Effects of Distance Learning on Learning Effectiveness

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The development of computers in the past two decades has resulted in the changes of education in enterprises and schools. The advance of computer hardware and platforms allow colleges generally applying distance courses to instruction that both Ministry of Education and colleges have paid attention to the development of Distance Learning. To improve the quality of distance learning and students' learning effectiveness in the investigated universities, quantitative survey with SPSS19.0 is applied to analyzing data in this study, in which Factor Analysis, Reliability Analysis, Regression Analysis, and Analysis of Variance are utilized for organizing and analyzing data. About 600 college students in Department of Public Administration are proceeded questionnaire survey, and 472 valid copies are studied. The research findings show that 1.Distance Learning appears significantly positive effects on Curriculum Instruction in Learning Effectiveness; 2.Distance Learning presents notably positive effects on Technological Media in Learning Effectiveness; 3.Distance learning reveals remarkably positive effects on Curriculum Management in Learning Effectiveness; and, 4.demographic variables appear notable effects on the correlations between Distance Learning and Learning Effectiveness.

Keywords: Distance Learning, Learning Effectiveness, Public Administration.

INTRODUCTION

In such an era when information is rapidly developing, the Internet presents the characteristics of instantaneity, not being restricted in solid space of classrooms, and convenience for two-way interaction. When computer-based information is included in instruction, students' learning interests could possibly be enhanced. Distance Learning, with various versions, is also named digital learning. In 1990s, the rapid development of network and the general applications of computers and network

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have learning break through the restriction of regions, and synchronous and asynchronous distance learning is used for achieving the learning effect. Distance courses have been commonly applied to the instruction in colleges. Distance learning therefore has become a critical channel between school instruction and student learning. Some information experts predict that printing will no longer be the mainstream, but audio/video contents would be the major propagation.

In such an information society, information literacy and the application capability are the essential intelligence for modern people; and, the applications of information technology to enhancing national competitiveness have been the common objective of advanced countries. Accordingly, information education is regarded as the foundation stone for a nation and an individual toward information era. Since the era of knowledge economy, the Internet, instead of traditional subjects, has become a critical and potential element in Public Administration. The explosive development of

State of the literature

- The study aims to develop a scale instrument to allow us to determine the self-efficacy perceptions of primary education teachers regarding their use of technology when educating students.
- The developed scale instrument was obtained in the wake of the data gathered from primary education teachers.
- According to the conducted analyses of the developed scale instrument, it was determined to have validity and reliability.

Contribution of this paper to the literature

- The developed scale instrument is going to contribute to the literature in that it will make the information technologies coherent with the education, thus creating a model for teachers developing and designing the learning environment.
- That the developed scale instrument on information technologies included numerous expressions about different aspects is vital in terms of it being intended for the use of all education instruments.
- It is thought that the scale instrument puts forth the self-efficacy perceptions regarding the use of information technologies from the point of view of basic skills and the anxiety state.

the Internet and e-commerce in the past two years has researchers, practical managers, and the public witness the fact and potential of 3C1 technology changing the social style, commercial behaviors, organizational management, and political operation. It is undeniable that the Internet would be a key power leading the public organization. In such an information era, Public Administration belongs to the fiercely competitive management that most researchers regard Distance Learning and digital communication ability as the basic competence of public administrators. Apparently, Distance Learning is getting important in Public Administration.

According to the international concerns about Distance Learning, it is found from the development of general distance curriculum in domestic colleges and the certification of distance curriculum and materials that the development of Distance Learning has been extremely emphasized in the world, Ministry of Education, and colleges. The development of domestic Distance Learning has shown certain scale that the effects of Distance Learning on schools and students are considerable. As a result, Distance Learning deserves the emphasis of researchers.

LITERATURE REVIEW

Distance Learning

Distance Education, originated in mid-18th century, aimed to compensate the insufficiency of traditional education. It rapidly developed from correspondence courses and tapes (Williams, Paprock& Covington, 1999) to the release of personal computers and the applications of computer-based multimedia applications. The maturity of network technology has computer-based network technology become the advantageous media in current Distance Education, which provides more flexibilities and learning opportunities (Huang et al., 2009; Yin et al., 2010). The emphasis of Lifelong Learning has challenged the traditional ideas of schools being the final learning places. The broad applications of the Internet have Distance Education become another wave of learning mainstream (Tsou, 2009). Web-based instruction is open-ended, in which the resources are almost endless and infinite. Learners could receive resources of texts, figures, audio and video, and interpersonal interaction through hyperlinks and online inquiries (Chen, 2010).

Distance Learning used to be confused with Distance Education and Distance Instruction. As a matter of fact, Distance Learning stresses on students' learning processes in Distance Learning that it is student-centered (Huang et al., 2009). Distance Learning was described, in American Education Conference in 1996, as a system or process connecting the classified learning resources and learners (Lewis, 2000). Williams, Paprock& Covington (1999) regarded Distance Learning or Distance Education as learning allocation – the instruction presented when learners and teachers were separated in space and time. Billings et al. (2001) described Distance Learning as the segmented time/space between learners and teachers that education technology was utilized for establishing a learning environment for the continuous education of nursing staff.

Distance Learning could be segmented by time and space and generally presented by synchronous and asynchronous (Billingset al., 2001; Lewis, 2000). Synchronous activities refer to several people simultaneously communicating on the computer-based network, such as videoconferencing, with which the users could see images and hear voice at the same time. Asynchronous activities indicate the communication among several people not at the same time that the information is stored in a designated computer, which theoretically could be read, seen, or heard by the users at any time and places (Chiu, 2009). In adult education, autonomous and flexible learning is emphasized. The asynchronous learning approach offered in computer-based network technology features the flexibility of

learning time that learners could precede individual and collaborative learning (Lu, 2009). It is estimated that asynchronous computer-based network learning would become the mainstream in the future. For nursing staff in public health, asynchronous distance learning would be suitable for the work characters and the restrictions of family responsibilities (Cragg, 1994) that it is considered as the best approach for on-job training (Farel&Polhamus, 2001; Yin, 2009; Chiu & Wu, 2010). Simonson et al. (2000) pointed out learners as the key members in Distance Learning and Attitude, Experience, Cognition, and Learning Styles being the primary indices to measure Distance Learning, in which Attitude was regarded as the most important index. Attitude is considered as a lasting and consistent psychological response to people, affairs, and objects. The questionnaire of Distance Learning Effectiveness in this study therefore refers to the research dimensions proposed by Simonson et al. (2000)

Learning Effectiveness

Learning Effectiveness refers to the learner's learning results in formative and summative evaluations.Gilliver, Randall &Pok (1998) discussed the effects of online courses on learning and found higher Learning Effectiveness of the experiment group with web-based learning.Shiratuddin (2001) studied 169 college students with lecturing and online learning and also discovered the higher Learning Effectiveness of the online learning group.However, Freeman, Grimes & Holliday (2000) found no distinct effect of distance audio/video and two traditional instruction on Learning Effectiveness. It was discovered that team learning appeared higher Learning Effectiveness than individual learning did on computer-based curriculum; besides, team learning presented significant promotion on Learning Effectiveness of low-achievement students. Uribe et al. (1995) proved the higher Learning Effectiveness of the matched group than the individual group. However, Klein & Doran (1999) concluded different findings that, in the computer-based course, no remarkable difference in Learning Effectiveness among the individual, the extended interactive, and the random interactive groups. There are a lot of factors in Learning Effectiveness. Wang (2009) indicated that learners preferring abstract concepts, in passively observed learners, appeared higher Learning Effectiveness.Chien (2009) noticed the notable differences between Learning Styles and Learning Effectiveness, but the effects of Learning Styles on Learning Effectiveness became insignificant after the use of multimedia-assisted materials. In this case, interactive multimedia–assisted materials could reduce the effects of Learning Styles on Learning Effectiveness. In other words, interactive multimedia-assisted materials

could adapt to learners with different learning styles and reduce the effects of Learning Styles.

Regarding Learning Effectiveness, Biner (1993) explored the evaluation tools for Learning Attitude in Distance Educationandfound the key dimensions of Curriculum Instruction, Technological Media, and Curriculum Management. This study therefore refers to the research dimensions of Biner (1993) for the questionnaire of Distance Learning Effectiveness.

RESEARCH METHOD

Research hypothesis deduction

Uribe et al. (1995) pointed out the factors in Learning Effectiveness as personal characters (age, education background, seniority) and work environment. Hsu (2010) regarded the factors in training effectiveness as personal characters (including gender, age, education background, class, and seniority), participation motivation (containing Attitude, Expectation, and Opinion of training contents), and environmental factors (covering organizational climate, work environment, and supervisor and peer support). With the integration of above literatures, the factors in Learning Effectiveness generally contain demographic variables (like age, education background, gender, seniority) and learning factors in education psychology (such as individual personality trait, self-efficacy, learning participation, learning satisfaction, learning ability, learning motivation, learning style, learning approach, learning cognition, learning attitude, response to learning content).

Learning Effectiveness, as an index to measure learners' learning results (Wang, 2009), is one of the key items in instruction quality evaluation. Learning Effectiveness would be affected by learning styles, curriculum design, and instruction (Kearsley, 2009) that a lot of researchers invest in discussing the effects of personal characters or learning behaviors on Learning Effectiveness. For instance, Lynch et al. (1998) explored the effects of Learning Styles on Learning Effectiveness of students in medical schools and the relationship; and, Jones (1996) discovered the partial effects of ability, self-efficacy, and individual objective on effectiveness. Apparently, there are plenty of factors in Learning Effectiveness. Aiming at some factors in Learning Effectiveness, the effects of Distance Learning on Learning Effectiveness are investigated in this study. The following hypotheses are further proposed.

H1: Distance Learning shows notably positive effects on Curriculum Instruction in Learning Effectiveness.

H2: Distance Learning presents remarkably positive effects on Technological Media in Learning Effectiveness.
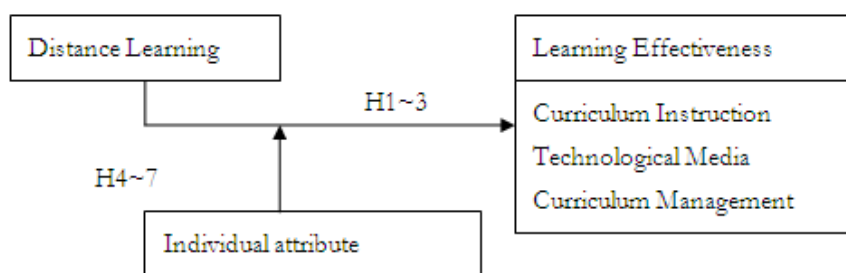
Figure 1. Research Frame

H3: Distance Learning reveals significantly positive effects on Curriculum Management in Learning Effectiveness.

H4: Gender appears remarkable effects on the correlations between Distance Learning and Learning Effectiveness.

H5: Age shows significant effects on the correlations between Distance Learning and Learning Effectiveness.

H6: Class reveals notable effects on the correlations between Distance Learning and Learning Effectiveness.

Research framework

According to domestic and international research, the research framework is proposed to discuss the correlations between Distance Learning and Learning Effectiveness.

Research subjects and sampling

Based on top ten universities in Department of Public Administration in Taiwan, including National Taiwan University, National Chengchi University, National Taipei University, National Chi Nan University, National University of Tainan, Taipei Municipal University of Education, Tamkang University, Shih Hsin University, Chinese Culture University, and Tunghai University, the students in Department of Public Administration are selected for the questionnaire survey. With convenient sampling, total 600 copies are distributed, and 472 valid ones are retrieved, with the retrieval rate 79%.

ANALYSIS AND DISCUSSION

Factor analysis of distance learning

With Factor Analysis, four factors were extracted from Distance Learning Scale, including Attitude (eigenvalue=3.131, α=0.83), Experience (eigenvalue=2.683, α=0.81), Cognition (eigenvalue=2.162, α=0.88), and Learning Styles (eigenvalue=1.527, α=0.86). The co-variance explained achieved 77.945%.

With Factor Analysis three factors were extracted from Learning Effectiveness Scale, containing Curriculum Instruction (eigenvalue=2.419, α=0.87), Technological Media (eigenvalue=1.897, α=0.80), and Curriculum Management (eigenvalue=1.335, α=0.84). The co-variance explained reached 72.684%.

Correlation analysis between distance learning and curriculum instruction in learning effectiveness

Applying Regression Analysis to testing H1, Table 1, the regression equation achieved the significance (F=16.884, p $<$ 0.000). Distance Learning appeared significant effects on Curriculum Instruction, where Attitude and Learning Styles showed remarkably positive effects on Curriculum Instruction and achieved the significance ($\beta = 0.196*$, $\beta = 0.173*$). H1 was therefore partially supported.

Correlation analysis between distance learning and technological media in learning effectiveness

Applying Regression Analysis to testing H2, Table 1, the regression equation reached the significance (F=19.435, p $<$ 0.000). Distance Learning showed notable effects on Technological Media, where Experience, Cognition, and Learning Styles presented remarkably positive effects on Technological Media and achieved the significance ($\beta = 0.153*$, $\beta = 0.212**$, $\beta = 0.182*$) that H2 was partially supported.

Correlation analysis between distance learning and curriculum management in learning effectiveness

Applying Regression Analysis to testing H3, Table 1, the regression equation achieved the significance (F=25.362, p $<$ 0.000). Distance Learning revealed significantly positive effects on Curriculum Management, where Experience, Cognition, and Learning Styles showed remarkable effects on Curriculum Management and reached the significance ($\beta = 0.167*$, $\beta = 0.158*$, $\beta = 0.179*$). H3 was therefore partially supported.

Table 1. Regression analysis between distance learning and curriculum management in learning effectiveness

	Learning Effectiveness (dependent variable)		
	Curriculum Instruction	Technological Media	Curriculum Management
Distance Learning (independent variable)			
Attitude	0.196*	0.083	0.125
Experience	0.117	0.153*	0.167*
Cognition	0.103	0.212**	0.158*
Learning Styles	0.173*	0.182*	0.179*
F	16.884	19.435	25.362
Significance	0.000***	0.000***	0.000***
R2	0.188	0.225	0.261
Regulated R2	0.033	0.046	0.051

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

Note: * stands for $p<0.05$, ** for $p<0.01$.

Table 2. Effects of demographic variables on the correlations between distance learning and learning effectiveness

Demographic variable	Distance Learning	Curriculum Instruction	Technological Media	Curriculum Management
Gender	Attitude	Significant	Significant	Not significant
	Experience	Not significant	Significant	Not significant
	Cognition	Not significant	Not significant	Significant
	Learning Styles	Significant	Not significant	Significant
Age	Attitude	Significant	Significant	Not significant
	Experience	Significant	Not significant	Significant
	Cognition	Not significant	Significant	Not significant
	Learning Styles	Significant	Not significant	Significant
Class	Attitude	Not significant	Not significant	Significant
	Experience	Significant	Significant	Not significant
	Cognition	Not significant	Significant	Not significant
	Learning Styles	Significant	Not significant	Not significant

Data source: self-organized in this study

Moderating effects of demographic variable

Effects of gender on the correlations between Distance Learning and Learning Effectiveness

With Analysis of Variance, the empirical results, Table 2, presented the notable effects of gender on the correlations between Attitude, Learning Styles and Curriculum Instruction, between Attitude, Experience and Technological Media, and between Cognition, Learning Styles and Curriculum Management that H4 was partially supported.

Effects of age on the correlations between Distance Learning and Learning Effectiveness

With Analysis of Variance, the empirical results, Table 2, revealed the notable effects of age on the correlations between Attitude, Experience, Learning Styles and Curriculum Instruction, between Attitude, Cognition and Technological Media, and between Experience, Learning Styles and Curriculum Management that H5 was partially supported.

Effects of class on the correlations between Distance Learning and Learning Effectiveness

With Analysis of Variance, the empirical results, Table 2, presented the remarkable effects of class on the correlations between Experience, Learning Styles and Curriculum Instruction, between Experience, Cognition and Technological Media, and between Attitude and Curriculum Management that H6 was partially supported.

CONCLUSION

Summing up the data analyses and research conclusions, the practical applications of Distance Learning and the further research are proposed suggestions. The research results present the effects of Attitude, Experience, Cognition, and Learning Styles on

Learning Effectiveness that Distance Learning appears notable effects on Learning Effectiveness.

It is therefore suggested that proper schedule control should be included for students in Department of Public Administration cultivating regular reading habits and autonomously controlling the time in Distance Learning. The application of proper schedule control to guiding students learning step by step and enhancing their learning attitudes should be taken into account when designing Technological Media and Curriculum Management systems. In regard to Curriculum Instruction, students should present regular reading habits and cultivate favorable learning attitudes and experiences in Distance Learning so as to acquire the optimal Learning Effectiveness. In the Distance Learning process, fixed time for handing in assignments could have students appear continual learning attitudes and experiences. With the convenience of information technology, the inclusion of multimedia interactive systems could motivate students to interact through voice and images. As some students could not clearly express the problems because of text key-in difficulty, certain extent of Chinese word key-in is required for the effective application. It is therefore suggested to enhance the design of interactive systems so as to reinforce Learning Styles of students in Department of Public Administration and promote Curriculum Instruction and student participation.

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