Identifying a General Structure of Teachers' In-service Learning

Lung-Hsing Kuo, Hsieh-Hua Yang, Hung-Jen Yang and Chin-Hsi Chen

Abstract: - Teachers are professionals should change with the environment, enhance their professional abilities and to give students a better quality of education. 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. This study aims to find relationships between course type and age group, course type and first registered specialty, and to find structure base on profile (age group, first registered specialty, school level, and course type) of in-service teachers studied in-service teacher advancement education in Taiwan. We found there is a real relationship between course type and first registered specialty, course type and school level, and course type and age group for teachers who participated in 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, Professional Development, Teacher Education, Cluster

I. Introduction

In recent years, our environments are driven by changes in society, fast growth by science, technology and knowledge development. 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[1].

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' [2]. It is a key factor in influencing the professional development of teachers and contributing to the improvement of their knowledge through an active role [3]

Teacher Education Act and Teacher-Law are provided legal basis of in-service advancement education for teachers and life-long learning and on-the-job training has become the important subjects in education reform. 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 [4],[5]. 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' in-service teacher advancement education? Therefore this study aims to find relationship between course type and age group, relationship between course type and first registered specialty, and to find a structure base on profile (age group, first registered specialty, school level, and course type) of in-service teachers studied in-service teacher advancement education in Taiwan.

A. 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

In this study the subjects are the teachers has been attending in-service advancement education activities of course type either in "administration" or "teaching" in Taiwan during 2009 to 2010. We use 2009 and 2010

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.

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.

Table 1 Number of persons/times by course type

Course type	**Number of persons/times**
Administration	812
Teaching	2188
Total	**3000**

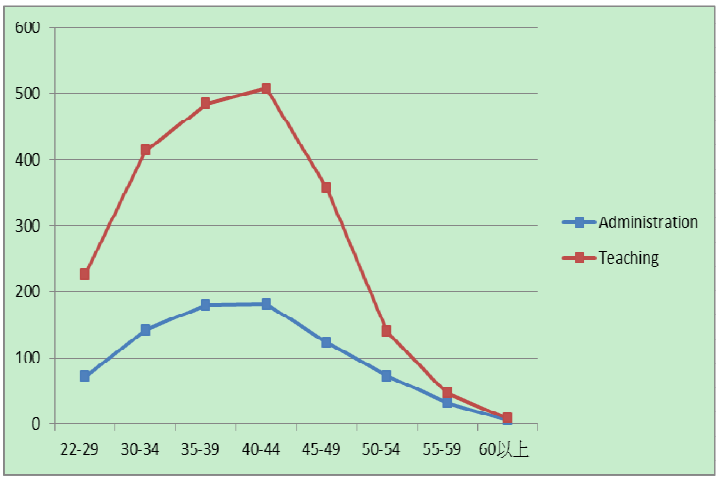

Fig. 1 Age distribution

Table 2 Number of persons/times by age group

Unit: persons/times

	Course type		
Age group	**Administration**	**Teaching**	Total
22-29	72	227	299
30-34	142	414	556
35-39	180	485	665
40-44	182	508	690
45-49	124	358	482
50-54	73	140	213
55-59	33	47	80
60 above	6	9	15
Total	812	2188	3000

Table 3 Number of persons/times by school level

Unit: persons/times

School level	Course type		Total
	Administration	**Teaching**	
Preschool	21	38	59
Primary school	461	1464	1925
Junior high school	137	402	539
Senior high school	119	167	286
Senior vocational school	71	96	167
Special education school	2	21	23
Correctional school			
Total	812	2188	3000

Table 4 Number of persons/times by first registered specialty

Unit: persons/times

First registered specialty	Course type		Total
	Administration	**Teaching**	
Preschool education	22	56	78
Primary school education	453	1408	1861
Secondary school education	273	558	831
Vocational School education	57	92	149
Special education	7	74	81
Total	812	2188	3000

III. Findings

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 special education is about three 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 a real relationship between course type and first registered specialty for teachers who participated in in-service teacher advancement education. 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 special education school is about three 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 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 a real relationship between course type and age group 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	273	22	7	57	453	812
	Expected Count	224.9	21.1	21.9	40.3	503.7	812.0
teaching	Count	558	56	74	92	1408	2188
	Expected Count	606.1	56.9	59.1	108.7	1357.3	2188.0
Total	Count	831	78	81	149	1861	3000
	Expected Count	831.0	78.0	81.0	149.0	1861.0	3000.0

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

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	44.518[a]	4	.000
Likelihood Ratio	46.891	4	.000
N of Valid Cases	3000		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.11.

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	Correctional school	Total
administration	Count	21	2	119	71	137	461	1	812
	Expected Count	16.0	6.2	77.4	45.2	145.9	521.0	.3	812.0
teaching	Count	38	21	167	96	402	1464	0	2188
	Expected Count	43.0	16.8	208.6	121.8	393.1	1404.0	.7	2188.0
Total	Count	59	23	286	167	539	1925	1	3000
	Expected Count	59.0	23.0	286.0	167.0	539.0	1925.0	1.0	3000.0

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

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	69.852[a]	6	.000
Likelihood Ratio	66.530	6	.000
N of Valid Cases	3000		

a. 2 cells (14.3%) have expected count less than 5. The minimum expected count is .27.

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
administration	Count	72	142	180	182	124	73	33	6	812
	Expected Count	80.9	150.5	180.0	186.8	130.5	57.7	21.7	4.1	812.0
teaching	Count	227	414	485	508	358	140	47	9	2188
	Expected Count	218.1	405.5	485.0	503.2	351.5	155.3	58.3	10.9	2188.0
Total	Count	299	556	665	690	482	213	80	15	3000
	Expected Count	299.0	556.0	665.0	690.0	482.0	213.0	80.0	15.0	3000.0

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

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.638[a]	7	.014
Likelihood Ratio	16.648	7	.020
N of Valid Cases	3000		

a. 1 cells (6.3%) have expected count less than 5. The minimum expected count is 4.06.

A. Administration

This section we will focus on the teachers who participated 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 455 subjects and group 2 has 357 subjects. From the Table 12 we can see for the first registered specialty, the cluster 1 members are only from the special school education specialty and primary school education specialty. However, the majority of the first group is the teachers whose first registered specialty are primary school education being 99.8% of total primary school

education specialty. The majority of the cluster two members are from secondary school education specialty, preschool education specialty, and senior vocational school education. 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 98.7% of total primary school level. The majority of the cluster two is preschool level, special education school level, senior high school level, senior vocational school level, junior high school level, and correctional school. Table 14 shows the cluster distribution for age group. We found both clusters has similar age distribution except the cluster 1 teachers in the 40-44 age group is much higher (31.8% higher) than cluster 2; cluster 2 teachers in the age group of 60 above is 100% higher than cluster 1, which means there is no 60 years old above teachers in cluster 1.

Table 11 cluster distribution for course type of administration category

		N	% of Combined	% of Total
Cluster	1	455	56.0%	56.0%
	2	357	44.0%	44.0%
	Combined	812	100.0%	100.0%
	Total	812		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	3	42.9	0	.0	452	99.8
2	273	100.0	22	100.0	4	57.1	57	100.0	1	.2
Combined	273	100.0	22	100.0	7	100.0	57	100.0	453	100.0

Table 13 cluster distribution for school level

		Cluster		Combined
School level		1	2	
Preschool	Frequency	0	21	21
	%	0	100	100
Special education school	Frequency	0	2	2
	%	0	100	100
Senior high school	Frequency	0	119	119
	%	0	100	100
Senior vocational school	Frequency	0	71	71
	%	0	100	100
Junior high school	Frequency	0	137	137
	%	0	100	100
Primary school	Frequency	455	6	461
	%t	98.7	1.3	100
Correctional school	Frequency	0	1	1
	%	0	100	100

Table 14 cluster distribution for age group

Age Group		Cluster 1	Cluster 2	Combined
22-29	Frequency	35	37	72
	%	48.60	51.40	100.00
30-34	Frequency	76	66	142
	%	53.50	46.50	100.00
35-39	Frequency	102	78	180
	%	56.70	43.30	100.00
40-44	Frequency	120	62	182
	%	65.90	34.10	100.00
45-49	Frequency	69	55	124
	%	55.60	44.40	100.00
50-54	Frequency	38	35	73
	%	52.10	47.90	100.00
55-59	Frequency	15	18	33
	%	45.50	54.50	100.00
60 above	Frequency	0	6	6
	%	0.00	100.00	100.00

B. Teaching

This section we will focus on the teachers who participated 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 782 subjects and group 2 has 1406 subjects. From the Table 16 we can see for the first registered specialty, the majority of the cluster 1 members are from secondary school education specialty, preschool education specialty, special school education specialty, and senior vocational school education. The cluster 2 members are only from the primary school education specialty, being 99.9% of total primary school education specialty. 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, junior high school level, and correctional school. The cluster 2 only contain teachers who study teaching course type of in-service advancement education their school level is primary school, being 96.0% of total primary school level. Table 18 shows the cluster distribution for age group. We found both clusters has similar age distribution except the cluster 1 teachers in the age group of 60 above is 33.4% much higher than cluster 2; cluster 2 teachers in the age group of 30-34, 40-44, and 45-49 is much higher than cluster 1 and the differences are 24.2%, 45.2%, and 26.8% respectively.

Table 15 cluster distribution for course type of teaching

		N	% of Combined	% of Total
Cluster	1	782	35.7%	35.7%
	2	1406	64.3%	64.3%
	Combined	2188	100.0%	100.0%
	Total	2188		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	558	100.0%	56	100.0%	74	100.0%	92	100.0%	2	.1%
2	0	.0%	0	.0%	0	.0%	0	.0%	1406	99.9%
Combined	558	100.0%	56	100.0%	74	100.0%	92	100.0%	1408	100.0%

Table 17 cluster distribution for school level

		Cluster		Combined
School level		1	2	
Preschool	Frequency	38	0	38
	%	100.00	0.00	100.00
Special education school	Frequency	21	0	21
	%	100.00	0.00	100.00
Senior high school	Frequency	167	0	167
	%	100.00	0.00	100.00
Senior vocational school	Frequency	96	0	96
	%	100.00	0.00	100.00
Junior high school	Frequency	402	0	402
	%	100.00	0.00	100.00
Primary school	Frequency	58	1406	1464
	%t	4.00	96.00	100.00

Table 18 cluster distribution for age group

		Cluster		Combined
Age group		1	2	
22-29	Frequency	96	131	227
	%	42.30	57.70	100.00
30-34	Frequency	157	257	414
	%	37.90	62.10	100.00
35-39	Frequency	171	314	485
	%	35.30	64.70	100.00
40-44	Frequency	139	369	508
	%	27.40	72.60	100.00
45-49	Frequency	131	227	358
	%	36.60	63.40	100.00
50-54	Frequency	59	81	140
	%	42.10	57.90	100.00
55-59	Frequency	23	24	47
	%	48.90	51.10	100.00
60 above	Frequency	6	3	9
	%	66.70	33.30	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 in-service teacher advancement education in Taiwan. The conclusions are as follows:

- We found there is a real relationship between course type and first registered specialty for teachers who participated in in-service teacher advancement education.
- There is a statistical evidence for teachers who study in-service advancement education that course type and school level has relationship.
- There is a relationship between course type and age group for teachers who participated in in-service teacher advancement education.
- Teachers who study course type of administration category is divided into two groups. The majority of the first group is the teachers whose first registered specialty are primary school education and their school level is primary school. We found both clusters has similar age distribution except the cluster 1 teachers in the 40-44 age group is much higher (31.8% higher) than cluster 2; cluster 2 teachers in the age group of 60 above is 100% higher than cluster 1, which means there is no 60 years old above teachers in cluster 1.
- Teachers who study course type of teaching category is divided into two groups. For the first registered specialty, the cluster 2 members are only from the primary school education specialty, and the school level is primary school. We found both clusters has similar age distribution except the cluster 1 teachers in the age group of 60 above is 33.4% much higher than cluster 2; cluster 2 teachers in the age group of 30-34, 40-44, and 45-49 is much higher than cluster 1 and the differences are 24.2%, 45.2%, and 26.8% respectively.

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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