AC 2012-3357: ASSURING QUALITY OF CONTINUING ARCHITECTURAL EDUCATION: LEARNERS' PERCEPTIONS

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Assuring Quality of Continuing Architectural Education: Perceptions of Learners

INTRODUCTION

Living standards and knowledge standards are increasing with the popularization of globalization. The concept of lifelong learning is attracting considerable attention from people. Learning activities that emphasizes continuous learning despite the age of the learner have gained respect from international organizations worldwide (Anthony, 2002; Ministry of Education, 2010). It has also become the principle for national reformation and social development in most countries. During the last few years, the learning requirements of adult learners have increased in conjunction with the number of higher education organizations; university administrators began to value the function of extension education (Cowan and Pinheiro-Torres, 2004). In 1991, fifty colleges and universities were operating in Taiwan. In 2011, the number of colleges and universities was as high as 145, a three-fold growth rate. All 145 colleges and universities have established extension education centers. Moreover, 19 extension education institutions have an Architecture Department (Ministry of Education, 2010). Hence, because the number of colleges and universities in Taiwan is outsized, and the schools generally establish extension education centers, the education service targets and the education chances increase. The supply is constantly increasing to create survival and competitive pressures for extension education centers.

For the extension education of architecture related colleges and universities, several schools have established in-service classes to recruit students from various backgrounds. However, the perception of architecture education and the backgrounds of teachers and specialties of each school differ; the programs differ for each school. Because all of these colleges and universities aggressively promote extension education and implement various programs, they neglect to determine whether the program design and applied teaching method meets the needs of learners. They also neglect to notice whether the curriculum and facilities, teachers, and services meet the goal of extension education, and whether the professional programs are of excellent quality. Therefore, schools must understand whether the program planning and teaching content meets the degree of perception and satisfaction of learners (Finn, 2002; Wang, 2008). Therefore, the appropriateness of the program planning and teaching content can be determined. These can be used as the reference for drafting development strategies in the future. The extension education of the universities differs in direction and style. Extension education must focus on the needs of learners, and must be non-standard education that is practical application orientated (Ministry of Education, 2010). In addition, the nature of extension education differs from that of standard university education. The forms of extension education activity must be diversified to meet the

requirements of adult learners. Extension education must provide diversified programs to satisfy multiple learning for adult learners in current knowledge economy society (Anthony, 2002). Several students believed that service quality is the main determinate in deciding whether university extension education is successful. Service quality affects the degree of satisfaction of students and the profitability of extension education.

Consequently, this study selected one of the nation's oldest, largest, and most comprehensive continuing higher education providers, that is, Department of Architecture of OOOO University Extension Education (Advanced Extension Education: Night Program; Institute of Continuing Education: Weekend Program), which is the pioneer and leader in technological and engineering education in Taiwan, to investigate the perceptions of students regarding extension education of architecture program. The department of architecture of the university has been established for a long time (Ministry of Education, 2010). Architecture teaching content of the architecture program, service quality, and self-learning evaluation were analyzed. Questionnaires and statistical analysis were performed to understand the learning outcome of students, and their perceptions toward the program and the teaching of extension education. The research questions were designed to explore and describe perceptions of students at a leading technological university in Taiwan. Specifically, the research addressed the perceptions of students regarding extension education of architecture and the primary factors that affect successful learning in the extension education context. This study explored and discovered perceptions of extension education students of architecture major regarding the following: (a) Architecture Teaching Content, (b) Service Quality, and (c) Self-learning Evaluation. The results can be used to provide reference for architecture departments of colleges and universities in planning the program and curriculum.

A BRIEF REVIEW OF LITERATURE

Regarding the Service Quality of extension education, Wang (2004) proposed that university extension education must bear the concepts of "education knows no boundaries" and "freedom of spirit in mind." The teaching content must be carefully planned and organized. The extension educators must be properly trained to acquire instructing strategy ability. However, Wang (2004) suggested that university extension education must have proper plans and strategies for the learners to help them adapt to changes in society to solve practical problems. Courses associated with the quality of human culture must be planned, in addition to practical courses, when planning the program. Vaira (2004) further proposed that extension education must focus on public demands, and help the learner solve individual problems caused by changes in the social environment. Wang (2008) suggested that the style of extension education must be diversified to meet the requirements of adult learners in the

current world, and provide diversified programs to satisfy the multiple learning of adult learners in current knowledge economy society.

Liu indicated that the perception of students toward service quality is the main determinant for the success of the university extension education. The perception towards the service quality affects the degree of satisfaction of students and the profitability of extension education. Glasser (2000) suggested the degree of satisfaction of students toward the programs involve difficulty of the program, arrangement of the program, thesis quality, and education evaluation procedure. The degree of satisfaction of students toward teaching involves the equipment that students are allowed to use, education guidance, and communication between school and students.

For architecture teaching content, Hindle and Rwelamila (1998) suggested that architecture design education must cultivate cultural literacy of students and teach various courses related to architecture, such as social studies, technology, economy, and aesthetics. Boyer and Mitgang (1996) proposed that architecture design education must cultivate the design aesthetic perception of students to express design content and style by using appropriate materials. Wang (2004) suggested that architecture design education must cultivate the ability of students to analyze plans, train the thinking ability of students, and emphasize professional skills and design practice. Boyer and Mitgang (1996) suggested that the objective of architecture education is to teach relative design courses and problem solving knowledge, and to initiate the design thinking ability and creativity of students. Moreover, Hindle and Rwelamila (1998) explained that architecture design is an aesthetic activity with styles and content that covers arts, humanities, and constructions. It is a design behavior using analysis, determination, conclusion, and integration, indicating that design is a design behavior with comprehensive planning, which includes conditions such as practicality, artistic appearance, and uniqueness. Wang (2010) indicated that, when teaching architecture design, teachers must teach students to clarify the problem, and help them obtain deduction logic and problem solving ability. Wang believed that the interaction between teacher and student is the foundation to maintain the teaching quality, and teachers must pay more attention to the learning process of students, such as design topic, problem discovery, and data analysis. Wang (2004) indicated that architecture design education in Taiwan can be divided into four main orientations, as follows: 1. Functionality-orientated: the study topic focuses more on the rationality, legality and validity of deign; 2. Programmability-orientated: focuses on urban design, renovation, and landscape architecture; 3. Sociality-orientated: emphasizes the satisfaction of user requirements to promote public charity; and 4. Creativity-orientated: focuses on innovation and change seeking, and develops design operation technique and the possibility of space form.

For Self-learning Evaluation, Zimmerman(2000) suggested that self-learning is a learning process that approves self-demands, including creativity learning, active learning, attitude learning, and responsibility learning. Lizzio and Wilson(2005) explained that the self-learning process is establishing of learning goals, choosing an appropriate learning strategy, and performing evaluation for the learning outcome. Cheong and Chang (2004) proposed that self-learning has the following features: 1. Self-learning is active learning; 2. Self-learning emphasizes integration with the social network; 3. Self-learning focuses on interaction with the outside environment; 4. Self-learning emphasizes the characteristics of the learner; and 5. Self-learning can promote learning motivation. Lizzio and Wilson(2005) indicated that self-learning is learner-centered for learners to learn how to plan, execute and evaluate. Self-learning facilitates self-maturation and ability promotion. Chen emphasized that, during self-learning, employment ability and professional technique can be promoted to accomplish the goal of self-learning. Hwang also suggested that the goal of self-learning is to solve problems and gain skills. In addition, for self-initiated learning, the learning goal and content are determined and planned by the learner, and the learning plan and the learning element are controlled by the learner; individual and career development are not blocked.

METHODOLOGY

This research is quantitative research. After the literature review and analysis, the content of the questionnaire was drafted and provided to experts to review the questionnaire validity. Once the questionnaire content was confirmed, students of Department of Architecture of OOOO University Technology Extension Education were determined as the target population for the questionnaire. The questionnaire was organized after literature review and information analysis. It was used to investigate the perception of students toward learning behavior for the programs in Department of Architecture Extension Education. The questionnaire was developed according to the result of literature analysis. After review by six experts to delete questions and modify content, the questionnaire included 12 questions relating to Architecture Teaching Content, 14 questions relating to Service Quality, and 10 questions relating to Self-learning Evaluation. The survey instrument was mailed to a sample of 80 registered students in the continuing extension program in the National Taipei University of Technology, Taiwan. The sample was randomly selected from the continuing extension program of the Department of Architecture, which included approximately 356 students. Seventy-two students returned usable questionnaires (90%). After eliminating eight questionnaires that contained incomplete information, 72 valid questionnaires were obtained (90% recovery rate). The research frame diagram is shown in Fig. 1.
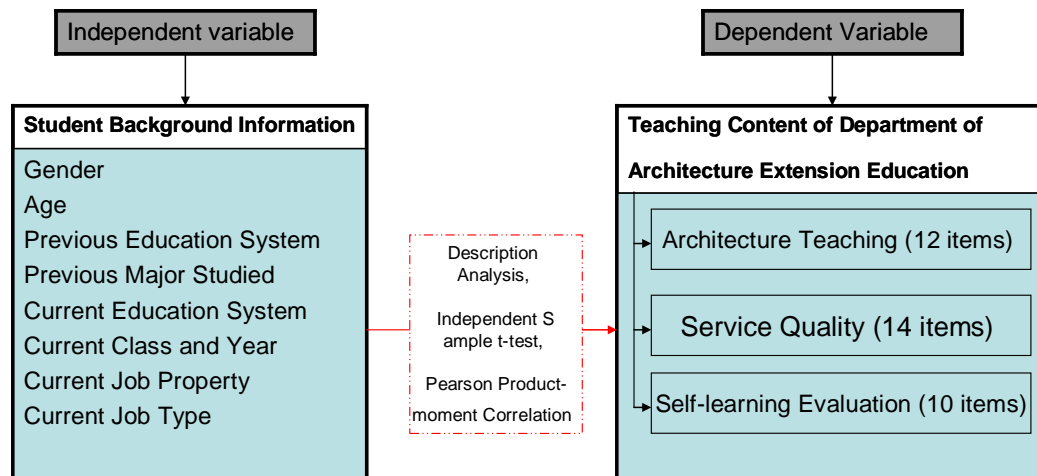
Figure 1. Research Outlined.

DATA ANALYSIS

Demographic Profile of Respondents

    The basic information of the returned samples were explained according to the frequency distribution and the percentage rate using statistical software. The distributions of background variables for these 72 students were obtained. The background information included *Gender*, *Current Education System*, *Education System before Learning*, *Major Studied before Learning*, and *Current Job Property* (see Table 1).

Table 1. Demographic Profile of Respondents.

Item	Gender		Current Education System		Education System Before Learning		Major Studied Before Learning		Current Job Property	
Categories	Male	Female	Advanced Extension Education	Institute of Continuing Education	College	Not College	Architecture-related	Non-architecture Related	Architecture-related	Non-architecture Related
Number of Respondents	41	31	38	34	52	20	48	24	36	36
Percentage	56.9 %	43.1 %	52.8 %	47.2 %	77.8 %	22.2 %	66.7 %	33.3 %	50 %	50 %

Perception Analysis for Students of Department of Architecture Extension Education Regarding Architecture Teaching Content, Service Quality, and Self-learning Evaluation:

  Description statistics was performed by statistical software to discuss the perception of participants toward Architecture Teaching Content, Service Quality, and Self-learning Evaluation. The mean and standard deviation (SD) were used to determine the perceptions of

participants toward extension education and information distribution. Furthermore, independent *sample t* was performed to test the difference between Advanced Extension Education and Institute of Continuing Education. The difference for perceptions of students from various education systems toward the extension education was determined. If $p < .05$, the difference is significant.

Architecture Teaching Content:

Regarding the Architecture Teaching Content of OOOO University Extension Education, participants of the Advanced Extension Education believed that an insufficient number of courses were related to social humanities, the architecture program planning cannot satisfy the needs of learners, and the teaching skills are not diversified. Conversely, students of Institute of Continuing Education believed that architecture programs must include multimedia teaching to enhance the expression ability of students regarding design. They also believed that social humanity cultivation courses must be opened, and that these programs must cultivate the social observation ability and thinking ability of students.

For the overall items in Architecture Teaching Content, the mean for participants of both education systems was 3.70, which implies that the students were highly satisfied with the teaching content. Six questions showed considerable differences, in which the means for the participants of Institute of Continuing Education were higher than those of Advanced Extension Education. This indicates that students of Institute of Continuing Education are more likely to identify the architecture program content. It also demonstrates the differing program content planning for various education systems.

Table 2. Analysis Chart for Students' Degree of Perception toward Architecture Teaching Content

Item	Advanced Extension Education			Institute of Continuing Education			t-value
Architecture teaching content	Mean	SD	Ranking	Mean	SD	Ranking	
1. Diversified Teaching Method	3.42	.83	2	3.91	.79	6	-2.564*
2. Diversified Program Content Planning	3.50	.92	6	3.94	.78	9	-2.202*
3. Architecture Program Planning Satisfies Learning Demands	3.42	.86	3	3.88	.98	4	-2.132*
4. Carry Out Program Teaching Outline	3.45	.95	5	3.94	.85	8	-2.312*
5. Master Architecture-related Basic Professional Program	3.45	.86	4	3.88	.84	5	-2.160*
6.Include Social Humanity Care Cultivation Program	3.32	.93	1	3.62	.85	2	-1.427
7. Include Knowledge Program Based on Ecological Environment and Urban Development	3.53	.89	8	4.03	.80	12	-2.526*
8. Include relative Multimedia Program to Enhance Design Expression Ability	3.50	.76	7	3.56	1.16	1	-.251

9.Able to Cultivate Design Thinking and Space Creating Abilities	3.87	.62	12	3.91	.83	7	-.252
10. Able to Cultivate Social Observing and Thinking Abilities	3.74	.72	11	3.82	.76	3	-.496
11.Able to Establish Abilities to Analyze and Process Architecture Problems	3.71	.77	10	3.97	.80	11	-1.409
12.Degree of Perception Toward OOOO University Extension Education Idea)\	3.66	.75	9	3.97	.94	10	-1.575
Respondents of Valid Samples: 72; College Students: 38; Non-College Students: 34; *p＜.05, **p＜.01							

Service Quality：

For the Service Quality, students of both Advanced Extension Education and Institute of Continuing Education believed that the first three items were inferior, that is, relative activity conducted by school administration and department administration, and consultation channel provided by the department and teaching space. This indicates that, for activities conducted by Department of Architecture Extension Education, after-school architecture activity, architecture exhibition observation, and national and international architecture tours must be conducted, in addition to speech activity, to resolve the insufficiency. For the consultation channels, external consultation channels must be set up for students of Advanced Extension Education and Institute of Continuing Education. Full-time consultants must be assigned to consult with students. For the teaching space, in addition to providing classrooms for teachers and students, after-class discussion rooms and drafting and model producing rooms must be provided for student use. (Table 3)

For the overall items of Service Quality, the mean for the participants of both education systems was 3.51. It indicates that the evaluation of students toward Service Quality is above average. The differences for participants of both education systems were not considerable for Service Quality. This indicates that the opinions and degrees of satisfaction for Service Quality for students of Institute of Continuing Education and Advanced Extension Education are consistent.

Table 3. Analysis Chart for Students' Degree of Satisfaction toward Service Quality.

Item	Advanced Extension Education			Institute of Continuing Education			t-value
Service Quality	Mean	SD	Ranking	Mean	SD	Ranking	
1. Relative Activities Held by School Administration and Department Administration	2.97	.82	1	3.26	.83	2	-1.495
2. Consultation Channel Provided by the Department	3.13	.78	2	3.18	.90	1	-.227
3. Speech Activity Held by the Department	3.47	.83	7	3.62	.89	7	-.711
4. Overall Program Planning	3.53	.86	9	3.68	.88	10	-.732
5. Professional Compulsory-program Planning	3.63	.75	10	3.62	.89	8	.072
6. Professional Optional-program Planning	3.50	.80	8	3.68	.88	9	-.894

7. Teachers' Guidance Toward Assignment	3.68	.87	14	3.85	.86	12	-.826
8. Interaction Between Teacher and Students in Class	3.63	.75	12	3.88	.88	13	-1.305
9. After-class Tutorship for Students	3.42	.76	6	3.62	.92	6	-.992
10.Teachers' Teaching Quality	3.66	.78	13	3.88	.77	14	-1.226
11.General Equipment and Resource Supply	3.39	1.03	5	3.50	.83	5	-.475
12.Library and Internet System	3.63	.88	11	3.68	.77	11	-.229
13.Professional Teaching Equipment	3.39	.97	4	3.35	.92	4	.187
14.Teaching Space	3.26	1.03	3	3.29	.91	3	-.135
Respondents of Valid Samples: 72; College Students: 38; Non-College Students:340; *p＜.05, **p＜.01							

Self-learning Evaluation:

For Self-learning Evaluation, participants of Advanced Extension Education believed that extension education helps employment ability, enhances professional knowledge and skill, and helps establish a lifelong self-learning attitude. However, participants of Institute of Continuing Education believed that extension education enhances professional architecture knowledge and skill, and helps promote architectural design and thinking abilities. They also believed that the image and brand of OOOO University can promote self-learning value. Moreover, among the Self-learning Evaluation items, seven items differed considerably for students of both education systems. Among these seven items, the means for participants of Institute of Continuing Education were all larger than participants of Advanced Extension Education. This implies that, after receiving OOOO University extension education, the self-learning credits for students of Institute of Continuing Education were higher than those for students of Advanced Extension Education. It also indicates that students of Institute of Continuing Education learn more than students of Advanced Extension Education. (Table 4)

Table 4. Analysis Chart for Students' Degree of Perception toward Self-learning Evaluation.

Item	Advanced Extension Education			Institute of Continuing Education			t-value
Self-learning Evaluation	Mean	SD	Ranking	Mean	SD	Ranking	
1. Establish Lifelong Self-learning Attitude	3.79	.58	3	4.12	.81	4	-1.999*
2. Establish Inter-disciplines Learning Integration Ability	3.66	.63	9	4.06	.81	7	-2.354*
3. Promote Architecture Design Thinking Ability	3.74	.60	6	4.15	.78	2	-2.507*
4. Promote Architecture Space Composition Ability	3.74	.60	5	4.09	.83	6	-2.073*
5. Enhance Creativity and Thinking Ability	3.76	.68	4	4.03	.87	8	-1.459
6. Enhance Professional Knowledge and Skills	3.82	.61	2	4.18	.80	1	-2.172*
7. Accept that Extension Education is Helpful Regarding to Work	3.68	.70	8	4.09	.83	5	-2.238*
8. Accept that Extension Education is Helpful Regarding to Employment Ability	3.82	.61	1	3.79	1.01	10	.109
9. Willing to Invite Friends and Families to Join Extension Education	3.63	.63	10	3.97	.83	9	-1.954
10.The School Image and Brand Can Promote Students' Learning Value	3.71	.61	7	4.15	.86	3	-2.507*
Respondent of Valid Samples: 72; College Students: 38; Non-College Students: 20; *p＜.05, **p＜.01							

DISCUSSION

Based on the information analysis, we obtained the perception of students toward Architecture Teaching Content, Service Quality, and Self-learning Evaluation. For the Architecture Teaching Content, social humanity courses and multimedia teaching courses must be added to the architecture program planning. The teaching methods of teachers must be more diversified and emphasize the cultivation of social observation ability and thinking ability of students. For Service Quality, architecture-related activities must be promoted after-class, and superior consultation channels must be provided in the department to allow convenient consultation for students. For teaching space, after-class discussion rooms and drafting and model producing rooms must be provided to the students. For Self-learning Evaluation, the self-learning attitude of students of Advanced Extension Education must be established, and students of Institute of Continuing Education must be employment-program-orientated to improve the employment ability of students.

Various Educational Backgrounds：

The differences in extension education learning behavior regarding students from various backgrounds are discussed. This study determined whether *Education System before Learning*, *Major Studied Before Learning*, and *Current Job Property* differed considerably in Architecture Teaching Content, Service Quality, and Self-learning Evaluation. Independent *sample t-test* was performed to determine whether any differences occurred in extension education for various background variables. If $p < .05$, the difference is significant.

Significant Difference Analysis of *Education System Before Learning* Regarding Extension Education Learning:

After an independent *sample* t *test*, the difference was not significant ($p < .05$) for the 36 items of *Education System before Learning* (College and Non-college) regarding Architecture Teaching Content, Service Quality, and Self-learning Evaluation.

For the Architecture Teaching Content, the difference in *Education System before Learning* for students (including Senior high school, higher vocational school, college, university and institute) was not significant. The mean for Architecture Teaching Content items for college students and non-college students was 3.72 and 3.64, respectively. This demonstrates that, when the teaching method is diversified and based on cultivating the analyzing and relative problem solving abilities of students, creativity teaching for space design and observation ability teaching for social thinking must also be included. Multimedia assistance must be used to enhance expression ability. The program content planning must be based on architecture-related foundation, social humanity cultivation, and ecological environment and urban development to allow students to identify the extension education idea

of OOOO University to meet the learning requirements of students from various education systems. For the Service Quality, the difference in *Education System before Learning* of students was not significant. The mean for Service Quality for college students and non-college students was 3.51 and 3.50, respectively. This indicates that Service Quality can be further improved. The activities conducted by school administration and department administration must be more diversified. The consultation channels must be promoted to provide consultation service for students. The schoolwork guidance from teachers must include after-class tutorship, and teachers must be encouraged to interact with students in class to promote the teaching quality. For equipment resources, teaching rooms and workrooms must be provided for student use. For Self-learning Evaluation, the difference for students of various education systems before learning was not significant. The mean for Self-learning Evaluation items of college students and non-college students was 3.87 and 3.93, respectively. This shows that lifelong self-learning attitude and cross-field learning integration ability were established after college and non-college graduates joined the OOOO University Extension Education. Architecture design thinking and architecture space composition abilities can be promoted to enhance architecture knowledge and skills.

Table 5. Table of Significant Differences for Various *Education Systems Before Learning* Regarding Extension Education Learning.

Item		College		Non-College		t-test		
		Mean	SD	Mean	SD	F value	t value	Significance
Architecture Teaching Content	1. Diversified Teaching Method	3.69	.76	3.55	1.05	3.644	.640	.524
	2. Diversified Program Content Planning	3.77	.76	3.55	1.15	7.977	.792	.436
	3. Architecture Program Planning Satisfies Learning Demands	3.58	.94	3.80	.95	.605	-.902	.370
	4. Carry Out Program Teaching Outline	3.73	.95	3.55	.89	.024	.735	.465
	5. Master Architecture-related Basic Professional Program	3.67	.86	3.60	.94	.029	.316	.753
	6. Include Social Humanity Care Cultivation Program	3.54	.83	3.25	1.07	1.856	1.218	.227
	7. Include Knowledge Program Based on Ecological Environment and Urban Development	3.77	.88	3.75	.91	.027	.082	.935
	8. Include relative Multimedia Program to Enhance Design Expression Ability	3.50	.90	3.60	1.14	1.489	-.392	.696
	9. Able to Cultivate Design Thinking and Space Creating Abilities	3.94	.64	3.75	.91	3.174	1.011	.315
	10. Able to Cultivate Social Observing and Thinking Abilities	3.79	.70	3.75	.85	.110	.197	.844
	11.Able to Establish Abilities to Analyze and Process Architecture Problems	3.85	.78	3.80	.83	.122	.221	.825
	12.Degree of Perception Toward OOOO University Extension Education Idea	3.83	.83	3.75	.91	.002	.342	.733
The mean regarding the Items of Architecture Teaching Content for College Students is 3.72, for Non-college								

Student is 3.64.								
Service Quality	1. Relative Activities Held by School Administration and Department Administration	3.12	.88	3.10	.72	1.984	.070	.945
	2. Consultation Channel Provided by the Department	3.19	.84	3.05	.83	.586	.646	.520
	3. Speech Activity Held by the Department	3.52	.83	3.60	.94	.049	-.357	.722
	4. Overall Program Planning	3.56	.89	3.70	.80	2.406	-.621	.536
	5. Professional Compulsory-program Planning	3.58	.75	3.75	.97	.094	-.808	.422
	6. Professional Optional-program Planning	3.60	.82	3.55	.89	.008	.209	.835
	7. Teachers' Guidance Toward Assignment	3.79	.87	3.70	.86	.113	.387	.700
	8. Interaction Between Teacher and Students in Class	3.71	.80	3.85	.88	.821	-.641	.524
	9. After-class Tutorship for Students	3.48	.85	3.60	.82	.851	-.537	.593
	10. Teachers' Teaching Quality	3.75	.76	3.80	.83	.228	-.243	.809
	11.General Equipment and Resource Supply	3.50	.96	3.30	.86	.415	.813	.419
	12. Library and Internet System	3.71	.82	3.50	.83	.021	.974	.333
	13. Professional Teaching Equipment	3.44	.94	3.20	.95	.003	.978	.331
	14. Teaching Space	3.25	1.03	3.35	.81	3.244	-.391	.697
The mean regarding the Items of Service Quality for College Students is 3.51, for Non-college Student is 3.50.								
Self-learning Evaluation	1. Establish Lifelong Self-learning Attitude	3.94	.64	3.95	.89	.315	-.041	.967
	2. Establish Inter-disciplines Learning Integration Ability	3.83	.71	3.90	.85	.133	-.371	.712
	3. Promote Architecture Design Thinking Ability	3.87	.66	4.10	.85	.022	-1.246	.217
	4. Promote Architecture Space Composition Ability	3.87	.69	4.00	.86	.510	-.694	.490
	5. Enhance Creativity and Thinking Ability	3.87	.77	3.95	.83	1.038	-.410	.683
	6. Enhance Professional Knowledge and Skills	3.96	.66	4.05	.89	.190	-.463	.645
	7. Accept that Extension Education is Helpful Regarding to Work	3.87	.74	3.90	.91	.013	-.166	.868
	8. Accept that Extension Education is Helpful Regarding to Employment Ability	3.81	.77	3.80	.95	.168	.036	.972
	9. Willing to Invite Friends and Families to Join Extension Education	3.79	.72	3.80	.83	.250	-.058	.954
	10. The School Image and Brand Can Promote Students' Learning Value	3.92	.74	3.90	.85	.046	.114	.910
The mean regarding the Items of Self-learning Evaluation for College Students is 3.87, for Non-college Student is 3.93.								

Significant Difference Analysis of *Major Studied Before Learning* Regarding Extension Education Learning：

After independent *sample t-test*, the difference was not significant for those 36 items of *Major Studied before Learning* (Architecture-related and Non-architecture related) regarding Architecture Teaching Content, Service Quality, and Self-learning Evaluation. (Table 6)

For the Architecture Teaching Content, the difference in *Major Studied before Learning* of students (including architecture, civil engineering, interior design, landscape design, and others) was not significant. All participants with architecture-related and non-architecture related majors believed that the program must add a social humanity care cultivation course and relative multimedia course. Those students whose majors are architecture-related, and who previously participated in relative professional architecture foundation courses, believed

that the teaching method must be more diversified. However, participants with non-architecture related majors who do not have any architecture background, believed that the program must include relative professional architecture foundation courses. For the Service Quality, the difference in *Major Studied before Learning* for students was not significant. Participants with architecture-related and non-architecture related majors believed that relative activities conducted by school administration and department administration, and consultation channels provided by the department and teaching space can be further improved. For the Self-learning Evaluation, participants with architecture-related majors assumed that they were unable to establish cross-field learning and integration abilities, and were unable to promote architecture space composition ability. Participants with non-architecture related majors believed that extension education cannot help employment ability, and cannot increase innovation ability and establish cross-field learning and integration abilities.

Table 6. Significant Difference Analysis of *Major Studied Before Learning* Regarding Extension Education Learning：

Item		Architecture-related		Un-architecture-related		t-test		
		Mean	SD	Mean	SD	F-value	t-value	Significant
Teaching Content	1. Diversified Teaching Method	3.56	.85	3.83	.82	.883	-1.293	.200
	2. Diversified Program Content Planning	3.65	.89	3.83	.87	.626	-.851	.397
	3. Architecture Program Planning Satisfies Learning Demands	3.67	.91	3.58	1.02	.977	.353	.725
	4. Carry Out Program Teaching Outline	3.60	1.01	3.83	.76	3.672	-.983	.329
	5. Master Architecture-related Basic Professional Program	3.77	.83	3.42	.93	1.983	1.639	.106
	6. Include Social Humanity Care Cultivation Program	3.44	.90	3.50	.93	.110	-.275	.784
	7. Include Knowledge Program Based on Ecological Environment and Urban Development	3.75	.91	3.79	.83	.171	-.188	.851
	8. Include relative Multimedia Program to Enhance Design Expression Ability	3.58	.90	3.42	1.10	1.793	.689	.493
	9. Able to Cultivate Design Thinking and Space Creating Abilities	3.94	.73	3.79	.72	.662	.805	.424
	10. Able to Cultivate Social Observing and	3.77	.81	3.79	.59	.991	-.112	.911

	Thinking Abilities						
	11. Able to Establish Abilities to Analyze and Process Architecture Problems	3.90	.86	3.71	.62	.008	.952	.344
	12. Degree of Perception Toward OOOO University Extension Education Idea	3.81	.84	3.79	.88	.208	.097	.923
Service Quality	1. Relative Activities Held by School Administration and Department Administration	3.04	.82	3.25	.85	1.661	-1.002	.320
	2. Consultation Channel Provided by the Department	3.13	.82	3.21	.88	1.312	-.398	.692
	3. Speech Activity Held by the Department	3.46	.90	3.71	.75	.937	-1.173	.245
	4. Overall Program Planning	3.50	.92	3.79	.72	4.810	-1.470	.147
	5. Professional Compulsory-program Planning	3.56	.92	3.75	.53	7.882	-1.093	.278
	6. Professional Optional-program Planning	3.48	.92	3.79	.59	6.059	-1.743	.086
	7. Teachers' Guidance Toward Assignment	3.75	.96	3.79	.66	1.902	-.192	.849
	8. Interaction Between Teacher and Students in Class	3.75	.84	3.75	.79	.168	.000	1.000
	9. After-class Tutorship for Students	3.56	.90	3.42	.72	1.229	.693	.491
	10. Teachers' Teaching Quality	3.71	.85	3.88	.61	4.534	-.952	.345
	11. General Equipment and Resource Supply	3.46	1.01	3.42	.78	1.346	.177	.860
	12. Library and Internet System	3.63	.89	3.71	.69	1.773	-.402	.689
	13. Professional Teaching Equipment	3.35	.98	3.42	.88	.155	-.264	.793
	14. Teaching Space	3.23	1.04	3.38	.82	1.745	-.600	.550
Self-learning Evaluation	1. Establish Lifelong Self-learning Attitude	3.92	.77	4.00	.59	.915	-.467	.642
	2. Establish Inter-disciplines Learning Integration Ability	3.81	.79	3.92	.65	1.723	-.557	.579
	3. Promote Architecture Design Thinking Ability	3.90	.81	4.00	.51	4.307	-.667	.507
	4. Promote Architecture Space Composition Ability	3.85	.82	4.00	.51	6.417	-.922	.360
	5. Enhance Creativity	3.90	.86	3.88	.61	1.930	.106	.916

	and Thinking Ability							
	6. Enhance Professional Knowledge and Skills	3.96	.80	4.04	.55	1.315	-.459	.647
	7. Accept that Extension Education is Helpful Regarding to Work	3.85	.87	3.92	.58	3.218	-.316	.753
	8. Accept that Extension Education is Helpful Regarding to Employment Ability	3.88	.82	3.67	.82	.558	1.22	.311
	9. Willing to Invite Friends and Families to Join Extension Education	3.69	.80	4.00	.59	6.632	-1.870	.066
	10. The School Image and Brand Can Promote Students' Learning Value	3.90	.81	3.96	.69	.831	-.325	.746

Respondent of Valid Samples: 72 Respondents; College Students: 48 Respondents; Non-College Students: 24 Respondents; *p＜.05, **p＜.01

Significant Difference Analysis of *Current Job Property* Regarding Extension Education Learning:

After an independent *sample* t *test*, the difference was not significant for those 36 items of *Current Job Property* (architecture-related and non-architecture related) regarding Architecture Teaching Content, Service Quality, and Self-learning Evaluation. (Table 7)

For the Architecture Teaching Content, the difference in *Current Job Property* of students (including construction company, construction industry, architects, interior design company, government and public organizations, and others) was not significant. However, because participants with architecture-related jobs had a certain extent of professional architecture-related knowledge, their degree of perception and degree of satisfaction for Architecture Teaching Content, Service Quality, and Self-learning Evaluation were higher than those with non-architecture related jobs.

Participants with architecture-related jobs believed that courses related to ecological environment and urban development must be added to the program. They also thought that the program must enhance the space creativity of students and cultivate the social observation ability of students. For the Service Quality, they believed that speech activities conducted by the department, and equipment and resource supplies and teaching space can be further improved. Finally, for the Self-learning Evaluation, they thought that extension education cannot help employment ability or establish cross-field learning and integration abilities.

Table 7 Significant Difference Analysis of *Current Job Property* Regarding Extension
Education Learning:

Item		Architecture-related		Non-architecture-related		t-test		
		Mean	SD	Mean	SD	F-value	t-value	Significant
Teaching Content	1. Diversified Teaching Method	3.72	.91	3.58	.77	.19	.70	.49
	2. Diversified Program Content Planning	3.83	.91	3.58	.84	.21	1.21	.23
	3. Architecture Program Planning Satisfies Learning Demands	3.72	.97	3.56	.91	.00	.75	.46
	4. Carry Out Program Teaching Outline	3.72	.97	3.64	.90	.00	.38	.71
	5. Master Architecture-related Basic Professional Program	3.83	.81	3.47	.91	3.03	1.78	.08
	6. Include Social Humanity Care Cultivation Program	3.50	.88	3.42	.94	.56	.39	.70
	7. Include Knowledge Program Based on Ecological Environment and Urban Development	3.75	.87	3.78	.90	.00	-.13	.89
	8. Include relative Multimedia Program to Enhance Design Expression Ability	3.67	.89	3.39	1.02	1.14	1.23	.22
	9. Able to Cultivate Design Thinking and Space Creating Abilities	3.86	.76	3.92	.69	.06	-.32	.75
	10. Able to Cultivate Social Observing and Thinking Abilities	3.75	.81	3.81	.67	.48	-.32	.75
	11. Able to Establish Abilities to Analyze and Process Architecture Problems	3.83	.81	3.83	.77	.08	.00	1.00
	12. Degree of Perception Toward OOOO University Extension Education Idea	3.86	.87	3.75	.84	.05	.55	.58
Service Quality	1. Relative Activities Held by School Administration and Department Administration	3.14	.90	3.08	.77	.29	.28	.78
	2. Consultation Channel Provided by the Department	3.28	.88	3.03	.77	1.91	1.28	.21
	3. Speech Activity Held by the Department	3.50	.94	3.58	.84	.62	-.41	.68
	4. Overall Program Planning	3.61	.90	3.58	.73	.00	.14	.89
	5.Professional	3.67	.89	3.50	.81	.33	.43	.67

	Compulsory-program Planning						
	6. Professional Optional-program Planning	3.67	.86	3.61	.90	.02	.85	.40
	7. Teachers' Guidance Toward Assignment	3.92	.81	3.72	.81	2.56	1.51	.13
	8. Interaction Between Teacher and Students in Class	3.78	.83	3.36	.83	.02	.29	.78
	9. After-class Tutorship for Students	3.67	.83	3.69	.75	.21	1.56	.12
	10. Teachers' Teaching Quality	3.83	.81	3.42	.81	.19	.76	.45
	11. General Equipment and Resource Supply	3.47	1.06	3.67	.72	2.52	.25	.80
	12.Library and Internet System	3.64	.93	3.36	.90	2.82	-.14	.89
	13. Professional Teaching Equipment	3.39	.99	3.25	.94	.35	.12	.90
	14.Teaching Space	3.31	1.01	3.94	.67	.08	.24	.81
Self-learning Evaluation	1. Establish Lifelong Self-learning Attitude	3.94	.75	3.89	.75	.00	.00	1.00
	2. Establish Inter-disciplines Learning Integration Ability	3.81	.75	3.94	.67	.00	-.47	.64
	3. Promote Architecture Design Thinking Ability	3.92	.77	3.92	.65	.11	-.16	.87
	4. Promote Architecture Space Composition Ability	3.89	.82	3.81	.75	1.23	-.16	.87
	5. Enhance Creativity and Thinking Ability	3.97	.81	3.94	.63	.07	.91	.37
	6. Enhance Professional Knowledge and Skills	4.03	.81	3.83	.65	.72	.49	.63
	7. Accept that Extension Education is Helpful Regarding to Work	3.92	.91	3.75	.81	1.36	.45	.66
	8. Accept that Extension Education is Helpful Regarding to Employment Ability	3.86	.83	3.89	.67	.12	.57	.57
	9. Willing to Invite Friends and Families to Join Extension Education	3.69	.82	3.94	.67	3.05	-1.10	.27
	10. The School Image and Brand Can Promote Students' Learning Value	3.89	.85	3.58	.77	2.90	-.31	.76

DISCUSSION

Based on the information analysis, the learning behavior for extension education of students with various backgrounds was not significantly different. In difference analysis of students for *Education System before Learning*, the teaching method and the program content of OOOO University Extension Education meets the learning requirements for college students and non-college students. The architecture design thinking ability and architecture space composition ability of students are promoted. For the Service Quality, college and

non-college students all believed that after-class tutorship and diversified activities and consultation channels must be provided.

In the difference analysis for students with various majors before learning, students with architecture-related majors participated in architecture courses and had relative professional architecture foundation education; however, they lacked social humanity care cultivation education and multimedia education. However, because students with non-architecture related majors do not have any architecture education background, the programs must include relative professional architecture foundation education. In Self-learning Evaluation, participants with architecture-related majors and non-architecture related majors thought that they were unable to establish cross-field learning and integration abilities. Therefore, cross-field learning and cultivation of integration abilities of students must be considered in teaching and program planning.

Finally, from the difference analysis for students of various current job properties, students with architecture-related jobs had relative professional architecture knowledge. Therefore, the program planning must include advanced professional architecture courses to increase the space creativity and social observation ability of students.

Correlation Analysis for Architecture Teaching Content, Service Quality, and Self-learning Evaluation in Extension Education:

Pearson's product-moment correlation was used to test whether any relationships occurred among Architecture Teaching Content, Service Quality, and Self-learning Evaluation for students in Department of Architecture Extension Education to understand the degree of relativity and the situation. Table 8 shows that the correlation between the degree of perception for Architecture Teaching Content, the degree of satisfaction for Service Quality, and the degree of perception for Self-learning Evaluation is significant (two-tailed). The correlation was analyzed, as follows:

Architecture Teaching Content and Service Quality were positively correlated ($p = .000$). The correlation coefficient was 0.838, which is a high positive correlation. It indicates that, when the Architecture Teaching Content is improved, the Service Quality gains a high degree of student perception. It demonstrates that Service Quality can be promoted by improving the Architecture Teaching Content of extension education. In addition, if the teaching methods and the programs are more diversified, students would accept and identify the guidance of the teacher.

Architecture Teaching Content and Self-learning Evaluation were positively correlated (p

= .000). The correlation coefficient was 0.790, which is a high positive correlation. It indicates that, when the Architecture Teaching Content is improved, the Self-learning Evaluation gains a high degree of student perception. In addition, the program content planning and the teaching method affect the promotion of learning ability of students. In addition, professional architecture knowledge and skills of students can be enhanced by cultivating the design thinking ability and space creativity of students.

Service Quality and Self-learning Evaluation were positively correlated (p = .000). The correlation coefficient was 0.726, which is a high positive correlation. It indicates that the higher the students' degree of satisfaction for Service Quality, the higher the students' degree of perception for Self-learning Evaluation. Hence, improving Service Quality is crucial to promote the degree of perception of students for Self-learning Evaluation. In addition, the promotion of program planning and the interaction between teachers and students can enhance the professional architecture knowledge of students and establish their lifelong learning (Table 8).

Table 8. Correlation Analysis Table for Architecture Teaching Content, Service Quality, and Self-learning Evaluation

Pearson		Teaching Content	Service Quality	Self-learning Evaluation
Teaching Content	Pearson Correlation	1.000	.838**	.790**
	Significant(two-tailed)	.	.000	.000
	Respondents	72	72	72
Service Quality	Pearson Correlation	.838**	1.000	.726**
	Significant(two-tailed)	.000	.	.000
	Respondents	72	72	72
Self-learning Evaluation	Pearson Correlation	.790**	0.726**	1.000
	Significant(two-tailed)	.000	.000	.
	Respondents	72	72	72
Valid Samples: 72 Respondents; *p＜.05; **p＜.01				

CONCLUSION

Based on the analysis of the perception of Architecture Teaching Content, Service Quality, and Self-learning Evaluation, students of Advanced Extension Education and Institute of Continuing Education have high degrees of perception for the teaching content provided by Department of Architecture, OOOO University Extension Education. They also have high degrees of self-evaluation for the architecture program. However, the credit for Service Quality is only above average. Relative activities, and consultation channels and teaching space can be further improved. Moreover, the items of *Education System Before Learning*, *Major Studied Before Learning* and *Current Job Property* were determined accordingly for the learning behavior analysis of students from various backgrounds. For

learning behavior analysis for *Education System Before Learning*, the teaching method and the program content planning meet the learning requirements for college and non-college graduates. For learning behavior analysis for *Major Studied before Learning*, students with architecture-related majors had basic professional architecture education, whereas students of non-architecture related majors did not have any architecture education.

Therefore, basic professional architecture education for students with non-architecture related majors must be included when planning the programs. For learning behavior analysis regarding *Current Job Property*, students with architecture-related jobs had a certain extent of architecture-related professional knowledge; the programs must include advanced professional architecture-related courses. For the learning behavior analysis for students with various backgrounds, the difference was not significant for Architecture Teaching Content, Service Quality, and Self-learning Evaluation. This indicates that the architecture program planning and the teaching of OOOO University meet the learner requirements from various levels.

Finally, the correlation among Architecture Teaching Content, Service Quality, and Self-learning Evaluation was positive. The perception of students for Service Quality improved in conjunction with the Architecture Teaching Content. In addition, Service Quality is crucial to improve student perception for Self-learning Evaluation. The service quality of extension education is learner-demand centered. It can help learners solve individual problems caused by changes in society. Extension education provides various program planning and perfect teaching strategies to satisfy multiple learning of adult learners. Service Quality provides program arrangement, teaching equipment, and teaching guidance. In addition, Architecture Teaching Content can be used to integration ability of learners. From the teaching process, the professional theory abilities of students are cultivated to urge students to grasp basic professional architecture foundation. Self-learning may help students establish learning goals to solve problems and gain skills to satisfy individual employment ability.

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