ASEAN Economic Community (AEC): Are Our Engineering Students Ready for 2015?

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ABSTRACT

ASEAN Economic Community (AEC) implementation in 2015 will affect Thailand in many ways, including our economy and education systems. This project focuses on the readiness of Thai engineering students for AEC in 2015. This regional integration as a single market will allow free flows of trade in goods and services, free flow if investment and skilled labor among the ASEAN members. One of the 8 careers that will be allowed to flow freely within AEC is engineer. The focus of this study is to assess the readiness of our engineering students and the engineering profession in Thailand. We distributed surveys to Thai engineering students from 7 university (N=726). The study sought to investigate readiness in terms of AEC preparation. Our results indicated that the overall readiness of Thai engineering studentsis still low.

Keyword: Readiness, AEC, Engineering students, Thailand

1. INTRODUCTION

ASEAN (Association of South East Asian Nation) was established on August 8, 1967 aming 10 countries as members: Thailand, Singapore, Indonesia, Malaysia, Philippines, Brunei, Vietnam, Laos, Myanmar and Cambodia. ASEAN must integrate in order to be competitive with other regions. The ASEAN Community has 3 pillars: ASEAN Security Community (ASC), ASEAN Socio-Cultural Community (ASCC) and ASEAN Economic Community (AEC). The AEC will be implemented in 2015 to integrate ASEAN economies to be a single market. The AEC will allow more convenient trade and flow of services, investment, and skilled labor among ASEAN countries. (Office of the Education Council, 2010) Engineering is one of the 8 skilled professions that will be affected with the implementation of AEC so we chose to do this topic of the readiness of the engineering students in Thailand to determine whether they will be ready for AEC or not. In the near future, there will be free trade among ASEAN in 11 priority sectors, many of which are related to engineers such as mechanics, electronics, information technology, transportation &logistics, and agriculture (Mavijuk, 2009).

In AEC, labor markets will require more skills, especially English language, because English is the official language to communicate among ASEAN countries. Therefore, we have to develop our labor skills to be more competitive with other countries in ASEAN by improving education systems. Project base learning (PBL) is interesting in case of helping students develop rich cognitive model of problems (Yusof1, et al., 2004), doing more researches and implementing the knowledge with real life situation (Newman, 2005). Anyway, AEC has the significant effect to our country and engineers who are compared as the driver to improve economy and development. If we know the current readiness and the weakness of the engineering students so we can prepare our human resource to be able to compete with others countries in ASEAN in order to gain advantage of the implementation of AEC (Du, Graaff, and Kolmos, 2009).

2. LITERATURE REVIEW

2.1 ASEAN Economic Community

ASEAN (Association of South East Asian Nations) was established in the Bangkok Declaration which started with 5 members at that time: Singapore, Indonesia, Malaysia, Philippines and Thailand. Currently, ASEAN has 5 members more such as Brunei (1984), Vietnam (1995), Laos (1997), Myanmar (1997) and Cambodia (1999) (Sim, 2008) ASEAN is integrated in order to create a single regional common market of over 600 million people with more power in negotiation with other countries. There are 3 Pillars: ASEAN Security Community (ASC), ASEAN Socio Cultural Community (ASCC) and ASEAN Economic Community (AEC), which increase convenience of free trading, free flowing of services, investing and skilled labors among ASEAN countries.

AEC proposes to integrate one competitive single market among ASEAN countries with free movement of goods, services, investment, skilled labor, and freer flow of capital. Good infrastructures are necessary to support the changes, especially education which is an important factor for developing countries (Office of the Education Council, 2010). Engineering professional is the base of creating, inventing, building and developing many useful inventions such as avenues, canals, bridges, buildings, tools, apparatus, machines, vehicles, materials, petroleum, technologies, processes, information etc. Thus, the engineering profession is a driver to improve the country in terms of economy and development (Wongsamarn, 2011).

2.2 Problems in Thai Education System

English has been set to be the official language in ASEAN, every country realizes that language is very important in order to communicating for business purposes, educational purposes, military purposes, etc. (Official of the Higher Education Commission, 2010) and Thailand is still behind the others. According to the English Test as a Foreign Language Internet Based Test (TOEFL IBT) score, Thailand has averaged 75 points out of 120 points which is higher than Laos, Myanmar, and Vietnam. Addition to another report from English First institute has shown that the English proficiency of Thailand is in 42nd rank from 44 countries. (Test and Score Data Summary, 2009) Moreover, Thailand has joined the Organization for Economic Co-operation and Development (OECD) program for international student assessment that aims to evaluate 15 years old students by reading test, mathematics and sciences.(Organization for Economic Co-Operation and Development, 2009) Pisa (Programme for International Student Assessment) is an international study that was launched by in 1997. It aims to evaluate educational systems worldwide every three years by assessing 15-year-olds' competencies in the key subjects: reading, mathematics and science. Unfortunately, Thailand ranking had average lower from PISA 2000 to PISA 2009 (Wongsamarn, 2011).

2.3 Problems of Thai Engineers

Thai engineers face two important challenges in coming AEC: lack of communication skills and lack of knowledge regarding engineering regulations. Even though English is the universal language of business, many Thai people are not fluent in English, which may lead problems for Thai engineers interested in working abroad, especially in communicating with foreigner coworkers. Moreover, the future labor market will require higher skills in English and knowledge of laws and regulations in each country. Thus, our engineers need to understand the regulations of each country in order to be competitive with other people in ASEAN (AEC News Alters, 2012).

3. HYPOTHESIS

Based on literature review, we developed the following hypotheses to determine the readiness of Thai engineering students for AEC in 2015.

H_1 Higher education year in the university, especially fourth year engineering students, will be more aware and more prepared for AEC.

H_2 Engineering students in public university will be more aware and prepared than the ones in private universities.

H_3 Students who have higher income can take more tutorial classes and other preparation to prepare for AEC.

4. METHODOLOGY

We did the questionnaire survey to gather the information from the 750 engineering students for 7 universities in order to evaluate their readiness for the implementation of AEC in 2015. The surveys were divided into 7 parts: general information, general AEC knowledge, the readiness of the student for AEC, education preference, knowledge about council of engineer and ABET, the Top rank company in Thailand that hiring the engineers. According to 726 questionnaires to analyze the data, another 24 questionnaires are not valid.

The method that we used to analyze the data is ANOVA method in SPSS that within the significant level of 0.05 0r 95% confidential ($P<0.05$) because we want to analysis the variation between groups for example the group of engineering student; Comparison between the level of preparation of engineering students and the year of study, Comparing between income and English test, Comparing between income and extra tutorial class in order to understand the different between each group.

5. RESULTS

5.1 Survey Result

The 726 questionnaires represented a 96.8% response rate. As shown that students were average age of 20 to 21 (SD = 1.41), and had a mean of second and third year student (SD = 1.10). Approximately Seventy-four percent (n = 534) of the students were male and 26.4% (n = 192) were female. Public University was 81.5% (n=592) and Private University was 18.5% (n=134).Thai program students were 93.5% (n = 679) International students were 6.5% (n = 47). Income was separated into 5 groups; 13.9% of income less than 3,000 (n = 101), 31.5% of 3,000-6,000(n = 229), 21.3% of 6,000-9,000 (n = 155), 18.6% of 9,000-12,000 (135), and 9.8% of more than 12,000 (n = 71). There was 26% (n = 189 of 726) who took English Test, and 74 % (n = 537) did not. In education issue, most of students agreed that they can apply knowledge in organization (*M = 2.535, SD = 0.956) and their ability of using English is good enough for working in when AEC will come into effect (*M = 2.246, SD = 1.015). They suggested that classes provided proper material and equipment for engineering to use (*M = 2.246, SD = 1.015) and university play a role in developing the curriculum to support coming AEC (*M = 2.568, SD = 0.980). However, most of students moderately agreed in implementing AEC (*M = 2.535, SD = 0.956). Statement was reverse coded (1=Strongly Agree 2=Agree 3= fair 4=Disagree 5=strongly disagree).

5.2 ANOVA Result

5.2.1 Comparison between the Level of Preparation of Engineering Students and the Year of Study

H_1 suggested that higher education year, especially fourth year student will have the most self preparation in searching information. As Table 1 was conducted one-way ANOVAs

to compare education year on self preparation for AEC, the significant difference on self preparation among education year was self support by internet (F= 5.171*). From Post hoc in table 2 indicated that Fourth year students had significant effect with Fist year (p = 0.003), Second year (p = 0.00) and Third year (p = 0.047). Thus, we accepted H_1which Fourth year had the most enthusiastic in self supported by internet. (81% of fourth year students, M = 0.686)

Table 1: One-way ANOVAs comparing Education year and Self support

	Sum of Squares (Between/Within)	df	Mean Square	F
Education year (First-Up to Forth years) :				
Self-support by Internet	4.367 151.164	4 716	1.092 .211	5.171*
Self-support by Intermediary and television	.371 146.772	4 716	.093 .205	.453
Self-support by Magazine	.351 70.773	4 716	.088 .099	.887
Self-support by Interchange with friends and experts	.336 126.904	4 716	.084 .177	.474
No self-support	.998 79.989	4 715	.250 .112	2.231†

* p<0.05
† p<0.10

Table 2: Post Hoc Tests of Education year and Self support

(I) Domain	(J) Domain	Mean Difference (I-J)	(I) Domain	(J) Domain	Mean Difference (I-J)
Self-support by Internet:			Self-support by Intermediary and television		
Year 1	Year 2	-0.0264	Year 1	Year 2	0.0144
	Year 3	-0.0505		Year 3	0.0287
	Year 4	-.1977*		Year 4	0.0403
	Upper year 4	-0.1586		Upper year 4	0.1559
Year 2	Year 1	0.0264	Year 2	Year 1	-0.0144
	Year 3	-0.0241		Year 3	0.0144
	Year 4	-.1713*		Year 4	0.0259
	Upper year 4	-0.1322		Upper year 4	0.1415
Year 3	Year 1	0.0505	Year 3	Year 1	-0.0287
	Year 2	0.0241		Year 2	-0.0144
	Year 4	-.1471*		Year 4	0.0116
	Upper year 4	-0.1081		Upper year 4	0.1271
Year 4	Year 1	.1977*	Year 4	Year 1	-0.0403
	Year 2	.1713*		Year 2	-0.0259
	Year 3	.1471*		Year 3	-0.0116
	Upper year 4	0.0391		Upper year 4	0.1156

(I) Domain	(J) Domain	Mean Difference (I-J)	(I) Domain	(J) Domain	Mean Difference (I-J)
Self-support by Internet			Self-support by Intermediary and television		
Upper year 4	Year 1	0.1586	Upper year 4	Year 1	-0.1559
	Year 2	0.1322		Year 2	-0.1415
	Year 3	0.1081		Year 3	-0.1271
	Year 4	-0.0391		Year 4	-0.1156
Self-support by Magazine			Self-support by Interchange with friends and knower		
Year 1	Year 2	0.0455	Year 1	Year 2	0.0094
	Year 3	0.0176		Year 3	0.0577
	Year 4	0.0276		Year 4	0.025
	Upper year 4	.1416*		Upper year 4	-0.0599
Year 2	Year 1	-0.0455	Year 2	Year 1	-0.0094
	Year 3	-0.0279		Year 3	0.0484
	Year 4	-0.0179		Year 4	0.0156
	Upper year 4	.0961*		Upper year 4	-0.0693
Year 3	Year 1	-0.0176	Year 3	Year 1	-0.0577
	Year 2	0.0279		Year 2	-0.0484
	Year 4	0.01		Year 4	-0.0327
	Upper year 4	.1240*		Upper year 4	-0.1176
Year 4	Year 1	-0.0276	Year 4	Year 1	-0.025
	Year 2	0.0179		Year 2	-0.0156
	Year 3	-0.01		Year 3	0.0327
	Upper year 4	.1140*		Upper year 4	-0.0849
Upper year 4	Year 1	-.1416*	Upper year 4	Year 1	0.0599
	Year 2	-.0961*		Year 2	0.0693
	Year 3	-.1240*		Year 3	0.1176
	Year 4	-.1140*		Year 4	0.0849
No self-support					
Year 1	Year 2	0.0093		Year 4	0.071
	Year 3	0.0105		Upper year 4	.1488*
	Year 4	0.0816	Year 4	Year 1	-0.0816
	Upper year 4	.1593*		Year 2	-0.0723
Year 2	Year 1	-0.0093		Year 3	-0.071
	Year 3	0.0012		Upper year 4	.0777*
	Year 4	0.0723	Upper year 4	Year 1	-.1593*
	Upper year 4	.1500*		Year 2	-.1500*
Year 3	Year 1	-0.0105		Year 3	-.1488*
	Year 2	-0.0012		Year 4	-.0777*

5.2.2 Comparison between Private and Public Universities and the Level of Preparation of the Engineering Students

H_2 suggested that public university students will have more preparation than private university students. After testing with one-way ANOVAs, we found the results of significant difference effects from self support by internet, family support by suggesting and learning foreign language, and private support showed in table 3. In addition, Private university students have higher percentage of finding information via Internet (77%, n = 103 of 134) and family support by suggestion (49%, n = 64 of 130) than Public University (66%, n= 172 and 36%, n= 212 respectively). On the other hands, public university students have family support by learning language (54%, n = 319) more than private university students (35%, n = 46); such as Chinese (Mean=0.666), Japanese (Mean=0.638), and German (41%, n=15 of 37 who would like to learn foreign language). Moreover, public university students have 61% (n = 357 of 585) in advertising via media more than private university students which is 52%.

Table 3: One-way ANOVAs comparing Type of University and overall preparation

	Sum of Squares (Between/Within)	df	Mean Square	F
Type of university (Private/Public):				
Self-support by Internet	1.111 154.716	1 722	1.111 .214	5.184*
Self-support by Intermediary and television	.156 147.231	1 722	.156 .204	.765
Self-support by Magazine	.030 71.130	1 722	.030 .099	.303
Self-support by Interchange with friends and knower	.281 127.115	1 722	.281 .176	1.596
No self-support	.251 80.786	1 721	.251 .112	2.242
Family-support by suggesting	1.884 168.316	1 718	1.884 .234	8.037*
Family-support by learning foreign language	3.718 176.247	1 718	3.718 .245	15.148***
No family-support	.067 91.031	1 718	.067 .127	.532
University-support by advertising	.808 171.569	1 713	.808 .241	3.359†
University-support by seminar	.164 159.603	1 713	.164 .224	.734
University-support by AEC curriculum	.061 90.926	1 713	.061 .128	.478
No university-support	.076 77.861	1 714	.076 .109	.696
University-support by others	.004 8.883	1 711	.004 .012	.309
Private organization-support	.871 72.858	1 639	.871 .114	7.639*
Government- support	.192 84.893	1 639	.192 .133	1.448

	Sum of Squares (Between/Within)	df	Mean Square	F
Type of university (Private/Public):				
Council of engineers-support	.423	1	.423	3.359†
	80.497	639	.126	
No any organizations-support	1.118	1	1.118	4.622*
	154.326	638	.242	

* p<0.05, † p<0.10, ***p<0.001

5.2.3 Comparison between Income and Extra Tutorial Class

H_3 suggested that Students who have higher income will be supported by taking extra tutorial class more than lower income**.** The results of Table 4 pointed out that there was the significant difference on the level of income (F = 3.754*). Post hoc test in Table 6 showed that the income level less than 3,000 had significantly with income level more than 12,000 (p = 0.002). However, students tended to take the extra tutorial class increasingly.

Table 4: One-Way ANOVA comparing Income and Extra tutorial class

	Sum of Squares (Between/Within)	df	Mean Square	F
Extra tutorial:				
	3.357	4	.839	3.754*
Income	152.497	682	.224	
	155.854	686		

*The significant level is less than 0.05.

Table 5: Post Hoc Tests of Income and Extra tutorial class

(I) Domain	(J) Domain	Mean Difference (I-J)	(I) Domain	(J) Domain	Mean Difference (I-J)
Extra tutorial					
less than 3,000	3,000-6,000	-0.1302	6,000-9,000	less than 3,000	0.1435
	6,000-9,000	-0.1435		3,000-6,000	0.0133
	9,000-12,000	-0.1329		9,000-12,000	0.0105
	more than 12,000	-.2822*		more than 12,000	-0.1387
3,000-6,000	less than 3,000	0.1302	9,000-12,000	less than 3,000	0.1329
	6,000-9,000	-0.0133		3,000-6,000	0.0027
	9,000-12,000	-0.0027		6,000-9,000	-0.0105
	more than 12,000	-0.152		more than 12,000	-0.1493
more than 12,000	less than 3000	.2822*			
	3000-6000	0.152			
	6000-9000	0.1387			
	9000-12000	0.1493			

6. DISCUSSION AND CONCLUSION

According to the survey result, Thai engineering students are moderately agree and prepared themselves for the implementation of AEC such as they have high percentage on finding information on the internet by themselves, their English score and the readiness of engineering students is quite high because Engineering faculty in each universities has high score of National Admission test which are GAT (General Aptitude Test), PAT (Professional and Academic Aptitude Test) and O-NET(Ordinary National Educational Test) In addition, to compare between two type of university private and public university. For public university has higher percentage in University supported by advertisement and Family support them to study in foreign languages than private university. Which mostly they are interested in Chinese and Japanese that are ASEAN +3 countries. The lower rankings are Myanmar and Laos. On the other hand, for private university they have high percentage of self-support by finding information on the internet and their family supported by given the suggestion to them. Moreover, the higher income students tend to study more in extra curriculum. According to the research that they take only the extra curriculum that related to the class in their school in order to increase their GPA such as Mathematics and Science. However, they have lower percentage in study foreign language. This probably means that our engineering students are not ready in term of languages support by the researched that we found those Thai students are not ready in term of English language which is the main language that will use to communicate among AEC countries. In conclusion , Even though from the survey indicate that our student are ready for AEC but that is just a part of the country so it cannot completely conclude that the student in overall country has the same level of readiness.

6.1 Limitation

In our project, we still have some limitations. First, number of participants was too small and low varieties of the sample groups because we collected data from the universities that were located only in Bangkok and vicinity. Moreover, the universities are well-known. However, the reliability of the result is not adequate due to the lack of data collection in certain samples.

6.2 Further Study

In case of anyone is interested to study further about this topic, for more reliability of the result they should plan to collect data from the universities all over the country and collect the data in the same amount of sample. Cooperating with the Government is useful in term of collecting the raw data, the exact policy and necessary documents.

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