

Discriminant Analysis of the 21st Century Skills on the Graduates' Employment

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Abstract—The study aimed to discriminate the 21st century skills that influenced the employment of the graduates from the Faculty of Education, Prince of Songkla University, Pattani Campus. The sample size of 138 was set by simple random sampling technique via G*Power Program. The research instrument was the 21st century skills assessment form. It was found that the 21st century skills operational levels of the employed graduates and the unemployed graduates were “often” in every skill. For the group of the employed, the compassion had the highest mean followed by the communications, information, and media literacy skill. In the same way, the highest mean of the group of the unemployed was the compassion followed by the career and learning skill. On the contrary, the cross-cultural understanding skill had the lowest mean in both groups. The logistic discriminant analysis shows that the creativity and innovation skills and the career and learning skills had a statistically significantly positive effect whereas the critical thinking and problem solving skills, the communication, information and media literacy skills, and the computing and ICT literacy skills had a statistically significantly negative effect. The correctness score of the classification based on discrimination function was 71.7 %.

Index Terms—21st century skills, logistic discriminant analysis, employment, Teacher graduate

I. INTRODUCTION

Nowadays in Thailand the Faculty of Education is very popular in the university admission among the high school students. It can be seen from the competition ratio in Admission Exam 2016 to attend the Faculty of Education in the field of primary study at Prince of Songkla University. It is the highest competition ratio which is 1:52 followed by the Faculty of Education in the field of early childhood study at Thaksin University (1:40) [1]. The popularity of attending the Faculty of Education has started with many factors since 10 years ago. For example, every Thai people basically want to a government officer because of the stability, welfare and social benefits. The current issue of lacking teachers

makes students choose the Faculty of Education. They hope that after graduating, they will get a job and be exactly employed. In addition, the project of new generation teacher gives students a scholarship and guarantees that they will be put in a position of public teacher. This is another incentive that attracts a good grade student to study the teaching profession [2], [3]. It conforms to the survey results of the Association of Teachers and Lecturers (ATL) conducted from student teachers and newly graduated teachers. It reveals that there are 5 main reasons why they want to be a teacher. First, they would love to collaborate with children and make some changes. Second, the profession's details are various. Third, teaching is fun. Fourth, their teachers are their inspiration. Lastly, they want to teach their favorite subject [4].

In the age of the 21st century, a process of teacher production needs to be adapted very much in order to update the modern world such as changing the learning management system, measuring students' learning results conforming to the reality, encouraging virtue, morality and teacher ship etc. These are things that are pushed forward by teacher production units to respond the world of new generation. It agrees with the definition of the 21st century skills by the University of Melbourne-based and Cisco-, Intel-, and Microsoft-funded Assessment and Teaching of 21st Century Skills (AT21CS). It is divided into 4 categories which are 1) Ways of Thinking consisting of the Critical Thinking and Problem Solving Skill and the creativity and innovation skill, 2) Ways of Working consisting of the Collaboration, Teamwork, and Leadership Skill, 3) Tools for Working consisting of the Communications, Information, and Media Literacy Skill and the Computing and ICT Literacy Skill, and 4) Living in the World consisting of the Cross-Cultural Understanding Skill and the career and learning skill [5].

Similarly, it can be divided into 8 skills which are 1) Critical Thinking and Problem Solving 2) Creativity and Innovation Skill 3) Collaboration, Teamwork, and Leadership 4) Communications, Information, and Media Literacy 5) Cross-Cultural Understanding 6) Computing and ICT literacy 7) Career and Learning and 8)

Compassion [6]. According to the research of Lateh [7], the 21st century skills, the research skill and the computer skill were conducted to classify the needed skills of the computer teachers in the 21st century. It was found that the 21st century skills were the most influential skills in the discriminant scores followed by the computer skill meanwhile the research skill had a negative influence to the discriminant scores. Later, the research of Lateh [8] was conducted to develop the 21st century skills in the statistics course by arranging the research-based learning activity. It was found that the 21st century skills of the students were higher than 70%. Lerskornkijja [9] conducted the study by using the project-based learning management in the marketing course to develop the 21st century skills. According to the study of O'Connell and Pascoe [10], and the study of Turner, Leunggrattanas, Nirunrat, Jan-aruk, Wattakul, and Reunroeng [11], the needed skills that must be developed among physicians and nurses in agreement with the needs of the 21st century world.

After teacher students have completed the courses pursuing the curriculum which is composed of the theories and the operation in general courses, teachership and major subjects for 4 years and have had teaching practicum training for 1 year, they become graduates with a teaching license issued by Khurasapha and are ready for working as a teacher in a public or private school. Nonetheless, because of the current issues, the employment rate is quite small. This makes them unable to find a job soon. They have to apply for a teacher in a private school, but the available vacancies are not enough for newly graduated students. If they wait for being put in a government position in an available vacancy of a public school, they will face the high competition rate as shown in the summary of the applicants' number of the 2nd examination for an assistant teacher position 2015 on the 14th-20th of September 2015. It shows that the most 5 majors they applied for were 1) early childhood or kindergarten study (14,540 applicants against 101 vacancies), 2) Computer (13,710 applicants against 54 vacancies), 3) Social studies (12,650 applicants against 95 vacancies), 4) Science (11,642 applicants against 55 vacancies) and 5) English (10,594 applicants against 162 vacancies) [12], [13]. In addition, the employment survey of the graduates from the Faculty of Education, Prince of Songkla University, Pattani Campus of the academic year 2015 reveals that only 34.73 % of 572 graduates were employed [14]. Therefore, in this study, we were interested in classifying the employment of the graduates from the Faculty of Education, Prince of Songkla University, Pattani Campus. All 8 of the 21st century skills were used to investigate which skill influenced the employment of the graduates. Hopefully, this study would be useful for learning management, classroom activities and environment setting encouraging the skill.

II. METHODS

A. Population and Sample

Population in this study was the graduates from the Faculty of Education, Prince of Songkla University,

Pattani Campus in the academic year of 2015. The population size was 572 graduates. The simple random sampling technique by using the G*Power program at power 0.80 and error 0.05 of multivariate analysis test statistic was applied to set up the sample size of 138.

B. Research Instrument

The research instrument used in this study was the assessment form of the 21st century skills for the graduates from the Faculty of Education, Prince of Songkla University, Pattani Campus. It is divided into two parts. The first section contains the general information which are working status, gender, the senior high schools, Faculty of Education on university admission ranking, teaching practicum training unit, and GPA. Another section contains the operational levels of the 21st century skills for the graduates of the Faculty of Education with 5 rating scales which are 5 (always), 4 (often), 3 (sometimes), 2 (rarely) and 1 (never). The examples of the questions are as follows:

- When getting the information, you always translate and conclude it based on the analysis.
- You are always interested in the advance of the teacher profession in order to keep up with the future.
- You always think that teamwork creates learning skill and new concept that are applied to your own work.
- You always analyze the information, the possibility and the reliability of events and news shared via Facebook, Line etc.
- You always donate things, money or help the poor.

C. Research Methodology

After Review textbooks, documents and researches related to the 21st century skills, then create the assessment form of the 21st century skills for the graduates from the Faculty of Education, Prince of Songkla University, Pattani Campus, together with the consistency assessment form of the questions and the operational terms by selecting the questions with IOC \geq 0.50. Conduct the improved assessment form in accordance with the comments of the experts to 30 graduates apart from the sample. Then, Cronbach's Alpha was applied to investigate the reliability of the questionnaire equal to 0.85 and collect data from the assessment form during the graduation ceremony in September 2016. The general information be analyze by the percentage and analyze the operational levels by mean and standard deviation, together with interpreting the results. The interpretation consists of 5 levels: "always" (4.51-5.00), "often" (3.51-4.50), "sometimes" (2.51-3.50), "rarely" (1.51-2.50), and "never" (1.00-1.50). The logistic discriminant be analyze in order to inquire which skills of the 21st century affect the working status of the graduates from the Faculty of Education, Prince of Songkla University, and investigate their influence.

III. RESULTS

The analysis result of the general information shows that 138 samples were composed of 51 employed graduates and 87 unemployed graduates. Most of them

were female (82.61%). They graduated from the public senior high schools (52.17%). 70.29% of them selected the Faculty of Education as a primary for the university admission. Most of their teaching practicum training units were secondary schools (55.80%) and their average GPA was 3.21 as shown in Table I.

The analysis shows that operational level of the 21st century skills of the employed and the unemployed was

in “often” level in every skill. The highest mean in the group of the employed was for the compassion followed by the career and learning skills while one in the group of the unemployed was for the compassion followed by the communications, information, and media literacy skills. In both groups, the mean of the cross-cultural understanding skill was the lowest as shown in Table II.

TABLE I. GENERAL INFORMATION OF THE SAMPLE

	Number	Percentage
Working Status		
employed	51	36.96
unemployed	87	63.04
Gender		
male	24	17.39
female	114	82.61
Senior High School		
public	72	52.17
private	66	47.83
Faculty of Education on University Admission Ranking		
the 1 st	97	70.29
the 2 nd or lower	41	29.71
Teaching Practicum Training Unit		
primary school	61	44.20
secondary school	77	55.80
GPA min. = 2.21 max. = 3.85 mean = 3.21 S.D. = 0.35		

TABLE II. MEAN AND STANDARD DEVIATION OF THE 21ST CENTURY SKILLS FROM THE EMPLOYED AND THE UNEMPLOYED

	The Employed			The Unemployed		
	Mean	S.D.	Operational level	Mean	S.D.	Operational level
Critical Thinking and Problem Solving Skill	4.09	0.54	Often	4.02	0.46	Often
Creativity and Innovation Skill	4.18	0.62	Often	3.93	0.52	Often
Collaboration, Teamwork, and Leadership Skill	4.23	0.63	Often	4.13	0.59	Often
Communications, Information, and Media Literacy Skill	4.27	0.69	Often	4.42	0.49	Often
Cross-Cultural Understanding Skill	3.94	0.81	Often	3.64	0.80	Often
Computing and ICT Literacy Skill	4.25	0.53	Often	4.36	0.56	Often
Career and Learning Skill	4.39	0.56	Often	4.26	0.56	Often
Compassion	4.50	0.52	Often	4.49	0.49	Often

The result of the logistic discriminant analysis shows that at least one of discriminant coefficients from the discriminant function was not 0, statistically significant at 0.05. The Chi-square test statistic was calculated to be 28.869 (Sig. = 0.007) at 13 degrees of freedom. The result of the goodness of fit test of the discriminant function corresponding to the Hosmer-Lemeshow test was that there was enough evidence to say it was a good fit at the significance level of 0.05. The Chi-square test statistic was calculated to be 11.738 (Sig. = 0.163) at 8 degrees of freedom.

Table III shows the discriminant coefficients and the values of Odds ratio affecting the working status of the graduates. When considered from the discriminant coefficients, the creativity and innovation skill and the career and learning skill had a statistically significantly positive impact. In contrast, the critical thinking and problem solving skill, the communications, information, and media literacy skill, and the computing and ICT literacy skill had a statistically significantly negative impact. It was found that the Odds ratio value of the creativity and innovation skill, and the career and learning skill was higher than 1 when considered from the values of Odds ratio which was a comparative

relationship between the working status and the skills. This implies that these two skills of the employed had a higher value than the unemployed. It can be also said that when the value of the creativity and innovation skill increased to 1, the probability of getting a job was 9.755 times. In the same way, when the value of the career and learning skill increased to 1, the probability of getting a job was 4.123 times. The other factors were fixed as a constant.

The Odds ratio value of the critical thinking and problem solving skill, the communications, information, and media literacy skill, and the computing and ICT literacy skill was less than 1. This implies that the three skills of the unemployed had a higher value than the employed. In other words, the three skills of the employed had a probability value between 2.39-3.93 times. When compared with the unemployed, the probability value was 10 times. This result corresponds to the mean stated in Table II except the critical thinking and problem solving skill of which the employed had a higher mean than the unemployed. The findings indicate that all of five skills could be used to predict the probability of getting a job among the graduates. The discriminant function equation could be written as follow.

TABLE III. DISCRIMINANT COEFFICIENT AND ODDS RATIO INFLUENCING THE GRADUATES' EMPLOYMENT

	Beta	Exp (Beta)
Constants	2.368	10.681
Gender	-0.373	0.689
Senior High School	0.072	1.075
Faculty of Education on Admission Ranking	-0.626	0.535
Teaching Practicum Training Unit	0.170	1.186
GPA	-0.675	0.509
Critical Thinking and Problem Solving Skill	-1.432*	0.239
Creativity and Innovation Skill	2.278**	9.755
Collaboration, Teamwork, and Leadership Skill	-0.940	0.391
Communications, Information, and Media Literacy Skill	-1.418*	0.242
Cross-Cultural Understanding Skill	0.376	1.457
Computing and ICT literacy Skill	-0.933*	0.393
Career and Learning Skill	1.417*	4.123
Compassion	0.618	1.855

$\text{logit}(p) = 2.368 - 0.373(\text{Gender}) + 0.072(\text{Senior High School}) - 0.626(\text{Ranking}) + 0.170(\text{Teaching Practicum Unit}) - 0.675(\text{GPA}) - 1.432(\text{Critical Thinking and Problem Solving Skill})^* + 2.278(\text{Creativity and Innovation Skill})^{**} - 0.940(\text{Collaboration, Teamwork, and Leadership Skill}) - 1.418(\text{Communications, Information, and Media Literacy Skill})^* + 0.376(\text{Cross-Cultural Understanding Skill}) - 0.933(\text{Computing and ICT literacy Skill})^* + 1.417(\text{Career and Learning Skill})^* + 0.618(\text{Compassion})$, when p value was a ratio of the employed.
 * p<0.01 ** p<0.05

The correctness result of the classification from discrimination function was 71.7%. The percentage of classifying the unemployed was 83.9 whereas the percentage of classifying the employed was 51.0 as shown in Table IV.

TABLE IV. CORRECTNESS OF THE CLASSIFICATION FROM DISCRIMINATION FUNCTION

	The unemployed	The employed
The unemployed	73	14
The employed	25	26

IV. DISCUSSION

It can be said that the operational levels of the 21st century skills of the sample were in the "often" level in every skill. For the group of the employed, the compassion had the highest mean followed by the communications, information, and media literacy skill. In the same way, the highest mean of the group of the unemployed was the compassion followed by the career and learning skill. On the contrary, the cross-cultural understanding skill had the lowest mean in both groups. It is pleasant to know that the teacher graduates had the high compassion when compared with the other skills conforming to the characteristics of a good teacher following what His Majesty King Bhumibol Adulyadej, the ninth monarch of Thailand from the Chakri Dynasty as Rama IX, conferred to the senior teachers of the year 1979 on Tuesday 29th, 1980 as follows.

"Real teachers have to do good things. They must be hard-working, industrious, great-hearted, sacrificed, tolerant and patient. They must also abide by discipline and calm. They must have a good behavior in accordance

with a good practice and custom. They must isolate from amenities and amusement that do not suit their own prestige. They must be intent, determined, honest, sincere, merciful, impartial and unbiased. They must be educated to sharp their mind for gaining knowledge and understanding cause and effect..."

Besides, the findings conform to 10 qualities of a good teacher, namely 1) effective discipline, 2) integrity and fairness, 3) industriousness, thrift and profession adherence, 4) teaching awareness and social responsibility, 5) creativity, criticism and reasonable judgement, 6) enthusiasm in the government of democracy and love of nation, religion and king, 7) good physical and mental health, 8) self-dependence, 9) pride and maintenance of art, culture and national resources, and 10) sacrifice, mercy, gratitude, bravery and harmony [15].

The creativity and innovation skill and the career and learning skill had a statistically significantly positive effect meanwhile the critical thinking and problem solving skill, the communications, information, and media literacy skill, and the computing and ICT literacy skill had a statistically significantly negative effect. It agrees with the research of Lateh [7] revealing that the 21st century skills influence the employment of the computer teachers most. They are more important than the computer skill. Lateh [8] also revealed that research-based learning of the students can enhance the 21st century skills more than 70%. We had a notion that a graduate who has creativity, improvement, critical thinking self-assessment and flexibility is needed by an institute. Because of this, the employed had higher level of the creativity and innovation skill, and the career and learning skill than the unemployed. However, it was found that the mean of self-assessment and some skills of the unemployed were significantly higher than the employed. It might be noted that in this study, the data were collected during the graduation ceremony which was earlier than previous years and many admission examinations of government officers were postponed because of political issues. Thus, the good grade graduates might wait for taking the exam. That's why they were still not applying for a job. Some graduates took language courses for continuing a master degree. To conclude, the findings could be some guidelines for creating, improving and updating the curriculum of the Faculty of Education by integrating the skills to the courses or extra-curriculum activities so that graduated students can respond the needs of labor market.

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