A Study of Computer and Information Course Curricula for the General Education in Taiwan University

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Abstract: The contemporary university education should not only be able to help students develop the professional knowledge or skills, but need to consider how it can really be for the country, develop a rational thinking, human literacy, and social care professionals. The study focused on the numbers and social network analysis of "Computer and Information Course" for general education curriculum, in order to understand the current Taiwan higher education institutions. In this study we use university school curriculum resource network (http://ucourse.tvc.ntnu.edu.tw/) to obtain sample resources and use, and the software UCINET6.198 to analyze the social network variables to define the network position.

Key-Words: Social network, Computer and Information Course, General Education, UCINET

1. Introduction

The contemporary university education in the era and the needs of society, the profession is the primary consideration of the points, but universities should not only be able to help students develop the professional knowledge or skills, but need to consider how it can really be for the country, develop a rational thinking, human literacy, and social care professionals in educational institutions[3]. As for general education in Taiwan's universities, curriculum not for its educational functions from independent reflection, but the Ministry of Education resulting from the designation. The courses of its development perspective show the top-down approach.General education for students to build basic communication, thinking, critical capabilities; students are expected to understand all major areas of knowledge, eliminating the gap between the field of knowledge. In the era of ever-changing information technology, the real strength comes from the use of information and the creation of knowledge. Such the ability to respond to general education, that is, "Computer and Information Course" related courses is important. Europe and the United States well-known universities have begun to set up "information literacy" related courses, the students effectively use of information and the creation of knowledge. Evident on the computer and information technique education, national capacity-building of great importance, this study focused on general education to conduct "Computer and Information Course" the importance of curriculum in order to understand the current national higher education institutions to conduct the University of the Ministry of General Education, "Computer and Information Course" course of the current situation as the focus of inquiry.

The origin and development of general education can be viewed as "professional education" which is highly developed. Owing to human being reflection to the overall imbalance in the development of education, education, unequal distribution of resources, education philosophy utilitarian, secular educational value of as well as the rigidity of the education system and the thought of general education was development. The original meaning and purpose of general education is not only to raise

the educational value of ideas, but also to develop professional education [2] .

University of "general education", also known as "general education", is a kind of commonality with the overall goals of education and which is different from the professional education. Professional education is designed to train students with special academic abilities, and characters should be the future work needs; in general education students were re-equipped with a comprehensive, analysis, and linking the various subject areas, the extended care for life, nature and society, mind and vision. General Education and professional Education, the two complement each other in order to complete the ideal of university education[7].

Due to the industrial and technological revolution, society organizations are increasingly complex, increasingly finer division of labor, degree of specialization is deeper and deeper, over-emphasis on science and technology at the technical level and ignore the social and cultural dimensions in recent years. Taiwan's emphasis on general education, that is, in order to compensate for this Deviation to drive the knowledge economy era for emerging technologies, multi-cross of learning (inter-disciplinary) or multi-domain (multi-disciplinary) of the integrated technology, and apply professional knowledge to create, whether functional or cognitive value, most of the establishment in the humanities or social basis[6]. General education curriculum is the further development of technology, capacity of the foundation, is to complement the effectiveness of basic education[6].

Consensus is emerging as to what twenty-first-century college and university graduates need to know and be able to do. These “essential learning outcomes” of higher education are rooted in the long-standing belief that baccalaureate study should reinforce the values of liberal democracies, foster enlightened thought, and encourage engaged citizenship; they resonate with what educators, alumni, and business leaders believe students need to function effectively in a rapidly changing world[1]. These outcomes are:

- broad knowledge of human cultures and the natural and physical world, including social sciences, science and mathematics, humanities, histories, and the arts;
- intellectual and practical skills, including effective writing, inquiry, quantitative and information literacy, and teamwork and problem solving;
- individual and social responsibilities, including civic knowledge, intercultural knowledge and competence, ethical reasoning and action, and lifelong learning skills; and
- integrative learning, including the capacity to adapt knowledge, skills, and responsibilities to new settings and questions[1].

2. The promotion for general education of computer and information technology in Taiwan

Domestic sources of law on general education in Taiwan, according to the Ministry of Education promulgated "University General Education Electives Implementation" in 1984, students need to select "literature and art", "history and culture", "society and philosophy", "mathematics and logic", "physical science", "life science", and "applied science and technology" seven basic categories, four to six credits of general education elective courses, the provision to the May 26, 2004 petitioning the Council of Grand Justices to make 380 the text, has been increased to be revised general education subject 8 credits. It shows the importance of general education for education authorities lately. In recent years, domestic universities to actively promote general education, students have not been outside the door of knowledge and research methodologies, college graduates can not help but look beyond one corner, unable to keep fully abreast of modern

knowledge of the development of liberal re-emphasized the development of education is to equip students to meet the everyday needs of the future society of knowledge and skills. Therefore, the development of general education to meet the lifelong learning needs of the information society era, the establishment of necessary information about daily living capacity, combined with today's diverse educational integration, critical, development trends in the interpretation and action programs to complete the mission of university education, is the development of general education schools an urgent need to explore topics in depth[7]. Coming to knowledge-based economy era, the need to deal effectively with the capacity of digital information through the implementation of computers and information technology in education can be used to the life, economic, political activities at all levels, the application of information technology to enhance overall national competitiveness, but also the world's advanced countries in a common goal. Actively seeking to join the knowledge economy development in our columns, when the personnel training of university education by, in response to the times and the Computer and Information Course, ability to implement on general education.

3. Methodology

In this study, we use university school curriculum resource network to obtain sample resources and use social network analysis to understand the relationship between course's attributes.

3.1 Sample source

In this study, university school curriculum resource network (http://ucourse.tvc.ntnu.edu.tw/) as data sources in order to "computer" and "information" as keyword queries for course name to obtain 2006 academic year to 2009 school year, first semester of computer and information technology in education course materials a total of 1,406. And based on the name of classified technology, theory, human application deviled into three categories, according to "courses of each semester.

3.2 University of California of Irvine Network Programms (UCINET)

Social network analysis refers to the knot together, connecting variables to social network, and profit with the community plan (sociogram), a point that members, in order to line represents the relationship between the members, showing the properties of these social configurations, value for volume of social cohesion and social pressure[8]. Social network analysis methods include the core measures, identification of groups to analyze the role, figure based on the following row-based statistical analysis and so on. In most social sciences, traditional methods for data analysis are relatively simple by comparison. We have focused on the attributes of social actors. Thus, data come to us in the form of a rectangular, matrix. Social network analysis is not focused on the individual. It is explicitly concerned with the social relations that link to each other. Typically, UCINET software for analyzing network data involve the search for "socially important" structural patterns in data matrices. This study first analysis of the relationship between the data compilation coding, a relationship matrix data file, and then use the software package UCINET6.198 for calculation and analysis, and use NetDraw function to establish the relationship between matrix and graph drawing Social Network.

4. Results & Discussion

4.1 "Computer and Information Course" in 2006 to 2009 school year

Table 1 presents the number of "Computer and Information Course" from 2006 school year to 2009 school year semester 1. There were 265 courses in 2006 school year, 523 courses in 2007school year,

489 courses in 2008 school year, and 129 courses in 2009 school year semester 1. Classification on the different courses of view, 2006 school year to 2009 school semester 1, a total of 134 technical classes, theory classes a total of 488, humanities application class a total of 784. Overall, 2007 and 2008 commencement

of the school year a larger number of types of courses humanities application class, followed by the theory class, again for technical classes.

Table 1 the number of computer and information technique courses

Semester	2006		2007		2008		2009	Total
Course categories	Semester1	Semester2	Semester1	Semester2	Semester1	Semester2	Semester1	
technical	13	11	24	29	15	19	23	134
theory	42	39	106	77	83	82	59	488
humanities application	107	53	132	155	141	149	47	784
Total	162	103	262	261	239	250	129	1406

4.2 Social network analysis of "Computer and Information Course"

UCINET Social network analysis as Table 2, indicated Network Centralization is 68.59%. The maximum degree is 95, the minimum degree is 1. The former 30 course names link to "Computer and Information Course" are Table 3. And, use NetDraw function to graph drawing Social Network between the former 30 course names that link to "Computer and Information Course" shows as Figure 1.

	Degree	NrmDegree	Share
Mean	5.82	4.409	0.008
Std Dev	9.951	7.539	0.013
Sum	774	586.364	1
Variance	99.02	56.83	0
Minimum	1.00	0.758	0.001
Maximum	95.00	71.970	0.123

Table 2 the degree centrality measures of computer and information courses

Note: Network Centralization = 68.59%

Table Table 3 Freeman's degree centrality measures (the former 30)

	Degree	NrmDegr	ss
information	95.00	71.97	0.12
computer	56.00	42.42	0.07
application	29.00	21.97	0.04
technology	28.00	21.21	0.04
introduction	22.00	16.67	0.03
society	16.00	12.12	0.02
management	15.00	11.36	0.02
network	14.00	10.61	0.02
teaching	12.00	9.09	0.02
science	11.00	8.33	0.01
system	11.00	8.33	0.01
education	9.00	6.82	0.01
social	9.00	6.82	0.01
medical	9.00	6.82	0.01
literacy	9.00	6.82	0.01
library	9.00	6.82	0.01
internet	8.00	6.06	0.01
assisted	8.00	6.06	0.01
explore	8.00	6.06	0.01
use	7.00	5.30	0.01
language	7.00	5.30	0.01
chinese	7.00	5.30	0.01
research	7.00	5.30	0.01
software	7.00	5.30	0.01
world	7.00	5.30	0.01
practical	7.00	5.30	0.01
nature	7.00	5.30	0.01
life	7.00	5.30	0.01
animation	7.00	5.30	0.01

4.3 "Computer and Information Course" of general education by credit

Table 4 presents the number of the computer and information science courses from 2006 to 2009 school year semester1. Figure 2 presents 2006 to 2008 school year computer and information courses distribution. Overall, 2006 to 2008 school year computer and information course to 2 credits of the courses offered the most, followed by 3 credits courses, 1 credit courses. Classification in terms of the curriculum in order to humanities application class, followed by theory class, technical class should be at least.

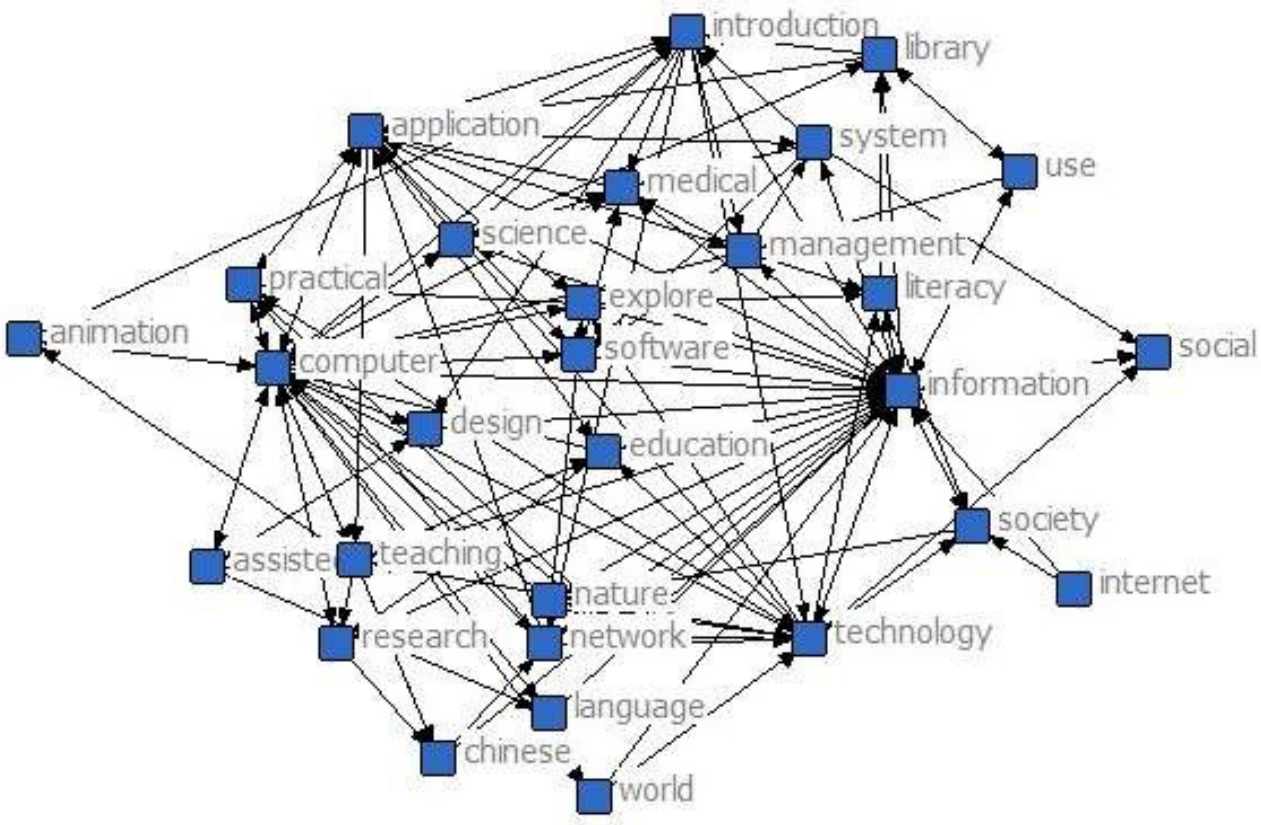

Figure 1 Social Network between the former 30 course names

Table 4 2006 to 2009 school year the number of computer and information technique courses offered by credit

school year	2006				2007				2008				2009 (Semester 1)				
Credit / Course categories	1 Credit	2 Credits	3 Credits	Sum	1 Credit	2 Credits	3 Credits	Sum	1 Credit	2 Credits	3 Credits	Sum	1 Credit	2 Credits	3 Credits	Sum	Total
technical class	0	23	1	24	1	38	14	53	0	32	2	34	11	12	0	23	134
theory class	0	78	3	81	2	112	69	183	0	112	50	162	0	42	16	58	484
humanities application class	0	158	2	160	0	275	12	287	0	279	14	293	0	48	0	48	788
Total	0	259	6	265	3	425	95	523	0	423	66	489	11	102	16	129	1406

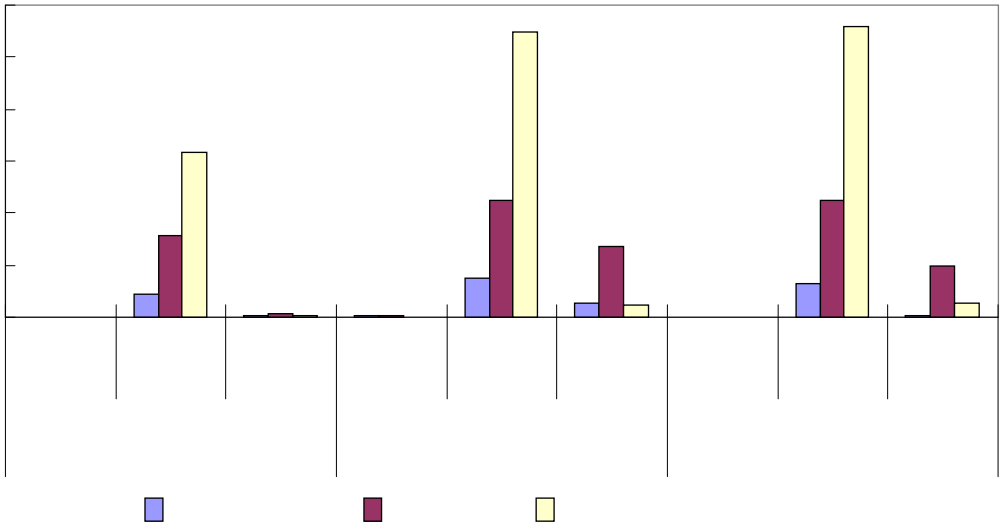

Figure 2 2006 to 2008 school year the number of computer and information science courses distribution

4.4 "Computer and Information Course" of general education by public and private

Table 5 presents 2006 to 2009 school year the number of computer and information courses by school type (public and private). Figure 3 presents 2006 to 2008 school year in computer and information courses by other public and private distribution. Overall, 2006 to 2008 school year computer and information courses commence the largest number of private schools, followed by public schools. Classification in terms of the curriculum's name, humanities application class were the most, followed by theory class, technical class.

Table 5 2006 to 2009 school year semester1 computer and information technique courses offered by school type (public and private)

school year	2006			2007			2008			2009 (Semester 1)			
school type / Course categories	public	private	Sum	public	private	Sum	public	private	Sum	public	private	Sum	Total
technical class	10	14	24	23	30	53	18	16	34	18	5	23	134
theory class	36	45	81	51	132	183	51	111	162	30	28	58	484
humanities application class	53	107	160	105	182	287	87	206	293	24	24	48	788
Total	99	166	265	179	344	523	156	333	489	72	57	129	1406

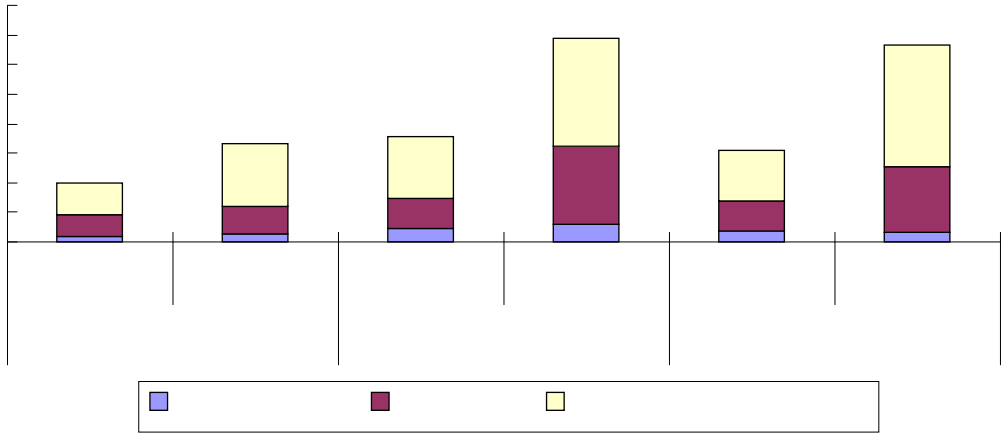

Figure 3 2006 to 2009 school year semester1 computer and information technique courses offered by public and private distribution

4.5 "Computer and Information Course" of general education by course type (compulsory or elective)

Table 6 presents 2006 to 2009 school year semester1 the number of computer and information course by course type (compulsory or elective). Figure 4 presents distribution of 2006 to 2008 school year computer and information technology courses. There were 146 compulsory courses and 92 elective courses in 2006 school year. There were 379 compulsory courses and 139 elective courses in 2007 school year. There were 324 compulsory courses and 153 elective courses in 2008 school year. There were 90 compulsory courses and 39 elective courses in 2009 school year semester 1. Overall, 2006 to 2008 school year courses offered by many as a compulsory. And humanities application class were the most part, followed by theory class, and technical class.

5. Conclusion

This article aims to analyze the "Computer and Information Course" of general education from 2006 school year to 2009 school year semester 1 in Taiwan. The largest quantities of "Computer and Information Course" are humanities application curriculums from 2006 to 2009 school year in Taiwan. From 2006 to 2008 school year commenced in larger quantities in order to compulsory-based, mostly for 2 credits courses, public offered more than private schools.

General education plays an important role in market-oriented process era. If there were no general education, university education easily became mechanical and regularization of the educational structures.

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Table 6 2006 to 2009 school year the number of computer and information technique courses by course type

school year	2006					2007				2008				2009 (Semester 1)			
type / categories	Compulsory	Elective	Others	Missing	Sum	Compulsory	Elective	Others	Sum	Compulsory	Elective	Others	Sum	Compulsory	Elective	Sum	Total
technical class	12	11	0	1	24	35	17	1	53	20	14	0	34	16	7	23	134
theory class	31	33	0	17	81	139	44	0	183	99	51	12	162	51	7	58	484
humanities application class	103	48	1	8	160	205	78	4	287	205	88	0	293	23	25	48	788
Total	146	92	1	26	265	379	139	5	523	324	153	12	489	90	39	129	1406

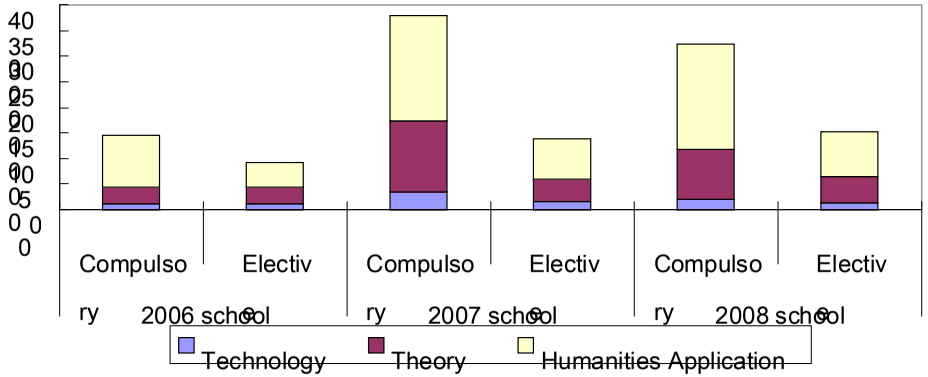

Figure 4 2006 to 2008 school year computer and information technology in education by compulsory or elective courses distribution

In the Information Age and life-long educational society, it reveals a commonality with the overall general education goals of education is in response to the trend of students necessary to establish the basis for information literacy. Understanding of higher education institutions to offer "Computer and Information Course" of general education, it can help the future of higher education institutions commenced a reference. In response to the advent of the digital age, computer and information courses of general education is a key point to implement the educational achievements of liberal education[5].

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