Determine ICT Learning Groups among Teachers In-service Education Participants

Lung-Hsing Kuo, Jui-Chen Yu, Hung-Jen Yang, and Lydia Lin

Abstract: - Today, students no longer rely on teachers as the main source of knowledge because of the rapid development and advancement in ICT, particularly the Internet and Web. Information is abundant and can now be accessed from anyplace and at anytime. Teachers are professionals should change with the environment, enhance their professional abilities and to give students a better quality of education. This study aims to find structure base on profile (age group, first registered specialty, school level, and course type) of in-service teachers studied ICT related courses of in-service teacher advancement education in Taiwan. We found there is a real relationship between course type and school level for teachers participated ICT related courses of in-service teacher advancement education. The result shows teachers who study course type of teaching or administration category can be divided into two groups.
Key-Words: In-service Teacher Education, Cluster, Information and Communication Technology

I. INTRODUCTION

Due to the rapid development and advancement in ICT, particularly the Internet and Web, students no longer rely on teachers as the main source of knowledge. Information is abundant and can now be accessed from anyplace and at anytime. Thus, the role of teachers is multi-faceted and no longer fit the well-known term 'sage on stage', depending on their function in students' learning [1]. Teachers are professionals should change with the environment, enhance their professional abilities and to give students a better quality of education. When teachers have more professional knowledge, they can be able to offer more study opportunities for students[2]. Today's classroom teachers must be prepared to provide technology-supported learning opportunities for their students. Being prepared to use technology and knowing how that technology can support student learning must become integral skills in every teacher's professional repertoire.

The Education Information Network in the European Union (EURYDICE) defines in-service training as 'a variety of activities and practices in which teachers become involved in order to broaden their knowledge, improve their skills and assess and develop their professional approach' [3]. It is a key factor in influencing the professional development of teachers and contributing to the improvement of their knowledge through an active role [4]

In-service teacher advancement education is help teachers to enhance teachers' professionalism and specialized knowledge of courses so that the overall quality of education is elevated. Teachers can spent their time to study variety of in-service advancement education courses at schools, In-service teacher advancement education agencies, Universities with teacher education, Universities without the department of teacher education or Life-long learning organizations [5],[6]. That is providing opportunities for professional growth, the possibility of continuing study and improving teaching knowledge of teachers. However, we curious about are there any general structure of teachers participated ICT related course in in-service teacher advancement education Therefore this study aims to find structure base on profile (age group, first registered specialty, school level, and course type) of in-service teachers studied ICT related courses of in-service teacher advancement education in Taiwan. The rest of the article is structured as follows. First, the brief research goals and definition of terms are given in this section. Second, the methods, data sources, models, and instrument are explained, followed by the results and findings. The last section concludes with a summary this study.

A. The research goals

The research goals in this study are:

- Is there any relationship between course type and age group?
- Is there any relationship between course type and first registered specialty?
- Is there any relationship between course type and school level?
- To find the general structure bease on profile (age group, first registered specialty, school level, and course type) of in-service teachers studied ICT related courses of in-service teacher advancement education

B. Definition of Terms

- **In-service teachers**: Refer to full-time teachers with teaching certificates serving in public and private K-12 schools.
- **School level:** Refers to the present-day school education system, such as: preschool, primary schools, school, junior high school, senior high school, senior vocational school, special education school, and juvenile correctional school (supervised

by Ministry of Justice).

- **First registered specialty:** Refers to the specialty in the subject field of certain school level related to the major officially registered on the first teaching certificate by the trainee teacher after completing the teacher training program.
- **Course type:** Refers to the in-service teacher advancement education course either in "administration" or "teaching" or "others" category.
- **Age group:** either 22-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, or 60 above.

II. Study Design

A. Research Subjects

In this study the subjects are the teachers has been attending ICT related courses of in-service advancement education activities and the course type either in "administration" or "teaching" in Taiwan during 2009 to 2010. We use Nationwide Teacher in-service Advancement Education Information Web (http://inservice.edu.tw/) database randomly select 3000 sample resources. The basic data analyses are shown in Table1 to Table 4 and Fig 1.

Table 1 Number of persons/times by course type

Course type	**Number of persons/times**
Administration	296
Teaching	2704
Total	**3000**

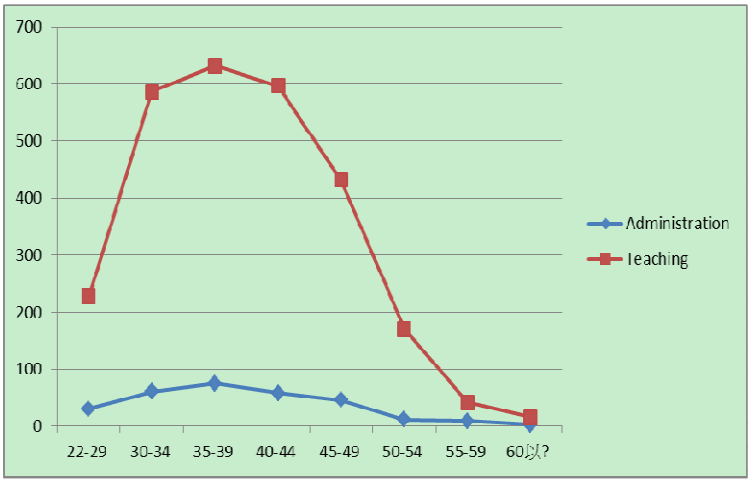

Fig. 1 Age distrubution

Table 2 Number of persons/times by age group

Unit: persons/times

	Course type		
Age group	**Administration**	**Teaching**	Total
22-29	31	228	259
30-34	61	586	647
35-39	75	632	707
40-44	59	597	656
45-49	46	432	478
50-54	12	171	183
55-59	9	42	51
60 above	3	16	19
Total	296	2704	3000

Table 3 Number of persons/times by school level

Unit: persons/times

School level	Course type		Total
	Administration	**Teaching**	
Preschool	7	26	33
Primary school	204	1830	2034
Junior high school	42	577	619
Senior high school	31	180	211
Senior vocational school	12	82	94
Special education school	0	9	9
Total	296	2704	3000

Table 4 Number of persons/times by first registered specialty

Unit: persons/times

First registered specialty	Course type		Total
	Administration	**Teaching**	
Preschool education	8	34	42
Primary school education	199	1792	1991
Secondary school education	70	746	816
Vocational School education	15	96	111
Special education	4	36	40
Total	296	2704	3000

B. Instrument & Data Analysis

The SPSS statistical software is used in this study. We use Chi-square test to test for the significance of relationships between variables cross-classified in a bivariate table. In our case, the dependent variable is the course type and independent variables are age group, first registered specialty and school level. The null hypothesis in this study is there is no relationship between course type and first registered specialty; course type and school level; course type and age group. Then, we use cluster analysis to find the mode for in-service teacher advancement education in Taiwan.

III. RESULTS

A. Is there any relationship between course type and age group?

Table 5 is the cross table for course type and first registered specialty. It shows the expected count for teachers who study course type of administration and their first registered specialty is preschool education is about two times more than the observed count. Table 6 shows the chiq-square test for testing the relationship between course type and first registered specialty. We found there is no real relationship between course type and first registered specialty for teachers who participated in in-service teacher advancement education.

Table 5 Cross table for course type and first registered specialty

Course type		First registered specialty					
		Secondary	Preschool	Special	Vocational	Primary	Total
administration	Count	70	8	4	15	199	296
	Expected Count	80.5	4.1	3.9	11.0	196.4	296.0
teaching	Count	746	34	36	96	1792	2704
	Expected Count	735.5	37.9	36.1	100.0	1794.6	2704.0
Total	Count	816	42	40	111	1991	3000
	Expected Count	816.0	42.0	40.0	111.0	1991.0	3000.0

Table 6 Chi-square test for course type and first registered specialty

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.201a	4	.126
Likelihood Ratio	6.349	4	.175
N of Valid Cases	3000		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.95.

B. Is there any relationship between course type and first registered specialty?

Table 7 is the cross table for course type and school level. It shows the expected count for teachers who study course type of administration and their school level is preschool education school is about two times more than the observed count. Table 8 shows the chiq-square test for testing the relationship between course type and school level. We found there is a real relationship between course type and school level for teachers who participated in in-service teacher advancement education.

Table 7 Cross table for course type and school level

Course type		School level						
		Preschool	Special education school	High school	Vocational school	Junior high school	Primary school	Total
administration	Count	7	0	31	12	42	204	296
	Expected Count	3.3	.9	20.8	9.3	61.1	200.7	296.0
teaching	Count	26	9	180	82	577	1830	2704
	Expected Count	29.7	8.1	190.2	84.7	557.9	1833.3	2704.0
Total	Count	33	9	211	94	619	2034	3000
	Expected Count	33.0	9.0	211.0	94.0	619.0	2034.0	3000.0

Table 8 Chi-square test for course type and school level

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.844a	5	.002
Likelihood Ratio	18.690	5	.002
N of Valid Cases	3000		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is .89.

C. Is there any relationship between course type and school level?

Table 9 is the cross table for course type and age group. It shows the expected count and observed count is about the same for the age group of teachers who study course type either in administration or teaching. Table 10 shows the chiq-square test for testing the relationship between course type and age group. We found there is no real relationship between course type and age group for teachers who participated in in-service teacher advancement education.

Table 9 Cross table for course type and age group

Course type		AgeGroup								
		22-29	30-34	35-39	40-44	45-49	50-54	55-59	60 above	Total
admi	Count	31	61	75	59	46	12	9	3	296
	Expected Count	25.6	63.8	69.8	64.7	47.2	18.1	5.0	1.9	296.0
teaching	Count	228	586	632	597	432	171	42	16	2704
	Expected Count	233.4	583.2	637.2	591.3	430.8	164.9	46.0	17.1	2704.0
Total	Count	259	647	707	656	478	183	51	19	3000
	Expected Count	259.0	647.0	707.0	656.0	478.0	183.0	51.0	19.0	3000.0

Table 10 Chi-square test for course type and age group

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.933a	7	.258
Likelihood Ratio	8.447	7	.295
N of Valid Cases	3000		

a. 1 cells (6.3%) have expected count less than 5. The minimum expected count is 1.87.

D. Administration

This section we will focus on the teachers participated ICT related courses of in in-service teacher advancement education for the administration course type. Table 11 shows teachers who study course type of administration category is divided into two groups. Group 1 has 199 subjects and group 2 has 97 subjects. From the Table 12 we can see for the first registered specialty, all teachers has primary school education specialty is assign to cluster 1. The rest of the first registered specialties are assign to cluster 2. Table 13 shows for the school level, the cluster 1 only contain teachers who study administration course type of in-service advancement education their school level is primary school, being 97.5% of total primary school level. The majority of the cluster two is junior high school level and senior high school level. Table 14 shows the cluster distribution for age group. We found both clusters has similar age distribution except the cluster 1 teachers in the 30-34, 35-39, 40-44, and 45-49 age group is much higher than cluster 2 and the differences are 34.4%, 38.6%, 45.8%, and 47.8% respectively; cluster 2 teachers in the age group of 60 above is 95% higher than cluster 1.

Table 11 cluster distribution for course type of administration category

		N	% of Combined	% of Total
Cluster	1	199	67.2%	67.2%
	2	97	32.8%	32.8%
	Combined	296	100.0%	100.0%
	Total	296		100.0%

Table 12 cluster distribution for first registered specialty

	First registered specialty									
	Secondary school education		Preschool education		Special school education		Senior vocational school education		Primary school education	
Cluster	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
1	0	.0	0	.0	0	.0	0	.0	199	100.0
2	70	100.0	8	100.0	4	100.0	15	100.0	0	.0
Combined	70	100.0	8	100.0	4	100.0	15	100.0%	199	100.0

Table 13 cluster distribution for school level

		Cluster		Combined
School level		1	2	
Preschool	Frequency	0	7	7
	%	0.00%	100.00%	100.00%
Senior high school	Frequency	0	31	31
	%	0.00%	100.00%	100.00%
Senior vocational school	Frequency	0	12	12
	%	0.00%	100.00%	100.00%

Junior high school	Frequency	0	42	42
	%	0.00%	100.00%	100.00%
Primary school	Frequency	199	5	204
	%t	97.50%	2.50%	100.00%

Table 14 cluster distribution for age group

Age Group		Cluster 1	Cluster 2	Combined
22-29	Frequency	17	14	31
	%	54.80%	45.20%	100.00%
30-34	Frequency	41	20	61
	%	67.20%	32.80%	100.00%
35-39	Frequency	52	23	75
	%	69.30%	30.70%	100.00%
40-44	Frequency	43	16	59
	%	72.90%	27.10%	100.00%
45-49	Frequency	34	12	46
	%	73.90%	26.10%	100.00%
50-54	Frequency	6	6	12
	%	50.00%	50.00%	100.00%
55-59	Frequency	5	4	9
	%	55.60%	44.40%	100.00%
60 above	Frequency	1	2	3
	%	33.30%	66.70%	100.00%

E. Teaching

This section we will focus on the teachers participated ICT related courses of in in-service teacher advancement education for the teaching course type. Table 15 shows teachers who study course type of teaching category is divided into two groups. Group 1 has 912 subjects and group 2 has 1792 subjects. From the Table 16 we can see for the first registered specialty, all teachers has primary school education specialty is assign to cluster 2. The rest of the first registered specialties are assign to cluster 1. Table 17 shows for the school level, the majority of the cluster 1 is preschool level, special education school level, senior high school level, senior vocational school level, and junior high school level. The cluster 2 only contain teachers who study teaching course type of in-service advancement education their school level is primary school, being 97.7% of total primary school and special education school, being 22.2% of total special education school. Table 18 shows the cluster distribution for age group. We found cluster 2 teachers in the age group of 30-34, 35-39,40-44, 45-49, 50-54, and 55-59 is much higher than cluster 1 and the differences are 29.6%, 39.6%, 41.8%, 29.2%, 29.8%, and 38% respectively.

Table 15 cluster distribution for course type of teaching

		N	% of Combined	% of Total
Cluster	1	912	33.7%	33.7%
	2	1792	66.3%	66.3%
	Combined	2704	100.0%	100.0%
	Total	2704		100.0%

Table 16 cluster distribution for first registered specialty

	First registered specialty									
	Secondary school education		Preschool education		Special school education		Senior vocational school education		Primary school education	
Cluster	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
1	746	100.0%	34	100.0%	36	100.0%	96	100.0%	0	.0%
2	0	.0%	0	.0%	0	.0%	0	.0%	1792	100.0%
Combined	746	100.0%	34	100.0%	36	100.0%	96	100.0%	1792	100.0%

Table 17 cluster distribution for school level

		Cluster		Combined
School level		1	2	
Preschool	Frequency	26	0	26
	%	100.00%	0.00%	100.00%
Special education school	Frequency	7	2	9
	%	77.80%	22.20%	100.00%
Senior high school	Frequency	180	0	180
	%	100.00%	0.00%	100.00%
Senior vocational school	Frequency	82	0	82
	%	100.00%	0.00%	100.00%
Junior high school	Frequency	575	2	577
	%	99.70%	0.30%	100.00%
Primary school	Frequency	42	1788	1830
	%t	2.30%	97.70%	100.00%

Table 18 cluster distribution for age group

		Cluster		Combined
Age group		1	2	
22-29	Frequency	107	121	228
	%	46.90%	53.10%	100.00%
30-34	Frequency	206	380	586
	%	35.20%	64.80%	100.00%
35-39	Frequency	191	441	632
	%	30.20%	69.80%	100.00%
40-44	Frequency	174	423	597
	%	29.10%	70.90%	100.00%
45-49	Frequency	153	279	432
	%	35.40%	64.60%	100.00%
50-54	Frequency	60	111	171
	%	35.10%	64.90%	100.00%
55-59	Frequency	13	29	42
	%	31.00%	69.00%	100.00%
60 above	Frequency	8	8	16
	%	50.00%	50.00%	100.00%

IV. CONCLUSIONS

This study aims to find structure base on profile (age group, first registered specialty, school level, and course type) of in-service teachers studied ICT related courses of in-service teacher advancement education in Taiwan.

There is no real relationship between course type and first registered specialty for teachers participated ICT related courses of in-service teacher advancement education.

We found course type and age group have no relationship between them for teachers participated ICT related courses of in-service teacher advancement education.

There is statistical evidence that course type and school level has relationship for teachers participated ICT related courses of in-service teacher advancement education.

Teachers who study course type of administration category is divided into two groups. For the first registered specialty, all teachers has primary school education specialty is assign to cluster 1. The rest of the first registered specialties are assign to cluster 2. For the school level, the cluster 1 only contain teachers who study administration course type of in-service advancement education their school level is primary school, being 97.5% of total primary school level. The cluster 2 teachers in the age group of 60 above are 95% higher than cluster 1.

Teachers who study course type of teaching category are divided into two groups. For the first registered specialty, all teachers has primary school education specialty is assign to cluster 2. The rest of the first registered specialties are assign to cluster 1. For the school level, the majority of the cluster 1 is preschool level, special education school level, senior high school level, senior vocational school level, and junior high school level. The cluster 2 only contain teachers who study teaching course type of in-service advancement education their school level is primary school, being 97.7% of total primary school and special education school, being 22.2% of total special education school. We found cluster 2 teachers in the age group of 30-34, 35-39,40-44, 45-49, 50-54, and 55-59 is much higher than cluster 1 and the differences are more than 29%.

However, we know there is some important meaning behind the classified groups we just found. Therefore a further study is required in the future.

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