budget and finance, missions and visions of the universities. University councils also emphasized the performance of the faculties and their function based on the teaching, student learning and infrastructures (Kirtikara, 2001).

Auditing, reporting and assessment became regular features of the governance of the education system to evaluate the accountability and transparency. Universities promoted the capacity of the academic staff in order to be effective and efficient in learning environment. Universities fulfilled to meet expectation of the society, capacity development of the academic staff, resources for the students including scholarships and loans and maintain culture. Therefore universities in Thailand become a potential source as well as technologically innovated for young people. Interconnection between stakeholders and business sector can develop the capacity development of the students as well as supporting the funding of the universities.

The higher education reform of Thailand promoted curriculum, design for teaching and learning. This is to ensure flexibility to meet requirements of national level for business sector and individual learners. Developing learning innovation and information technology had some effects on skills and knowledge of graduates. Student-centered approaches, analytical skills, critical thinking and learning motivations were basic reforms of higher education. Moreover, research development, technology innovation and autonomous of higher education institutions were involved the reforms of higher education. On the other hand, quality assurance and education evaluation developed national education policy and learning environment of higher education. In these ways, providing physical infrastructures, development of Information Technology, improvement of manpower and management mechanism promoted reforms of higher education in Thailand according to National Education Act 1999 (Sjoholm, 2002).

2.12 Educational Reform for Technological Universities

2.12.1 Curriculum

Curriculum is one of the instruments between teachers and students to create learning environment. Curriculum needs to be effective in educational institution in order to get the better education system. An effective curriculum delivers a quality education to student and teacher which need to be made including stakeholder with measurable design and system. The curriculum organizes core competencies, measurable plan and learning outcomes which expects students to have critical thinking, innovation and creativity. Students can make the best skills and ability before the next level. Teachers are involved as a part of key player to develop, identify, implement and upgrade the curriculum. An effective curriculum acts as a guideline for teachers and students to follow on the route to academic success (Glenn, 2016)

2.12.2 Impact on Administrators, Teachers and Students

The administrators concentrate on the details of the curricula to help students to achieve and develop their ability in academic years. The curricula are planned on monitoring of the teaching progress and relevant materials. Therefore

administrators adopt the curricula based on detail progress of students' learning in order to get effective curriculum.

Teachers perform according to the curriculum and deliver the courses and knowledge to the students. Teachers follow the learning objectives of curriculum in order to help the students achieving goals. Without adequate teaching skills and knowledge, teacher cannot build up the capacity of students. Curriculum encourages the capacity of teachers to fulfill the learning objectives and expected outcomes.

Students have to learn on a road map of curriculum which is a sequence of courses. If the curriculum cannot provide the students with the development of skills and knowledge, the objectives of learning will not be achieved. Therefore the curriculum ensures students to reach their goals and earn desired skill on the right tracks.

The curriculum development has a wide range because it is not only for the universities, schools, students, and teachers but also for the development of society in the education system. The curriculum development is a crucial part of supporting the economy of the country. It can also help address conflict and problems such as politics, gender issue, poverty and sustainable development of states. Universities need to ensure that the curriculum should be creative and linked to the local and global markets. The curriculum development can encourage improving the way of people's life and economy of the country. In order to develop the curriculum, the experts need to work together with lawmakers, government officials and business people. Coordinating with the business sectors and industries and other economic key players can introduce new rules and policies for education reform. Developing curriculum in education system can persuade students from foreign countries. Improving international students can bring income for universities. If the income of universities is getting higher, the quality of education system may be able to be upgraded in a certain way by providing the teaching staffs with trainings, the scholarship programs and the infrastructure for students such as libraries, school facilities and laboratories.

2.12.3 Pedagogy

Pedagogy is based on how to deliver the objectives of the courses to students. Teachers are using various teaching methodologies. Teachers use different teaching strategies to deal with the different group of students to improve their learning outcomes. Pedagogy is interactive communication between students and teacher to practice the abilities of learner and teachers in the learning environment. Teaching is an important role of pedagogy. The skills and capacity of the teachers must be in accordance with the well-acknowledged standards in the teaching system. The teaching system must be effective to improve students' learning. Teachers must have the essential knowledge of pedagogy and supervise student learning. Teachers need to practice and learn from their experiences for teaching. In addition, teachers have to apply technical knowledge and skill in their daily teaching. Learning is a process not the product that should involve the experiences and skills of individual teacher who can help not only the development of knowledge of each student but also necessary adjustment of classroom condition.

The effective teaching creates to achieve the learning objectives by teachers. There are two essential elements for effective teaching. The teachers must set up the good learning environment for the students and give clear instructions to the students in the classroom. Teachers can establish active engagement and instructional environment to improve the strengths of students in the learning process. Teachers determine teaching strategies, learning aids and objectives of the teaching with every specific learning process to be created. Pedagogy evaluates the suitable learning objectives and strategies in a variety of teaching situations and accomplishes learning process. The principles of pedagogy emphasize on individual knowledge and experiences in their life and work. Developing skills and knowledge which are related to learning objectives and planning of teaching are to be more effective in teaching. Pedagogy interrelates with curriculum and students in teaching that construct present abilities and knowledge of students to be more effective.

Pedagogy engages instructional strategies and resources to match with the different background of students as well as exploring the knowledge, skills and concept of every student. Pedagogy also encourages teachers how to perform as trainers, facilitators, coaches and instructors according to courses and curriculum.

Furthermore, teachers realize that how to apply teaching methodologies, different types of resources and teaching aids and organizing learners for group works. Finally, pedagogy assists teachers in evaluating the development of students, requirements of curriculum and reflects the teaching methodologies in learning process. Nowadays development of pedagogy become fundamental in the teaching system and more and more students participate in it (Bhowmilk, 2013).

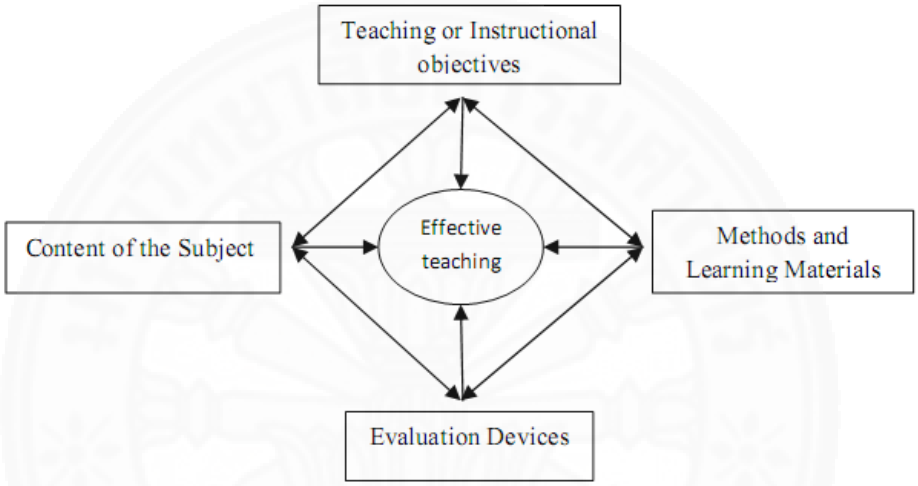


Figure 2.4 Pillars of the teaching learning process

Source: Role of Pedagogy in effective teaching, 2013 based on basic research journal of educational research and review

2.12.4 Infrastructures

The infrastructure of the university helps to enhance the preferment of faculty, academic staff and students in their work place. Facilities and teaching aids are fulfilling the objectives of teaching, learning environment and engaging with the real world. Among them, Information resources and technologies are the infrastructures of learning society.

Physical infrastructure is the basic requirement of the University. It includes campus, dormitory, sport facilities, library and information technology are essential for students and academic staff. These are the essential features of the university. The resources carry out the goals of the University and accomplish the

performance of the students as well as assisting teachers. These infrastructures also perform the achievement of the education system in learning process. Infrastructures reduce the sequence of administration process of the academic staff and routine of daily works.

The research development relies on the resources of the university in higher education system. Promoting the quality of the infrastructures for research and teaching can improve the learning environment of students. Creating materials for learning aid enhance the capability of students. Students must be able to use learning resources and have the skills, knowledge and experiences then ensure that they are able to apply them in their work places after they are graduated. Developing Information Technology is another important resource of the teaching and learning process because being able to access with the database is an essential element for teaching and researching. Accessing internet enhances the ability of the students which is linked to their research and academic projects as well. Therefore physical infrastructures are essential for the administrative process improvement, learning and teaching environment and an enhanced information environment of the higher education system (Peterson, 2013).

Libraries are essential parts of Universities and higher education. Libraries are the banks of knowledge which also create environment for students' learning to perform academic works. Libraries are not only resources for students and academic staff but also necessary equipment for their studies. Therefore libraries undertake significant achievements of students and performance of teachers in the academic year. It also contributes the development of faculty, students and teachers as well as the goals of the faculties in universities.

Students require library to gain more information about their subjects in order to improve their learning experiences. Libraries are involved in the learning community engaging teachers and students academically to get achievements. Nowadays, electronic libraries are widely used as a combination of academic library. E-Libraries are useful for remotes areas and used to get information in a shorter time incoherent. Therefore libraries are an important part of the university to encourage the capacity development of the students and teacher as well as research development of higher education (Morgan, 2013).

2.13 Conceptual Framework

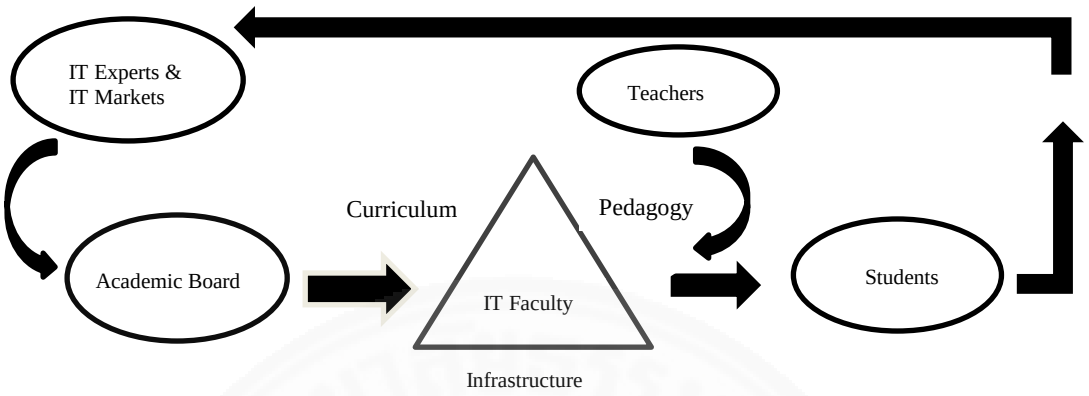


Figure 2.5 Framework for Educational Reforms of IT Departments in Technological Universities

Updating curriculum that is based on need of markets, changing the pedagogy that is based on interactive learning between teachers and students and providing learning aids and libraries for research and learning environments are fundamental in educational reform. The purpose of the educational reform is to develop the capacity of human resources. The curriculum in schools, especially in higher education, must be developed to retain human resources and economic development of the country. Students are the majority of the human resources in Myanmar. Therefore, capacity development of students is essential in order to produce qualified graduates in the local markets and business sectors. It can also build the quality of learning as well as the capacity of teachers. University needs to maintain and upgrade the teaching facilities, tools and equipment to be more effective for teaching and learning process.

CHAPTER 3
RESEARCH METHODOLOGY

This research was designed in quantitative method, which was conducted through an approach in documentary research method and the data collected in two technological universities in Mandalay and Kyaukse, Myanmar. This chapter is organized in (1) Documentary Research, (2) In-depth Interview, (3) Field Research and (4) Data Analysis.

3.1 Documentary Research

In documentary research, the data was collected from international and local organizations in which the reports about higher education in Myanmar were kept. The research explores on the curriculum, pedagogy and infrastructure implemented in the technological universities in Myanmar. The research is also contained of the data from the secondary source of data such as books, library documents, workshops, media, journals, internet, academic and policy research papers, public newspapers and international education institutes as well as Thammasat online data base. Some of the information can assess reports from international non-government organizations such as World Bank, Asia Development Bank and United Nations Agencies. In addition, reports on the technological universities to the ministry of education and private journal articles in Myanmar language. The speeches of educational leaders about higher education in Myanmar were also accessed for documentation.

3.2 In-Depth Interviews

The researcher conducted in-depth interviews to get detail information from key persons. The researcher had in-depth interview with heads of departments, teachers and students of technological universities in Mandalay and Kyaukse. The students who participated in these interviews were selected from each academic year including first year to final year in technological universities. The heads of the

departments of Information Technology and teachers from both universities were also interviewed. Finally, the researcher conducted interview with Dean of Curriculum Development Committee of IT in Thanlyin Technological Universities at Yangon, Myanmar.

The researcher observed the education system of technological universities such as pedagogy, curriculum and infrastructure in these two universities. Thanks to in-depth interviews, the researcher was able to collect specific information related to the research. The interview explored the education system of the technological universities and the challenges of the students and the teachers in each university. The researcher investigated the differences between the universities about the curriculum, pedagogy and infrastructure and as well listened to the students' and the teachers' opinions on the improvement needed of campus life and the changing of policy needed in the education system.

3.3 Field Research

This research selected Mandalay and Kyaukse Technological University to compare the differences between the two universities in the curriculum, the teaching methodology, the academic staff (teacher) and the teaching aids (infrastructure). Upon comparing, the causes were observed in order to promote the higher education not only in technological universities but also in other universities in Myanmar. Although these universities are supervised by the same ministry, they have different resources, numbers of academic staff and students and locations.

Mandalay Technological University is located in Mandalay which is the second largest city in Myanmar but Kyaukse Technological University was built in the rural area near Mandalay region. Mandalay Technological University was built in 1955 and Kyaukse Technological University was established in 1998. Most of the teachers in Mandalay have more experiences and better teaching ability than the teachers in Kyaukse. The students in Mandalay are much more knowledgeable than the students in Kyaukse because they can access the internet and get the chance to access the new technology which was only available in the bigger and more modernized city which is Mandalay. Although the life style of the students are not the

same but they have to survive the academic years under the same dull education system of technological universities.

3.4 Data Analysis

In this part, the research was composed of interviews, observations and conversation with students, teachers and other key informants. This research was done by using primary and secondary sources through reviewing literature. The data were analyzed based on result of interviews and rules and regulations of higher education system to give the recommendation on the policy of technological university in order to improve higher education in Myanmar. Furthermore, it is mainly emphasized on exploring ways to develop the capacity and knowledge of the students. Finally, the research observed the inefficiency and insufficient in term of policies, academic staff, teaching methodology and supports of technological universities to promote education system.

3.4.1 Analyzing Technique

Data were analyzed in three ways. Firstly, data and information were collected by literature and documentation and in-depth interview. Secondly, data was monitored by the research questions which were selected in the Chapter (1). Finally, the data was analyzed in the form of analysis review.

3.4.2 Participants

This research study proposed to examine participants' attitudes toward the curriculum, pedagogy and infrastructures of the technological universities in Mandalay and Kyaukse. The sample of research was organized with 10 students, 5 teachers and a head of department from the technological universities. The participants were interviewed as follows:

The researcher interviewed with Head of Departments in IT program about how they are conducting lecture to IT students in terms of pedagogy, curriculum and infrastructures in the technological universities. The researcher also

discussed with Head of Departments about the policy and plans of education system which are implementing in these two technological universities.

Then the researcher had interview with the lectures of IT departments who are teaching in the technological universities. We discussed on the teacher trainings, teaching methodologies, curriculum and teaching aids and their experiences in every year. The researcher interviewed their opinions of technological universities based on the working experiences.

Finally, the researcher interviewed students in IT department to explore their difficulties in the classrooms using computer room, learning in the class and their experiences in each academic year in both technological universities. The interview learned the opinions of students on their universities and challenges while they are attending university.

CHAPTER 4
RESULTS AND DISCUSSION

This chapter represents the result of education system of two technological universities in Mandalay and Kyaukse, Myanmar. The aim of this research is to explore how effectiveness of curriculum, pedagogy and infrastructures of Technological Universities can provide students to apply for respective jobs after they graduated especially in Mandalay and Kyaukse Technological University in Myanmar.

Interviews were conducted with teachers, students and stakeholders in Mandalay and Kyaukse Technological University. The data were analyzed using qualitative content analysis based on the interviews at the two technological universities.

4.1 Overview of Higher Education in Myanmar

Ministry of Education has implemented short and long-term education development plans that are intend to improve the quality of the higher education and is privileged to access education for all ethnic minorities. Education system in Myanmar has been centralized in universities and institutions. Universities are specialized in particular subjects under administration of corresponding ministry according to the University Education law of 1973. Ministry of Education has practiced Basic Education law of 1973, the University Education Law of 1973 and Vocational Education law of 1983 that do not support in undertaking the development of education. Although universities and institutions are under the supervision of related ministries, academic, and promulgation of policy relating to higher education are managed by Ministry of education but there is not collaboration and coordination among Ministries for higher education.

In addition to this, there is no regular curriculum review mechanism in education system. Curriculum framework is not clearly defined in the Basic Education Law. The universities and institutions do not have standardized test to examine the effectiveness and practical usefulness of curriculum. Most of the curriculum and text

book have not been reviewed for over ten years. There is no specific law in higher education that help support the development of curriculum in Myanmar. Curriculum reform should be prioritized in order to improve it in higher education. Moreover, the shortage of teachers make the universities unable to be provided with the sufficient number of students all over the country. There is a slight difference between the number of schools in urban and rural areas. Therefore, scarcity of teacher and qualification of teaching staff are not capable causes the critical and practical skills of students to be incapable of being developed, which is usually experienced in universities and institutions throughout the country.

4.1.1 Budget Allocation and Education System in Myanmar

However, this perspective based on Myanmar education system still lags behind the ones in other countries. During the military rule, the government spent 1.3% of the national budget in education sector which led to the rapid decline in the education system which used to be recognized as the best in Southeast Asia. The expenditures of government in education sector was 3% of total public expenditure in 2008 to 4% in 2009 and it increased up to 12% of public expenditure in 2012. The expenditure of education and health sectors is the lowest among the other sectors in Myanmar.

The allocation of budget to the education is not sufficient for higher education in Myanmar. According to budget allocation, the Ministry of Education was allocated up to 47%: the Ministry of Defense 2.7%, the Ministry of Science and Technology and the Ministry of Health 9% and 2.6% respectively in 2014.

In Education sectors, the most spending is on household goods among other spending because government built many universities all over the country. The spending on the limited budget allocated for education lacks strategic planning, which happens to be done ineffectively. The government should do something effective enough to improve the quality of university education system rather than building more new universities all over the country. The number of universities became 163 in 2012 although the number of university teachers is inadequate.

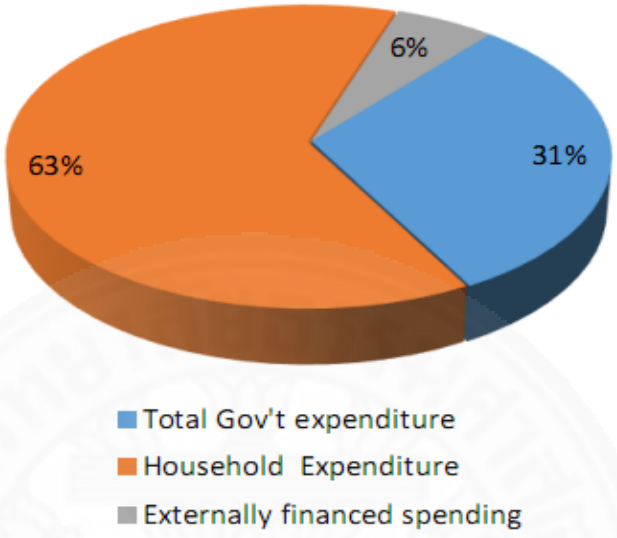


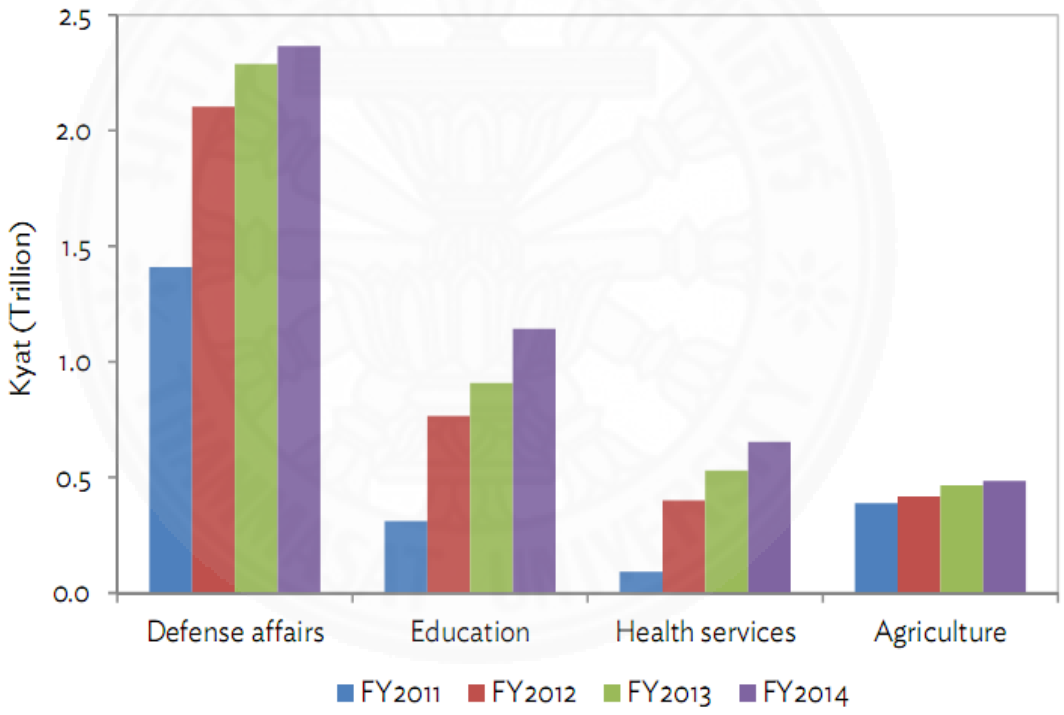
Figure 4.1 Expenditure of Ministry of Education

Sources: World Bank staff calculations based on IHLCS 2009/10 and MoE data for MoE spending in 2009/10.

It is essential for Myanmar not only to produce students who are capable of critical thinking and innovation in higher education system but to improve in infrastructure such as internet, libraries and laboratory facilities. Myanmar higher education system needs international educational cooperation, lacks social capital, lacks capacity to build international ties, curriculum, the centralization for institutions and universities and decentralization in bureaucracy of education system. There is plenty of scope for the reform of higher education system: infrastructure and information technology, the academic curriculum, the upgrading of the quality of faculty, higher education administration and governance and international engagement.

Myanmar is inclined to practice a more service-based economy but unemployment rate is frequently high because of an ineffective and underfunded education system. Based on the rote learning system, students cannot have practical skills and critical thinking for their capacity development. The courses of universities

cannot provide the requirement of the industry. Teaching system is based on rote learning and the government cannot support workshops, equipment and other infrastructure for all universities. This may cause the students unable to make use of what they have learnt after they are graduate. The quality of Myanmar higher education is getting more and more poor, the employers do not want to hire job to graduates. There is no interaction between universities and business sector. Graduates do not have related work experience and there is no opportunity for employers to influence course content. As graduates are poorly trained and lack skills, employers are difficult to get potential candidates to hire job.



FY = fiscal year.
Source: Union Government of Myanmar (2011, 2012, 2013, and 2014).

Figure 4.2 Public Expenditure Allocation by Sectors

4.2 Overview of Computer Science Universities and Technological Universities

Information and Communication Technology (ICT) plays the most important role in the country that can drive to modernize every sector of the country in order to collaborate with other countries at the same time. Myanmar government started to implement an e-government project in 1994 to develop accessing online in the public sector and to establish electronic government. The "Myanmar ICT development Master Plan" was introduced in 2005 collaboration of Korea International Cooperation Agency (KOICA), Korea Information Society Development Institute (KISDI) and the e-National Task force (Myanmar) but it was not accomplished.

The government undertakes the improvement of the education and health sectors under the framework of Economic and Social Reform that is based on the people- centered development. Therefore ICT education is one of the key priorities of social reforms of Myanmar government. Computer Universities are mainly focused on the ICT education in Myanmar. There were only two Computer Universities in 1998, University of Computer Studies in Yangon (UCSY) and University of Computer Studies in Mandalay (UCSM). There were twenty five computer universities in 2003 all over the country. In addition, Information Technology Department was started in 2002 to offer a degree of Information Technology in Mandalay Technological University. The program was intended to produce the qualified IT engineers who are gaining internet-based technologies that are based on the updating courses in the knowledge age. Moreover, Myanmar Institute of Information Technology (MIIT) was built in Mandalay by agreement between Myanmar and India government.

The number of ICT universities in Myanmar became twenty seven in 2015. The numbers of ICT universities increased within a short period. The government could not manage in recruiting staff in those universities without a review. These are the challenges and barriers of human resource development in ICT sector. The purpose of establishing of ICT universities is to generate highly qualified ICT graduates who are working in the ICT sectors of the country to collaborate with international ICT sectors. Although government emphasized the development of ICT

universities, it is essential for the universities to have skillful teachers and faculties established with the effective policy and regulations.

Table 4.1 Students, Graduates, Teaching Staff by Ministry, 2010-11

Ministry	Student	Graduate	Teaching Staff	%Graduated	Staff Student Ratio
1. Education	473408	105192	11063	22	1:43
2.Science &Technology	109537	14972	6285	14	1:74
3. Other	29194	5353	2569	18	1:11
Total	612139	125517	19917	21	1:31

*Excluding Distance Education

Source: Comprehensive Education Sector Review, Higher Education in Myanmar

4.3 Background of Technological Universities

4.3.1 Mandalay Technological University

The Government Technical Institute was established in 1995 and was upgraded to a full university in January of 2007 as Mandalay Technological University. Mandalay Technological University received ISO certificate 9001:2008, on 7 April, 2016 and offers Bachelors of Engineering in Civil Engineering, Electronic Engineering, Electrical Power Engineering, Mechanical Engineering, Information Technology, Mechatronic Engineering, Chemical Engineering, Mining Engineering and Architecture.

4.3.2 Kyaukse Technological University

Kyaukse Technological University has existed as a Government Technical Institute since 1988. Later it was upgraded to Technological University in 2007 and received its ISO certificate 9001:2008 in 2016. It is located in Kyaukse District, a remote area of Mandalay Region and 40.45 km from Mandalay city. Kyaukse Technological University offers bachelor degrees in Civil Engineering, Electrical Power Engineering, Electronic Engineering, Mechanical Engineering, Information Technology, Mechatronic Engineering, Metallurgy Engineering, Bio Technology and Nuclear Engineering.

4.4 Analyzing Curriculum Of It Department

Curriculum of technological universities can be analyzed into (1) Courses and Subjects and (2) Structure of Academic Year.

4.4.1 Courses and Subjects

The curriculum and courses are centralized under management of Academic Board in Information Technology Department. This body has decided that all technological universities should offer the same courses, with the same syllabi and the same textbooks everywhere. The curriculum of IT department is based on three fundamental courses. It takes six years to complete a Bachelor Degree of Engineering. There are Programming, Networking and Computer Architecture. Every academic year is based on these three courses. Students are taught advance-level subjects in their academic year from first year to final year that are based on these three curriculums.

The Academic Board is responsible for designing curriculum and courses for each academic year of classes. There are sixteen technological universities that offer IT subjects in Myanmar. Therefore an academic board was formed of thirty lecturers from these technological universities. Two lecturers from each university is responsible for respective subjects to review and update in review meeting. The academic reviewers meet at least twice before the academic year is started and after the mid- year to review with the assessment of students and requirements of business sector every year. The Academic Board adapts the curricula based on the Programming, Networking and Computer Architecture in every academic year of IT department and develops the curricula and courses in order to fulfill the requirements of IT industries and business sector. Finally, the courses and syllabus are adapted after discussion with stakeholders and agreement of academic board.

"The subjects are not correlated between academic years. We had to learn programming subject in second year but the programming subject was not taught in third year. We learned again programming subject in fourth year". (Students, Technological University)

Although the academic curriculums are published by Information Technology Academic Board, the academic board does not have policy and regulation system to view the implementation of the curriculum. There has not been any particular review system and standardized test to analyze how to conduct the curriculum in the technological universities as well as higher education institutions. Lack of a particular curriculum review system interfere not only pedagogical system in learning environment but also the capacity development of the students. This is one of the failures of the education system in technological universities.

"It should have proper policy and regulation to review and update curriculums for the new courses in the academic board. I think it will happen when universities have autonomy in their own university in the future." (Lecturers, Technological University)

The academic board reviews only emphasized on the assessment of students at the end of the academic year. Some courses are outdated and cannot be applied in the business sectors. Some courses are updated in accordance with international standards but it cannot be taught by teachers due to lack of learning resources.

4.4.2 Structure of Academic Year

Technological Universities practices two systems for Academic year. It takes six academic years roughly to accomplish the degree in technological universities. Students have to attend five days in a week from Monday to Friday. The lecture time is started from 8:30 am to 3:30 pm in a day. There are eight months in one academic year. The first four months is called first semester and last four months is called second semester in a year. One semester takes fourteen weeks. The mid-term examination is conducted after the first four months and the final examination is assessed at the end of the academic year. Grading system for each subject is generally defined based on the results of examinations, the score from 100 to 80 marks is grade A, 80 to 60 is grade B, 60 to 40 is grade C, 40 to 20 is grade D and below 20 is grade E. Therefore students need to pass not only mid-term examination but also final examination. Students need get at least 50 marks in every subject in the examination. Otherwise, they will fail the examination. The mid-term and final examinations are

the only assessment of student's performance who can attend next academic year. There is no other assessment to evaluate student's performance to attend next academic year.

4.5 Analyzing Pedagogy in It Department

Pedagogy is one of the elements that need to be studied to explore the education system of technological universities. The teaching methodology is an interrelation between students and teachers in academic places that create learning processes. Pedagogy in technological universities can be analyzed following topics.

4.5.1 Learning System

The learning system is currently based on the rote learning system in the technological universities. The teaching system does not serve as an effective connection between students and teachers because a student-centered system is not applied in the classroom. Teachers have to teach according to curriculum which is designated by the Academic Board.

"If we apply student-centered approach in teaching method, we need to ask students to read journals and articles which are related to lectures before the class. Journals and articles are not easy to find in library and it has scare resources for academic articles and it is not enough for all students" (Lecturers, Technological University)

Teachers cannot apply student-centered approach teaching in the classroom because of the scarcity of teaching aids. Also, there are no student discussions, presentations and group works in the academic year. Students are required to submit the term paper for the projects at the end of the year after the final examination. Therefore students emphasize on passing the examination by using rote learning method.

"We do not have group discussion and presentation in the classroom. Teachers used to teach according to curriculum and they never explain beyond the curriculum. There is a presentation once a year after group projects at the

end of a year. We never try to find about lectures and lessons in journals, articles as well as online too." (Students, Technological University)

Students in technological universities are learning from teachers one away or another. Teachers are teaching according to textbooks in the class_ there is no discussion with students about lectures. Students lack group discussions and group assignments in the classroom and in the academic courses. Participation of students in the classroom is not found in the technological universities. Therefore students cannot have participatory experience and there are no more opportunities to have interactive learning among the peer groups.

4.5.2 Capacity of Teaching Staff

Developing the capacities of teaching staff is crucial to pedagogy as well. To develop the capacity of teaching staff, teacher trainings must be provided in the education system. These teacher trainings are rare in the technological universities. There is no particular teacher training program available in the internal department of education system. The students also lack group work discussion and trying to find about the lessons in other sources such as academic journal, articles and online information. As a result, there is no interactive learning system in technological universities.

"We need to get teacher training in order to improve our teaching skills but it is hard to run it because teacher training cannot be conducted for all teachers. Therefore some of teachers were chosen to attend training. After that they shared with the other teachers in the department. Although sharing session is conducted in the department, it is not effective as attending a teacher training for us" (Lecturers, Technological University)

4.6 Analyzing Infrastructures in Technological Universities

Infrastructures are a basic requirement of an education system. Infrastructures help students practice their knowledge and skills which they have learned in the class. Infrastructures of technological universities can be analyzed into (1) Buildings and Campus, (2) Learning Resources and Libraries and (3) Workshops and learning aids.

4.6.1 Buildings and Campus

Both of the technological universities in Mandalay and Kyaukse, have the similar design of building and campus. The campuses and buildings are left empty around the paddy fields. Mandalay Technological University has just one main three-storied building while Kyaukse Technological University has two main buildings which has three floors and some are one-storied building which is the same as Mandalay Technological University. Teaching materials and learning are incomplete in the classroom and other facilities such as projector, computer, internet and air conditions, except tables, chairs and blackboard in the classroom.

"We don't have any high-quality facilities in the classroom. Tables and chairs make us very uncomfortable to sit throughout when we learn the lectures the whole day. The number of chairs and tables is not sufficient enough for each and every student to use them as their own; we have to share the long desks and chairs" (Students, Technological University)

Students feel uncomfortable studying in the classrooms. It is also inconvenient for the teachers to teach in the classroom. Two technological universities are located far from the city. It is not easy to go the universities. There is no bus and public transportation to go university. Students have to go to universities with their own motorbikes and cars or use the daily transport hired with the monthly payments by parents. There is also no dormitory for students to stay in the campus. Students have to hire private dormitory in the city while they are attending university.

"As you see, the conditions of classrooms do not look attractive for students to study in the classroom. Tables and chairs are in need of repair. There are no other learning materials such as internet, visual aids for teaching and other

facilities such as air conditions. The government needs to support more facilities and learning materials in the classroom to be more convenient and comfortable for teachers and students." (Lectures, Technological University).

4.6.2 Learning Resources and Libraries

The number of the facilities, computer rooms, libraries and workshops is not sufficient in the IT universities. Students can practice computer lessons once a week. There are insufficient numbers of computers for students to practice programming lessons and networking subjects. The ratio of number of computers and students is 1:5- preventing students from practicing IT lessons in the computer lab rooms. Moreover, there are no teaching aids as projector and internet are not provided in the class rooms. There is one projector per faculty, and some faculties have to borrow them from other faculties. Buildings require renovations in order to be safe. And furthermore there is no dormitory for students on campus. Students have to stay in private dormitories.

"We have to share computers with my friends in practical class. The computers have the very poor quality and are old which cannot operate data and software very well. We just only practice the basic programming courses." (Students, Technological University)

There are not enough text books for all students. In addition to this, the resources of the libraries are very scarce. Student cannot get the books what they would like to borrow. The number of books in libraries is very limited and it is very difficult to access with the library because some of the books are not allowed to borrow; they are just displayed in the showcases whose doors are locked.

Library resources are very scarce. Student cannot get the books what they would like to borrow. The number of books in libraries is not sufficient and accessing them is very difficult as some books are kept in locked showcases and not available for circulation. There are not enough text books for all students and they cannot borrow the books they need.

"*It is difficult to borrow books from library because we have to make membership card. We have to submit some documents to make membership card such as teacher recommendation and student ID card. Some of the books are not*

allowed to borrow outside because books are expensive. Therefore Librarians worry about the possible damage. If the books are destroyed, they cannot take responsibility for it. So books are always kept in the cupboards". (Students, Technological University)

"The students can use internet to read online books in universities but most of the students use internet for facebook and online chatting in the library. Books, journals and magazines are more essential for students and teachers in library." (Lecturers, Technological University)

Because library resources are so restricted, universities cannot provide support for conducting research by students and teachers. Conducting research is one of necessary components of universities in order to produce the qualified graduates. Therefore such an infrastructure is a basic requirement for supporting the learning environment of universities and institutions. Scarce resources for infrastructures disturb the accumulation of practical skills and capacity development of students.

4.6.3 Workshops and Learning Aids

Workshops are one of the learning aids in the learning environment where students can practice their skills. Workshops act as a real world for students to learn that are connected to the academic subjects. Both technological universities have workshops for students, but students can rarely practice in that place because the equipment and learning aids are not enough for all students. Some equipment is not allowed to practice because of the limited funding. If the equipment is damaged, nobody can take the responsibility for maintaining it again. Some of the machines do not have spare parts to be replaced if it is broken. Therefore workshops are not a place for students who cannot learn academic subjects. There are no teaching aids such as projector and internet are not provided in the classrooms. There is one projector for one faculty but some of the faculties have to borrow from other faculty if it is required to use it.

"Computers are not enough for all students to practice their lessons. Student cannot practice to use the computer one by one. Facilities in Infrastructures are still poor. Students are unhappy to learn in the classroom because desks, tables

and other classroom facilities are incomplete. The budget allocations of universities are very limited". (Lecturers, Technological University)

Resources for learning aids are scarce for students and teacher in the classroom. The projectors, computers, internet and other learning aids are not provided in the classroom. Teachers cannot teach interactive learning style in the classroom. Rote learning method is always conducted in teaching system of technological universities. Therefore scarcity of learning aids is the one of the reasons why the education system declines and it affects on capacity of the students.

4.7 Results of Research

4.7.1 Curriculum

Curriculum of Information Technology departments in technological universities is administrated by the Information Technology Academic Board. The Information Technology Academic Board was organized by two representatives of technological universities who are responsible for related subject. Therefore courses and syllabus are uniformed in technological universities all over the country. The Academic Board is responsible for adapting curriculum, reviewing syllabus and textbooks and updating lessons for IT subjects in terms of student evaluation and discussion with IT profession in the ICT sector in order to make the students well-prepared for ICT field and business sectors.

Although curriculums are managed by the Academic Board in Information Technology departments, there is no particular policies and regulation for adapting, reviewing and updating curriculum. The Academic Board reviews the curriculum in terms of the result of curriculum assessments of students and experts in ICT sectors. Moreover, there is lack of evaluation system in the Academic Board to review the courses and syllabus in Information Technology departments of technological universities.

4.7.2 Pedagogy

There is no interactive learning style between students and teachers in the classroom. Teachers have to teach according to the curriculum and their lesson plans in academic year. Students-centered approach cannot be practiced in the IT department of technological universities because the resources are scarce in students learning such as academic books, journals and electronic data. Therefore teachers cannot run discussion for lessons and group work presentation in the classroom. The fact is that class size of the students is extremely large for teacher and the ratio of students and teacher is 20:1.

On the other hand, the capacity of teaching staff needs to be well trained for teaching and training for related subjects. In this case, teachers have to teach according to curriculum but they do not have trainings for new courses and new edition of the text books. Therefore the rote learning method is the only method for the teaching system of technological universities in Myanmar.

Another factor is that most of the courses need teaching materials such as computers, internet, projectors and some visual aids in teaching system in the technological universities.

4.7.3 Infrastructures

The resources for infrastructures are limited in the technological universities. The teachers and students are facing the scarcity of infrastructure such as teaching materials and learning aids. The teacher cannot provide students with reading materials for the external knowledge because there are no internet access and few books in libraries. The classrooms lack computer and projector for learning and teaching. In the same way, the students do not have participation in the classroom discussion and cannot give presentation in the classroom. The practical time for students is once a week. The number of students and the number of computers in the lab is 5: 1. There is only one project which is done by group work at the end of the academic year. Therefore the education system does not play a supportive role in conducting research to those who are interested in research for academic paper.

4.7.3.1 Accessing Libraries

Libraries in technological universities need improvement. The academic books, journals and magazine are not enough for the large number of students in universities. Libraries are not user-friendly because membership registration is needed. Otherwise, students cannot access the library. Some of the books in libraries are not allowed to borrow because some are expensive and difficult to buy in the market. Therefore, librarians have no responsibility for any damage of books which are allowed to borrow. In addition, libraries cannot support to conduct research for students. The students in Kyaukse Technological University can access online library but it also has much limitation to access the library.

4.7.4 Engagement with Business Sectors and International Universities

There has been few collaboration and coordination with business sectors and international and local companies with technological universities. Global Innovation Consulting International supports the job training for students in IT department. Some of telecommunication companies offer jobs for graduate students as well as internship such as Ooredoo, Telenor and Myanmar Posts and Telecommunications. For scholarship opportunities, Myanmar Association of Japan Alumni (MAJA) is helping students to get scholarships from some of the universities in Japan. Although IT departments in technological universities have coordination with international companies and business sectors, students still lack practical skills and need to be more interactive with those companies. Most of the students do not know supporting of business sectors as well as about the scholarships. Furthermore, technological universities lack cooperation with international universities such as exchanging students, training for teachers and reviewing curriculum.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 Current Situation of It Education

Computer Universities and Technological Universities are the main source of IT education in higher education sector of Myanmar. The majority of the students in Myanmar who want to learn IT education are attending in the Computer Universities and Technological Universities. Although there are many IT education universities in Myanmar, students are relying Private IT education centers to learn IT education because public universities are lack of interactive teaching, teaching aids, computer rooms and learning resources for teachers and students. In addition to limited budgets for higher education, the weakness of teaching staff is the one of the reasons of declining the IT education and the whole education system in Myanmar. Thus, IT graduates cannot support the development human capital in Myanmar. Therefore education system in Myanmar is gradually behind the ASEAN and international as well as human capital development is falling down year after year.

Nowadays, Myanmar government is implementing the IT education with cooperation of Ministry of Education (MOE) and UNESCO to improve the teacher accessing ICT in the classroom started in 2015. Based on in-depth assessment of UNESCO, MOE initiated multi-step program of support for ICT development in Myanmar Education Sector including upgrading the capacity of teacher accessing ICT in teaching methodology. Furthermore the project intended to develop ICT-pedagogy integration training and support to the teacher in education reform process. Myanmar government realizes that capacity development of the teachers is key components in the education reforms. Moreover, utilizing the effective of ICT is a crucial part of teaching skills in learning environment. Therefore Myanmar government has undertaken the project based learning with ICT in the education sector with international organizations in education reform.

5.2 Discussion

According to the results, students and teachers of IT departments in technological universities have challenges with curriculum, pedagogy and infrastructure. In curriculum, students have to learn not only IT subjects but also other related subjects especially electronic subjects. According to teachers, students have to learn electronic subjects much more than IT subject in some academic year. The curriculums of IT subjects are not interconnect with one year to another from first to final academic year and needed to be designed basic concepts of theory in the curriculum. Students and teachers cannot practice learning aids and teaching material included in the curriculum. Adapting curriculum should be practiced with teaching materials and learning aids in the classroom. Therefore student participation in the learning environment is totally non-existent in technological universities. Teachers also cannot apply students-centered approach in the classroom. There is no interactive teaching system between students and teachers. Therefore students are lack of critical thinking and practical skills after they graduate. Insufficiency of infrastructure cannot support the practical skills of students. Therefore students cannot get a job easily after they graduates.

5.3 Reporting Policy Recommendations

Based on findings and results, the researcher would like to report policy recommendations. In order to improve the capacity development of students and teachers, technological universities should implement following policy recommendations as a priority.

First of all, Academic Board should organize with policy and framework to review all of the curriculums in every academic year of IT department in technological universities. Academic Board also should have not only particular review system but also external IT experts to adopt curriculum and syllabus in IT departments. Curriculum should focus on the requirements of IT industries and objectives of the framework of Academic Board. IT subjects should be more focus on the computer science and networking technology.

On the other hand, particular training for teacher in order to develop the capacity of teachers in technological universities should be developed and provide teacher training for new curriculum and syllabus.

Secondly, the government should increase the budget allocation for the technological universities to support the teaching aids and learning materials in the classrooms and IT departments in technological universities. Especially, library need to be upgraded to include online libraries because online libraries are cost effective and does not need much space. Libraries are essential to improve in the educational reform process in order to develop research and ability of the students and teacher. More Learning centers and computer lab rooms need to be built for IT students and teachers as well as technological students to study and practice lessons and subjects.

Finally, rote learning system should not practice in education system. Student approach learning method and interactive teaching system should be applied in learning and teaching system. Examination system should consider to be included which is based on students learning and performance in the whole academic year such as submitting assignments, group discussions, classroom presentations and so on.

All in all, technological universities should engage with IT business sectors and industries to give job opportunities for students.

5.4 Conclusion

The main objectives of this study have been to explore the weakness of curriculum, pedagogy and infrastructure of the IT departments in technological universities, Mandalay and Kyaukse. Many things that are needed to develop curriculum, pedagogy and infrastructures of the technological university, although both universities got ISO certificate. Still, there are many challenges in curriculum, pedagogy and infrastructure in the technological universities.

The Information Technology Academic Board is required to have particular curriculum review system in the technological universities. The review board should have greater authority to reviewing curricula that meet the standard of an international education system. The curriculum should be based on demand of IT markets and international education system.

The pedagogy of education system in technological universities needs to incorporate interactive learning systems between students and teachers. Students need to have group discussions, presentations for lessons, extra readings and assignments in order to develop student capacity as well as fulfill the demand of IT markets and the human capital of the nation. Developing new curricula and conducting teacher trainings are necessary to improve the capacity of teaching staff which is important to produce qualified graduates.

Finally, providing adequate infrastructure such as teaching material and learning aids helps to improve the practical skills of students. Libraries need to have sufficient books for students for their extra curriculum reading and research. Library also should be user friendly for every student. Furthermore, engagement with business sectors and international universities with technological universities are necessary for capacity development of students and academic staff in technological universities.

Some suggestions have been provided for improving the knowledge and skills of the students in technological universities. The curriculum should be standardized for academic board for every academic year in Information Technology Departments. The teaching staff should apply interactive teaching that is based on the student –centered approach to improve student's participations in the class. The universities need to provide adequate infrastructures such as library, learning aids and teaching materials for every student. Therefore curriculum, pedagogy and infrastructures are essential to reform in technological universities and other universities in order to produce qualified students that are support to human resource development of Myanmar.

5.5 Recommendations for Further Research

The present research has investigated the problems of curriculum, pedagogy and infrastructures of IT departments in technological universities, the results and conclusion of this research are continue to study further research.

1. The findings can be used to develop the capacity of students and teachers of technological universities. It can also be applied in order to improve the

skills and knowledge of the students in other universities in Myanmar such as medicine, arts and science, marine and computer science universities.

2. The present research only covered the three basic things of education system in technological universities, which may affect the present IT students in technological universities. Therefore, it is suggested that the further studies should be done for the whole education system of universities to promote the education system of Myanmar.

3. This research can only point out the problems of curriculum, pedagogy and infrastructure of Information Technology Departments of technological universities in Mandalay and Kyaukse. Further studies should focused on policy implementation of Ministry of Education in the universities that are under Ministry of Education and universities of other ministries.

4. This research is generally about the education system of technological universities and not related to laws of Educations in details. Therefore, the further studies and research should be made for Education Laws in Myanmar that influence the quality of education system in Myanmar to promote the Education sector and the development of human resources.

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BIOGRAPHY

Name	Mr. Myint Mo Tun
Date of Birth	May 26, 1987
Educational Attainment	Academic Year 2017: Master of Arts (Asia Pacific Studies) Collage of Interdisciplinary Studies Thammasat University, Bangkok, Thailand.
Scholarship	2015-2016: Thammasat University, Thailand
Work Experiences	25th October, 2014 to 25th August, 2015 Program Trainer Institute for Political and Civic Engagement, World Learning Myanmar 15th August, 2012 to 16th August, 2013 Assistant Project Manager UNICEF Project, Ratana Metta Organization, Yangon 1st January, 2011 to 31st March, 2012 Training Manager Myanmar Egress Capacity Development Center May, 2011 to April, 2014: Invigilator – Part time job British Council, Myanmar