

A Study on Information Literacy of Elementary School Teachers

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Abstract: The fast development of the network has caused a great impact on teachers who engage in the forefront educational works. For conforming to the demand of the internet era, it is an inevitable trend to train the teachers themselves to acquire the basic information literacy. In order to provide references for relevant units to initiate teachers' professional training programs, this study, through questionnaire, explored current situation about the information literacy of elementary teachers, and analyzed the relationship between the information literacy and the personal background. Based on the "The Indexes of Information Literacy of Teachers in Elementary and Secondary Schools" promulgated by the Ministry of Education, the questionnaire was developed and sent to 120 elementary teachers in Kaohsiung Taiwan. This research found that "professional literacy of information curriculum", "operational literacy of computer software", "basic literacy of the application to web-based instruction in disciplines", and "whole information literacy" are related to sex, ages, total service years, and weekly hours of computer usage.

Key-Words: - Elementary Teacher, Information Literacy, One-Way ANOVA

1. Introduction

Complying with the epoch trend of the knowledge economy, the Taiwan Ministry of Education has been implementing several policies to promote the cause of "basic construction of information education". In order to confirm with the promotion of information education policies, teachers, being educators, should adjust themselves for the changes. Having information literacy is the most important to a modern teacher, which is even the main key for the success or failure of information education. The information literacy of a teacher is good or bad will influence his or her students deeply [1].

Lee [2] noted that the future challenge for teachers is how to choose and apply various teaching material resources to offer more extensive studying information to their students. The emphasis of instruction will be transferred from traditional using paper resource materials to using web based information (for example, searching, choosing, and utilizing teaching resource through internet), as well

as help students to develop the skill of critical thinking and value judgment [3]. Accordingly, whether a teacher possesses the ability to instruct his or her students to utilize the learning resources on the network is very important.

In order to provide the reference for relevant units to initiate various learning programs for teachers, this research explored the current situation about the information literacy of elementary teachers, and analyzed the relationship between information literacy and teachers' personal background through questionnaire.

2. Literature Review

Students' knowledge mainly comes from the instructions of their teacher. However, teachers today often face classrooms of students more technologically literate than they are. Education systems and institutions must take seriously the challenges of Information Age [4]. Thus, it is very

important whether teachers are able to integrating technology into a classroom setting using effective teaching practices. Moreover, information literacy forms the basis for lifelong learning. It is common to all disciplines, to all learning environments, and to all levels of education. This study, firstly, explored the definitions of information literacy, as well as what are the required information literacy for teachers.

2.1 The Definitions of Information Literacy

According to The Literacy Development Council of Newfoundland and Labrador of Canada, "literacy not only involves competency in reading and writing, but goes beyond this to include the critical and effective use of these in peoples' lives, and the use of language (oral and written) for all purposes." [5]. This definition involves critical thinking about what one reads, as well as expanding the term to encompass oral forms of literacy. Chiou [6] argued that literacy refer to the understanding level of certain domain knowledge, the proficient level of skill, and the point of view of a person.

Due to the computer and the Internet developed widespread use in the 1990s, some have asserted that the definition of literacy should include the ability to use and communicate in a diverse range of technologies. According to American Library Association, information literacy is a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." [7]. In other words, information literacy mainly means that the individual has the ability to find, assess, and to utilize various information from different sources [8].

2.2 The Required Information Literacy for Teachers

The International Society for Technology in Education (ISTE) has suggested that teachers should have three major fields of information literacy [9]. They are:

A. Basic Computer / Technology Operations and Concepts

Teachers have abilities of using computer systems-run software to access, generate and manipulate data; and to publish results. They are also able to evaluate performance of hardware and software components of computer systems. Besides, they can apply basic troubleshooting strategies, and demonstrate knowledge of used of computers and technology in business, industry, and society.

B. Personal and Professional Use of Technology

Teachers are able to apply tools for enhancing their own professional growth and productivity. They can use computer technology in communicating, collaborating, conducting research, and solving problems. In addition, they are able to identify computer and related technology resources for facilitating lifelong learning and to promote equitable, ethical, and legal use of computer technology resources. Moreover, they can use of broadcast instruct, audio/video conferencing, and other distance learning applications.

C. Application of Technology in Instruction

Teachers are able to apply computers and related technologies to support instruction in their grade level and subject areas. They have abilities of planning and delivering instructional units that integrate a variety of software, applications, and learning tools. They are also able to describe research, and appropriate assessment practices as related to the use of computers and technology resources in the curriculum. In addition, they are not only able to design students learning activities that foster equitable, ethical, and legal use of technology by students, but also able to practice responsible, ethical and legal use of technology, information, and software resources.

According to "Basic Information Literacy Index for the Teachers of Elementary and Middle Schools" [10] promulgated by the Taiwan Ministry of Education, the information literacy is divided into three major aspects, including: 1) the professional literacy of information curriculum (PL); 2) the operational literacy of computer software (OL); 3) the basic literacy of the application to web-based instruction in disciplines (BL).

The professional literacy of information curriculum (PL) includes: understand the network courtesy; respect the intellectual proprietary; understand the importance of information safety; understand computers are a part of teaching tools. The operation literacy of package and application software includes (OL): use educational software and network resources; process, manage students' data and system management by computer technology; understand system operations and relevant applications. As to the basic literacy of the application of web-based instruction to disciplines, includes (BL): use network resources on teaching activities; use network resources to design interactive teaching; use network resources to carry on distance education.

3. Research Method

This research used questionnaire to explore the ability for the information literacy of elementary school teachers in Kaohsiung (Taiwan). The investigation items divided 3 categories (PL, OL, BL) are determined in accordance with “Basic Information Literacy Index for the Teachers of Elementary and Middle Schools” specified by the Taiwan Ministry of Education. T-test and One-Way Analysis of Variance were adopted to analyze the relationship between the information literacy of teachers and personal background. If there had significant difference, the Scheffe’ Method was further used to compare the difference among the investigation items.

4. Research Result

120 questionnaires have been sent out, 93 questionnaires have been recovered. The recovery rate is 77.5%. The effective questionnaires are 85. The availability rate is 70.83%.

A. The relationship between “Sex” and “PL” “OL”, and “BL”

After T-test, we found that the “PL” “OL”, and “BL” of male teachers is better than those of female teachers significantly. And the whole information literacy (WL) of male teachers is also better than those of female teachers significantly (see Table 1)

Table 1. “Sex” vs. “PL” “OL”, and “BL”

	Sex	Mean	SD	t	p
PL	M	70.6250	13.1473	2.907	.00
	F	60.4754	14.9751		
OL	M	80.9583	15.8374	2.587	.01
	F	69.9836	18.2423		
BL	M	50.0833	12.6900	3.307	.00
	F	40.8525	11.1323		
WL	M	201.6667	40.7971	3.033	.00
	F	171.3115	41.8081		

M: male; F: female

B. The relationship between “Age” and “PL” “OL”, and “BL”

The subjects were divided into four groups: 20-30 years old, 31-40 years old, 41-50 years old and above 51 years old. But only one person is above 51 years old, so this person is assigned in the group of 41-50 years old. The results showed that there is a great significant difference for the information literacy of elementary school teachers with different age level. The Scheffe’ Method was further used to compare the difference among the age level. We found that there are significant

differences for various information literacy caused by the age, wherein the information literacy of 21-30 years old teachers is better (Table 2).

Table 2. “Age” vs. “PL” “OL” “BL” “WL”

	Age	Mean	SD	F	FC
PL	A	68.28	11.39	8.845***	A>C B>C
	B	64.18	15.40		
	C	49.71	14.56		
OL	A	78.50	13.72	9.121***	A>C B>C
	B	74.72	17.93		
	C	56.14	19.01		
BL	A	47.00	10.52	6.675***	A>C B>C
	B	44.08	11.90		
	C	33.64	12.19		
WL	A	193.78	32.48	9.293***	A>C B>C
	B	182.97	43.25		
	C	139.50	44.59		

A:21-30; B:31-40; C:41+; ***:P<.001; FC: further compare

C. The relationship between “Total Service Years” and “PL” “OL”, and “BL”

The subjects were divided into five groups: 0-5 years, 6-10 years, 11-15 years, 16-20 years and above 51 years. The results showed that there is a great significant difference for the information literacy of elementary school teachers with different total service years. The Scheffe’ Method was further used to compare the difference among total service years. We found that the information literacy of total service with 0-5 years group is better than that of total service above 21 years old group significantly (see Table 3).

Table 3. “Total Service Years” vs. “PL” “OL”, “BL” “WL”

	Age	Mean	SD	F	FC
PL	A	67.04	10.22	4.177**	A>E B>E
	B	68.17	14.90		
	C	63.25	17.19		
	D	57.38	16.61		
	E	44.83	8.64		
OL	A	77.61	10.22	3.379*	A>E B>E
	B	78.28	14.90		
	C	72.35	17.20		
	D	66.46	16.61		
	E	53.17	8.64		
BL	A	46.86	9.73	2.739*	A>E C>E
	B	43.94	13.37		
	C	45.20	12.28		
	D	37.85	14.19		
	E	32.50	6.53		
WL	A	191.50	29.26	3.680**	A>E
	B	190.39	43.43		
	C	180.80	44.59		
	D	161.69	52.31		
	E	130.50	23.40		

A:0-5; B:6-10; C:11-15; D: 16-20; E: 20+
** :P<.01; * :P<.05

D. The relationship between “Weekly Hours of Computer Usage” and “PL” “OL”, and “BL”

The subjects were divided into four groups: below 1 hour, 1-3 hours, 4-7 hours, and above 8 hours. The results showed that there is a great significant difference for the information literacy of elementary school teachers with different weekly hours of computer usage. The Scheffe’ method was further used to compare the difference among the weekly hours of computer usage. We found that there is a significant difference between “PL” “OL”, and “BL” “WL”. The group of using computer above 8 hours weekly showed better in information literacy (see Table 4).

Table 4. “Weekly Hours of Computer Usage” vs. “PL” “OL”, “BL” “WL”

	Age	Average	SD	F	FC
PL	A	56.00	15.13	6.246**	D>A
	B	59.00	16.51		D>B
	C	58.63	14.63		D>C
	D	71.66	10.87		
OL	A	61.22	20.84	6.641***	D>A
	B	67.75	19.40		D>B
	C	68.67	15.30		D>C
	D	83.06	14.27		
BL	A	37.00	13.73	10.218***	D>A
	B	39.45	13.18		D>B
	C	38.33	8.79		D>C
	D	51.63	9.09		
WL	A	154.22	47.80	8.174***	D>A
	B	166.20	47.22		D>B
	C	165.63	36.45		D>C
	D	206.34	31.56		

A:1 hour-; B:1-3 hours; C:4-7 hours; D: 8hours+
***:P<.001; **:P<.01

E. The performance of “Sex” “Age” “Total Service Years” “Weekly Hours of Computer Usage” on “PL” “OL” “BL”

Regarding with “PL”, “Sex” showed significant difference on the question items such as “be able to use E-mail” “understand the courtesy of using the Telnet” “understand the infection of computer virus” “understand the security of network”. Male teachers showed significant than female teachers on “PL”. As to “OL”, male teachers showed significant than female teachers on the question items such as “understand the benefit and range of CAI” “be able to evaluate relevant CAI for curriculum” “be able to install CAI on computers and use it for teaching” “be able to apply CAI to various kinds of teaching activities” “be able to use network” “be able to use computer in teaching management and in analyzing the efficiency of students’ learning” “be able to operate the computer system and broadcast system of the school”.

Moreover, male teachers also showed significant than female teachers on the question items of “BL” such as “be able to link network” “be able to apply power point to teaching” “be able to apply the network in teaching activities” “be able to instruct students to learn through network” “collaborate with other teachers to carry on the teaching activities through computers” “use school webpage for interactive learning activities” “be able to use computers for liaison between classes and schools” “be able to operate the distance education” “be able to use video meeting to carry on remote teaching activities”.

The age over 41 years old group showed significant low on “PL” “OL” “BL” than the age groups of 21-30 and of 31-40. Teachers who use computers over 8 hours weekly showed significant on “PL” “OL”, “BL” “WL” than others. Moreover, the teachers whose total service years are over 21 years showed significant low than those whose total service years are under 21 years.

F. ANOVA Analysis

By using ANOVA to analyze and compare the “PL” “OL” “BL” of teachers, it was found that the Mean of question 6 (understand the infection of computer virus), 7 (understand the security of network), and 8 (understand the function of firewall and the importance of encrypted network) are lower significantly in “PL” (see Figure 1). It revealed that the teachers do not possess the relevant knowledge and ability of the information security.

Regarding OL, the Mean of question 1 (understand the benefit and range of CAI), 2 (be able to evaluate relevant CAI for curriculum), 3 (be able to install CAI on computers and use it for teaching), 4 (be able to apply CAI to various kinds of teaching activities), 11 (be able to use computer in teaching management and in analyzing the efficiency of students’ learning), and 14 (be able to operate the computer system and broadcast system of the school) are lower (see Figure 2). It revealed that most of the teachers do not apply CAI to their teaching because they do not possess the relevant knowledge of CAI. It also disclosed that teachers do not understand the computer and networks systems of their schools completely.

The Mean of question 9 (be able to operate the distance education), 10 (be able to use video meeting to carry on remote teaching activities) are lower significantly in “BL” (see Figure 3). It revealed that teachers do not possess the relevant knowledge and ability of using the equipments for distance education, and video-meeting. Regarding the whole information of literacy of the teachers, we

found that most of the teachers possess the ability of using computer software, such as Word, internet, but they are in short on the knowledge of distance education – both on the operation and application (see Figure 4).

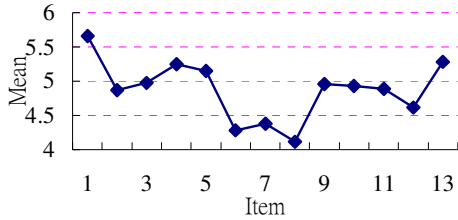


Figure 1. The Mean of PL

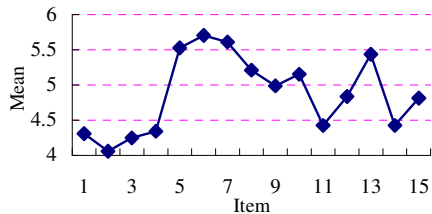


Figure 2. The Mean of OL

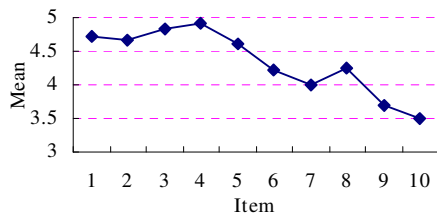


Figure 3. The Mean of BL

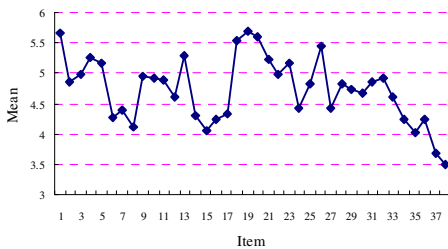


Figure 4. The Mean of WL

5. Conclusions

This study explored the relationship between personal background and the ability of information literacy for elementary school teachers. It was found

that: 1) the information literacy of male teachers is better than that of female teachers significantly; 2) the groups of 21-30 years old and 31-40 years old have better information literacy; 3) total service years is shorter, the information literacy is higher; 4) the information literacy for the teachers who use computer above 8 hours weekly is better.

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