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Analysis of Differences in Core Competencies According to Major, Grade and Gender of Korean University Students

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Abstract

In order to achieve global competitiveness, university students should have core competency as creative convergent talent that can actively respond to changes, recreate culture with new ideas, and play a leadership role in a constantly diversifying society. Therefore, it is very important to analyze the core competencies of university students according to their major, grade, and gender, and to develop differentiated and systematic curriculum based on this. In this study, a core competency test (by S University, 2016) was conducted on 5770 students in years 1 to 4 at "S University" in Seoul. We analyzed the core competencies of students (creative competence, convergence competence, community competence, communication competence, leadership competence, and global competence) according to their major, grade, and gender. The results showed that there were differences in the 6 core competencies among college students according to their majors($p<.05$): creativity and convergence competence were the highest in Art and the lowest in Law and Sports; communication and leadership competence were the highest in the convergence specialized free majors, and the lowest in Art; the highest communication competence was found in the humanities, and the lowest in convergence specialized free majors; global competence was the highest in the humanities, and lowest in the sports majors; Overall the six core competencies of Soongsil are the highest among those students in the convergence specialization. In addition, there were differences in core competencies among Korean university students according to the year of study students were($p<.05$) in all 6 core competencies ($p<.05$), with the students in the 4th year being the highest in all 6 core competencies including the core competency total. The core competence of students was found to be higher in males than females in all areas of creativity, convergence, global competence and core competence, except communication. Based on these results, universities should develop appropriate curriculum considering majors, grade, and gender in order to effectively cultivate core competencies of students.

Keywords: Core competency; Creative competence; Convergence competency; Community competence; Communication competency; Leadership competence; Global competence.

1. Introduction

In the society of the future heralded with the coming of the Fourth Industrial Revolution, competency will be needed to gain insights into rapidly changing social situations. The ability to cope with problems that span a wide range of areas through creative thinking, originality, and flexibility will be required. On the other hand, in order to be able to adapt to a meta-cognitive and hyper linked society, we need core competency as a prerequisite for global experts who can actively respond to new and rapid changes, recreate culture with new ideas, and play a role as leaders in a diversified society. We need creativity convergence talent and better developed human resources. Core competencies are being introduced by many companies to select, recruit and retain talented individuals. Creativity is a priority for many companies' core competencies. Given these trends, it is very important, indeed essential, for universities to develop educational programs that will improve the core competencies of university students who must act as key members of society and corporations.

Since the OECD identified the core competencies required for knowledge-based and lifelong learning societies, there has been a vigorous discussion of core competencies in the educational context and focuses on implementing competency-based curricula. Lee (2014) developed a core competency training program that can be applied to elementary, middle, and high school levels at the national level. In recognition of the need to enhance core competencies in order to be competitive in a globalized international society, the Korean government has been interested in developing a core competency-centered curriculum. As a part of this, we have focused on systematically developing core competencies for the society of the future through school classes, and we have been aiming for convergent instruction that meets the demands of the age of global convergence (Anggraini *et al.*, 2017).

Lee (2011) has proposed creativity, problem solving ability, communication ability, and information processing ability, interpersonal ability, self-management ability, basic learning ability, citizenship consciousness, international social understanding and career development ability as core competencies of the future. Education and continuous learning is required. This is consistent with Parry and Scott (1966)'s claim that competence is a collection of knowledge, skills, and attitudes that can be improved through training and development. On the other hand, in 2014

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the Ministry of Education developed a convergence instructional model to focus on career education and to derive the core competencies related to each career group in the future. Lee (2014) showed that career core competency is composed of the core competencies of self-understanding ability, self-management ability, creative problem solving, information utilization area, foreign language ability · computer literacy, and communication ability. The study also introduced three domains: the basic dimension (learning ability, self-concept, responsibility), the social dimension (social understanding ability, interpersonal ability, initiative, respect for others), and the problem solving dimension (conflict resolution and cooperation, teamwork formation, decision making / judgment ability) (Taiwan *et al.*, 2017).

In the end, in order to establish the direction of future education, it is urgent to develop a core competency that creative talent should have and to develop and apply a convergent instructional model that can develop these core competencies. It is necessary to analyze the core competencies of college students in order to prepare a convergence course as non-major subject course to foster core competencies in universities. As a result of the analysis, if the core competencies differ according to major, grade, and gender, it will be possible to develop differentiated and systematic curricula based on this.

To this end, in this study, we tested students in 2016 and 2017 using the '(Soongsil University, 2016)' developed by S University, and analyzed the differences in core competencies of students according to major, year of study and gender. It is hoped that the results of this study can be helpful for the development of curriculum for the enhancement of core competency in universities.

2. Method

2.1. Participants

Total 10,941 students (5,171 were participated in 2016, and 5,770 were in 2017) participated in the SSU core competency assessment in 2016 and 2017. Second year students (4,976 students, 40.9%) constituted the largest cohort of respondents, but there was a similar proportion of first year students (2,843 students, 26%), third year students (2,254 students, 20.6%) and fourth year students (1,368 students, 12.5%). By gender, 5,892 male students (53.9%) and 5,049 female students (46.1%) participated, a roughly similar ratio. The highest number of undergraduate student respondents belonged to the engineering college with 700 students, followed by the IT College with 557 students.

2.2. Instrumentation

Soongsil University (2016) was recently developed by S University taking into account the desired talents and core competencies of S University, located in Seoul, Republic of Korea. It is designed to measure 6 core competencies with 104 items on a Likert scale: creative competence, convergence competence, community competence, communication competence, leadership competence, and global competence. The construction of the core competence test, along with the definition of core competence and the item number and reliability of each sub-competence are shown below in Table 1.

Table-1. Construction of Core competence test

Competence: definition	Tot	Sub-competence	Item	Number	Reliability - Cronbach α
Creativity: Ability to clearly communicate and persuade their opinions using various linguistic and non- verbal skills, to listen to the opinions of others, to communicate effectively through empathy	20	Problem-finding	5	1-5	.873
		Originality	5	6- 10	
		Creating change	5	11- 15	
		Curiosity	5	16- 20	
Confluence: Ability to organize knowledge or create value by integrating knowledge and technology in various fields based on expertise in major, understanding of other academic fields, and open attitude	19	Integrated thinking	5	21- 25	.873
		Composition of new knowledge	4	26- 29	
		Openness	5	30- 34	
		Flexibility	5	35- 39	
Community: Interested in community issues, voluntarily participating in them, and able to implement social integration based on the spirit of Christianity and to cooperate and contribute to the achievement of peaceful	15	Peaceful reunification consciousness	5	40- 44	.873
		Christian Ethics	5	45- 49	
		Cooperative Citizenship	5	50- 54	

reunification					
Communication: Ability to clearly communicate and persuade their opinions using various linguistic and non-verbal skills, to listen to the opinions of others, to communicate effectively through empathy	20	Meaning transfer ability	5	55- 59	.873
		Empathy ability	5	60- 64	
		Persuasion and coordination ability	5	65- 69	
		Listening ability	5	70- 74	
Leadership:Ability to set the vision and goals of the community with a challenging spirit based on self-development and good interpersonal relationships and to lead them to achieve it successfully	15	Self development and management ability	5	75- 79	.873
		Goal setting and propelling ability	5	80- 84	
		Interpersonal skills	5	85- 89	
Global :Ability to adapt to global society and to lead it through a broad understanding of global change based on the ability to use foreign languages and various cultural capacities	15	Foreign language ability	5	90- 94	.873
		Global social adaptation and leadership	5	95- 99	
		Multicultural capacity	5	100- 104	
Total Core-competence	104				.932

2.3. Data Analysis

A t-test and a one-way ANOVA were used to compare the differences in core competencies measured in 2016 and 2017 between majors, grades, and gender. Scheffe analysis was used as post-hoc.

3. Results

3.1. Differences in Core Competences by Major

We analyzed the core competencies (creative competence, convergence competence, community competence, communication competence, leadership competence, global competence) of students according to their major with one-way AVOVA. The results of this showed that there were differences across the 6 competences according to student's majors.. The results are shown below in Table 2, and Table 3.

In terms of majors, the total score of the 6 core competencies was difference according to the majors, like the highest in students taking the Convergence characterization free majors, , and lowest in students majoring in Sports studies. The differences among these major subjects were statistically significant ($F=4.744$, $p<.001$). In the case of creative and convergence competencies the students majoring in Art achieved the highest scores, whereas those majoring in Law and Sports achieved the lowest scores. Again, the differences among these major subjects were statistically significant ($F=2.043$, $p<.05$).

Community and leadership competence was highest in the Convergence Specialized Free Majors, and lowest in the Creative Art Department.

In terms of Colleges, the results showed that the overall score in the College of Social Sciences was higher than in the Colleges of Humanities and Engineering. In turn, the College of Humanities was higher than the College of Engineering.

The highest communication competence was found in the liberal arts college, and the lowest in the Fusion Specialized Freedom Engineering. In addition, global competencies are highest in the College of Humanity and lowest in the Sports College.

Table-2. Comparing 6 Competencies among Majors: Descriptive Statistics

College	***N***	***M***	***SD***
IT (a)	1173	378.34	44.85
Business Administration (a)	722	384.87	42.79
Economy and Trade (b)	499	380.54	43.23
Engineering (c)	r1303	376.67	45.94
Law (d)	196	378.16	40.46
Social Science (e)	568	387.02	42.09
Sports (f)	68	374.71	48.54
Art (g)	88	385.20	44.01
Convergence specialized free majors (h)	122	387.94	43.32

Humanity (i)	678	385.61	43.17
Natural Science (j)	353	378.85	44.14
Total	5770	380.97	44.20

Table-3. Differences of 6 Core Competencies among Majors: ANOVA

	SS	*df*	*MS*	*F*	*p*	*Scheffe*
between-group	92102.055	10	9210.205	4.744	.000	*d<j<f, j>d
within-group	11180689.141	5759	1941.429			
total	11272791.196	5769				

We analyzed the core competencies (creative competence, convergence competence, community competence, communication competence, leadership competence, global competence) of students according to their major with one-way AVOVA. The results showed that students majoring in art had the highest level of creative competency, and those majoring in law had the lowest levels. Again these differences were statistically significant (F = 2.043, p <.05). The result is shown below in Table 4 and Table 5.

Table-4. Comparing Creative Competencies among Majors: Descriptive Statistics

College	***N***	***M***	***SD***
IT	1173	73.61	10.29
Business Administration	722	73.20	10.19
Economy and Trade	499	72.89	10.47
Engineering	1303	73.05	10.72
Law	196	71.48	9.34
Social Science	568	72.75	10.40
Sports	68	72.87	10.57
Art	88	76.15	10.30
Convergence specialized free majors	122	73.96	10.06
Humanity	678	72.42	10.05
Natural Science	353	73.48	10.55
Total	5770	73.10	10.37

Table-5. Differences of Creative Competencies among Majors: ANOVA

	SS	***df***	***MS***	***F***	***p***
between-group	2191.464	10	219.146	2.043	.026
within-group	617801.022	5759	107.276		
total	619992.486	5769			

3.2. Differences in Core competences according to Grade

The differences of the core competencies (creative competence, convergence competence, community competence, communication competence, leadership competence, global competence) of students according to their year of study were analyzed with one-way AVOVA. The results showed that the core competencies are highest in 4th year students followed in turn by1st year students, 3rdyear students and lastly2nd year students, who were the lowest in all competences. 4th year students' creativity competence was significantly higher than 2nd year students. The results are shown below in Tables 6 and 7.

Table-6. Comparing 6 Competencies according to student's grade: Descriptive Statistics

Core competence	**Year**	***N***	***M***	***SD***
Creativity	1	2791	72.96	10.42
	2	1814	72.36	9.98
	3	620	73.48	10.87
	4	545	75.87	10.31
	tot	5770	73.10	10.37
Convergence	1	2791	68.19	9.09
	2	1814	67.82	8.72
	3	620	68.99	9.61
	4	545	70.54	9.60
	tot	5770	68.38	9.11
Community	1	2791	55.21	7.78
	2	1814	53.49	7.41
	3	620	54.39	8.71
	4	545	55.31	8.23
	tot	5770	54.59	7.85
Communication	1	2791	80.08	9.70

	2	1814	79.62	9.40
	3	620	79.70	10.51
	4	545	81.08	9.61
	tot	5770	79.99	9.70
Leadership	1	2791	56.19	8.17
	2	1814	55.50	7.94
	3	620	56.65	8.60
	4	545	58.00	8.71
	tot	5770	56.19	8.22
Global	1	2791	48.73	10.01
	2	1814	47.61	9.85
	3	620	49.87	10.67
	4	545	51.00	10.83
	tot	5770	48.72	10.16
Total of 6 Competencies	1	2791	381.35	44.06
	2	1814	376.40	41.68
	3	620	383.09	47.71
	4	545	391.79	46.84
	tot	5770	380.97	44.20

*A: 1st grade, B: 2nd grade, C: 3rd grade, D: 4th grade

Table-7. Differences of 6 Core Competencies according to student's grade: ANOVA

		SS	***df***	***MS***	***F***	***p***	***Scheffe***
Creativity	between	5330.54	3	1776.85	16.668	.000	*B<A<C <D
	within	614661.95	5766	106.60			
	total	619992.49	5769				
Convergence	between	3424.20	3	1141.40	13.843	.000	*B<A<C <D
	within	475427.22	5766	82.45			
	total	478851.42	5769				
Community	between	3561.11	3	1187.04	19.424	.000	*B<A, B<D
	within	352363.42	5766	61.11			
	total	355924.53	5769				
Communication	between	968.83	3	322.94	3.440	.016	*B<D
	within	541324.32	5766	93.88			
	total	542293.15	5769				
Leadership	between	2776.79	3	925.60	13.776	.000	*B<C<D, A<D
	within	387411.36	5766	67.19			
	total	390188.15	5769				
Global	between	5895.88	3	1965.29	19.215	.000	*B<A<C <D
	within	589730.96	5766	102.28			
	total	595626.84	5769				
Total of 6 Competencies	between	104862.44	3	34954.15	18.047	.000	*B<A<C <D
	within	11167928.76	5766	1936.86			
			5769				
	total	11272791.20					

3.3. Differences in Core Competences by Gender

The differences of the core competencies (creative competence, convergence competence, community competence, communication competence, leadership competence, global competence) of students according to gender were analyzed with two independent group t-tests. The results showed that there was a statistically significant difference between males and females except on community and leadership competence ($p<.001$). Male students scored higher than female students in creativity, convergence, global and total core competence, but female students scored higher in communication competence. The results are shown below in Table 8.

Table-8. Differences of 6 Core Competencies between males and females: t-test

Competence	**male (n=3172)**		**female (n=2598)**		***t***	***P***
	M	***SD***	***M***	***SD***		
Creativity	74.56	10.63	71.33	9.75	11.915	.000
Convergence	69.43	9.51	67.10	8.43	9.720	.000
Community	54.76	7.14	54.45	8.40	-1.452	.146
Communication	79.31	10.28	80.81	8.86	-5.856	.000
Leadership	56.27	8.62	56.10	7.71	0.790	.429
Global	49.39	10.62	47.89	9.51	5.605	.000
Totalof6 Competencies	383.41	47.36	377.98	39.82	4.650	.000

4. Conclusion

In this study, in order to identify the characteristics of core competencies of Korean university students, core competencies were measured and compared for university students of S university located in Seoul. The results were as follows:

First, there were differences for the six core competencies according to the majors of the students enrolled in 2017. The students of the Convergence Specialized Free Majors were the highest overall for the combined 6 core competencies, however, the level of each core competency varied according to the different majors. Therefore, in developing and improving a core competency curriculum, it will be necessary to consider the specific characteristics of each major.

Second, there was a difference across each of the 6 core competencies according to the year of study that students were in. In the post-hoc analysis results, 4th year students scored the highest in each of the 6 core competencies including the core competency total score. Overall there were clear differences according to grade, and therefore it is necessary to develop a curriculum and teaching methods that consider the difference of competence according to the year of study that students are in. In particular, considering the fact that the capacity of the second year students is the lowest, it is necessary to analyze the causes of this and develop a special program.

Third, the core competence of college students was found to be higher in males than females in the competencies of creative, convergence, global competence and total core competence, and female students scored higher in communication competence. As a result, it can be inferred that Korean co-educational universities are still organized around male students. Therefore, it is necessary to support university education that adequately considers the characteristics of both male and female students.

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