The Effect of Online Training on Employee's Performance

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***Abstract*—The new telecommunication technology has opened educational opportunities to learners who are having difficulty participating in traditional instruction. Enhanced educational technology has played a critical role in professional development of employees in the business field, as online distance learning instruction is one of the popular options for so many instructional designers in business. This study sought to determine the effect of online distance-learning instruction on employees' learning achievement those who took a training program of online distance-learning instruction and those who did not. Since many factors will affect employees' learning achievement, this study also explored the effect of self-efficacy, gender, computer experience, and socioeconomic status, on the learning achievement of employees in a Taiwanese manufacturing company. Additionally, this study investigated students' satisfaction with online distance-learning instruction. The major findings were that learning achievement was similar for online distance learning and traditional face-to-face instruction. Also, it showed a significant relationship between self-efficacy and learning achievement. An implication is that a judicious embedding of self-efficacy consideration is the design and implementation of online distance learning courses might well enhance learning achievement.**

***Index Terms*—online distance-learning, self-efficacy, employees' training**

I. INTRODUCTION

In accordance to the global economy development and the need, educational training provides the transformation ability to employees individually and the whole organization. The enterprise's development depends on fostering the talent as well as displaying the ability of the talented person. The educational training is the key work fostering talented employees for an enterprise to continue indefinitely [21].

Without doubt, the target of educational training is to prompt personal skill, mold personal independence, and develop self-confidence. Moreover, regardless of theory or practice in educational training, the educational training links closely with the external environmental trend, the enterprise growth, and the professional development of employees [21]. Although the importance of educational training is continuously mentioned, when knowledge and skill of employees are no longer suitable for today' need, educational training will be urgenting needed, especially under the pressure of transformation.

Advances of educational technology have impacted curricula and the ways content is delivered and received in today's educational world. The new telecommunication technology has opened educational opportunities to learners who are having difficulty participating in traditional instruction. Enhanced educational technology has played a critical role in professional development of employees in the business field, as online distance-learning instruction is one of the popular options for so many instructional designers in business. Many educational departments in business organizations have been attempting to build an educational system accessible through distance learning in order to serve more employees in different branches efficiently.

The purpose of this study was to examine the effectiveness of online distance-learning instruction on the performance of employees training in a Taiwanese industry of manufacturing. Concurrently, this study sought to determine the effect of online distance-learning instruction on the learning achievement of employees who took the training program via online distance-learning instruction and those who did not. Since many factors affect employees' learning achievement, this study also explored the effect of self-efficacy, gender, computer experience, and socioeconomic status, on the learning achievement of employees in a Taiwanese manufacturing industry. Additionally, this study explored the issue of students' satisfaction with online distance-learning instruction.

II. THEORETICAL FRAMEWORK

A. Self -Efficacy

Bandura [1] defined self-efficacy as the personal judgment of one's capabilities to organize and execute courses of action to attain designated goals. Bandura's research identified self-efficacy as a significant predictor of a student's learning achievement.

Learning achievement can be influenced by various factors, both internal and external. However, self-

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efficacy is rooted in the core belief that one has the power to produce change by one's actions [1]. Self-efficacy can be extended beyond specific tasks or attainment goals – a person can have self-confidence in general.

Bandura held that beliefs about one's likelihood of success were better predictors of success [2]. Salanova *et al.* have shown that computer self-efficacy plays a moderating role between technology training[24]. Computer training and use may be associated with increased efficacy beliefs about computer use, which may contribute to an increased motivation to use technology.

From such a fundamental and sweeping view it can be concluded that self-efficacy is a paramount consideration in education. Levine and Donitsa-Schmidt [17] conducted a study, which demonstrated that high computer self-efficacy correlated with high computer-related knowledge. An investigation by Joo, Bong and Choi [14] led to the conclusion that computer self-efficacy is one of the critical variables determining the success of online learning. Similar results were obtained in studies by [12].

Experience using computers will strongly influence computer self-efficacy. Britner and Pajares found that after a computer training course participants exhibited a higher level of computer self-efficacy [3]. Smith found a high correlation between computer experience and computer self-efficacy[26]. Cassidy and Eachus reported a positive relationship between self-efficacy and computing experience[4]. In the context of prior researches, women have lower levels of self-efficacy/computer self-efficacy towards computers or the Internet [9-11]. The researches strongly suggested that in the promotion of self-efficacy in students by teachers, particular attention should be devoted to computer self-efficacy.

B. Learning Achievement in Distance Learning

It was stated that the literature generally reached a favorable comparison (i.e., roughly equal) when such types of learning were compared to traditional face-to-face classroom instruction. A comparison of students' learning achievement in distance learning courses versus traditional courses was done by Lockyer et al. [18]. There is no different in knowledge acquisition and learners' achievement did not show any significant difference. Clark based on reviewing hundreds of studies, concluded that there was no significant difference in learners learning achievement [6]. There are evidences showing different conclusion in learning achievement. Learners have better performance in face-to-face instruction, but web learners worked more in groups [28]. Learners use web practice quizzes improving their performance [13]. Meelissen and Drent indicated that learners from more privileged SES (socioeconomic status) background tend to have more positive computer attitude and better performance than les privileged peers[19].

C. Experience with Computer in Distance Learning

Experience with technology, including computer experience, was identified as a crucial element of success for online distance learners [25]. The Internet has become widely and frequently used in a wide variety of human activities, with its role often being vital. But use of the Internet is inseparable from computer usage; use of the first requires use of the second. The importance of computer experience is therefore unavoidably implied in a study of 152 high school students in Korea [14] found Internet self-efficacy to be an important variable with respect to student success in a web-based learning environment. The Joo, Bong and Choi study shows that experience of using computer is critical for further research and experience in using computer can be defined as the years and ability in using the computer [24]. In a study of 122 college students taking a course in research methodologies it was found that, in addition to self efficacy and experience with computer respecting course content, technological self-confidence on the part of students were good predictors of learner performance in the class [25]. From context of Meelissen and Drent shown that learners from higher socioeconomic status have more positive computer attitudes than their lower socioeconomic status peers[19]. This may be because learners from privileged families have more opportunities to use computers.

D. Learner Satisfaction in Distance Learning

To be truly effective, learning results should include student satisfaction. By the end of a course, the student should not only have acquired the course-targeted knowledge and skills, but also have the belief and feeling that the course successfully met his/her expectations. Perhaps the most immediate and obvious measure of program effectiveness focuses on the quality of the individual learning experience [8]. Chute stated that learner satisfaction is significant to all facets of distance learning [7]. It relates to design, development, and delivery. Technology-based learning is becoming increasingly popular, particularly by means of the World Wide Web (Internet). It is therefore becoming increasingly important that educators determine and analyze the expectations and experiences of the learner. Consequently, a number of studies have been conducted aimed at investigating the level of students' satisfaction associated with distance learning courses.

One such study was done by Sahin indicated that distance-learning students generally had a high level of satisfaction across-the-board [23]. The satisfaction applied to the use of technology, course content, and the support they received from instructors and mentors. Drennan, Kennedy, and Pisarski conducted a study to examine the factors that affect student satisfaction. The students had little of any prior experience with learning via the Internet [9]. The results showed that the course was very successful in introducing students to Internet-based instructional material. However, the students were subsequently reluctant to disassociate themselves from the familiar forms of tutor contact. Drennan, Kennedy,

and Pisarski suggested that although the students were accepting of supporting material from the Web, they might be unwilling to replace a good instructor with technology-based instruction [9]. In the context of Lim, computer self-efficacy has a positive relationship between learners' satisfaction with their Web-based distance education courses and their intent to participate in future Web-based courses [15]. The following hypotheses have been developed to explore research.

H1: There is a significant difference in employees' learning achievement between employees who receive online distance-learning instruction and employees who receive face-to-face instruction.
H2: There is a significant difference in employees' learning achievement between gender, employees' experience of using computer, and socioeconomic status for employees who receive online distance-learning instruction and employees who receive face-to-face instruction.
H3: There is a significant relationship in employees' learning achievement and self-efficacy between employees who receive online distance-learning instruction and employees who receive face-to-face instruction.
H4: There is a significant difference in satisfaction between employees who receive online distance-learning instruction and employees who receive face-to-face instruction.
H5: There is a significant combined effect of self-efficacy and/or gender and/or satisfaction and/or computer experience and/or socioeconomic status on the employees' learning achievement in Taiwanese manufacturing industry.

III METHOD

A. Design

This study is based on a quasi-experimental nonequivalent control group design. The pretest/posttest procedure was applied. Random assignment technique was not used in this study. The mean gain from the posttest was utilized to test for significant differences between experimental and control groups. The independent variable in this study is distance learning instruction and the dependent variable is learning achievement. The subjects in this study are employees of the Yu-Yi Ltd. Co. in Taiwan.

Online distance-learning provides a cost-effective solution to the demand for training at the company headquarters and branches at the same time. There were two groups of subjects in this study. One in Mainland China is the experimental group receiving online distance-learning instruction. The other one in Taiwan is a control group receiving face-to-face instruction. The experimental group consisted 14 employees and the control group consisted 13 employees selected randomly from volunteers. In addition, these two groups met at exactly the same time and share the same trainer. There were 27 participants in this study. Their ages range from 24 to 33; they are all full- time employees, who have earned at least a bachelor's degree.

Data was collected from employees of Yu-Yi Ltd. Co. who enrolled in the required training program offered both at online distance-learning instruction and face-to face instruction. Both groups met on the same day for two hours once a week, over a time period of four weeks.

The Online Technologies Self-Efficacy Scale (OTSES) and Self-Efficacy Toward Classroom Learning instrument was given as pretests at the beginning of the course to the both of the experimental group and the control group. A Background Information Survey was administered as a pretest to both groups as well. The training is titled How to Use Entry System of Yu-Yi (HUESYY) and the posttest referred to how employees have learned to utilize HUESYY. The posttest was titled Testing Skill of HUESYY. It also served as a pretest for both the experimental and control groups for check equivalence of the knowledge of HUESYY in the beginning of the training program. The Satisfaction Instrument served as a posttest to both experimental and control groups to evaluate how satisfied employees were with this training program. The posttest was scheduled for both groups at the end of the training program. The test results were analyzed to see if there is a significant difference in learning achievement between the experimental group taking online distance-learning instruction and the control group taking face-to face instruction. It was necessary to note that the effects of variables such as teaching style would not be confounding variables because the same trainer taught both the experimental and the control groups.

B. Instrument

To measure self-efficacy for employees who receive online distance-learning instruction and face-to-face instruction the researcher used The Online Technologies Self-Efficacy Scale (OTSES) and Self-Efficacy Toward Classroom Learning. The Online Technologies Self-Efficacy Scale (OTSES) developed by Miltiadou and Yu [20]. Internal consistency reliability (Cronbach's coefficient alpha) is .95 for all the 29 items. Self-Efficacy Toward Classroom Learning developed by Quinones and The acceptable internal consistency reliability (Cronbach's coefficient alpha) is .76 for all the 9 items[22]. Satisfaction Instrument developed by Lee is used to measure the satisfaction of employees who received instruction by distance learning and face-to-face [16]. The acceptable internal consistency reliability (Cronbach's coefficient alpha) is .93 for all the 19 items. The learning achievement pretest and learning achievement posttest were designed by the instructor to measure the knowledge that participants, should gain through the instruction provided in How to Use the Entry System of Yu-Yi. The background information survey included employees' name, gender, computer experience and socioeconomic status.

IVDATA ANALYSIS AND RESULTS

The researcher used the Statistical Package for the Social Sciences (SPSS) 16.0 for Windows to organize and test data. An analysis of the data gathered by a demographic questionnaire, OTSES scores, Self-Efficacy Toward Classroom Learning scores, satisfaction Instrument score and the score of achievement test of employees in a Taiwanese manufacturing industry.

A. Description of Population Sample

Employees' Characteristics included gender, Computer Experience, and Socioeconomic Status in this sample. The Frequencies and Percentages for Employees' Characteristics including experimental group and control group are showed in Table 1.

In Hypothesis One, the independent simple t-test was conducted. The perfect score of learning achievement test is 100. The means of the achievement pretest for the control and experimental groups were 51.46 and 44 respectively. The learning achievement pretest revealed no statistically significant difference between the two groups, F= .03, p= .170>.05. The descriptive statistics for these test scores are presented in Table II. The means of the achievement posttest for the control group and experimental group were 79.92 and 79.57 respectively. The learning achievement posttest revealed no statistically significant difference between the two groups, F= .017, p= .928>.05. The descriptive statistics for these test scores are presented in Table II.

One-way ANOVA was conducted in order to evaluate Hypothesis One. The descriptive statistics for learning achievement posttest are shown in Table III. The learning achievement posttest revealed no statistically significant difference between the two groups, F(1,25)=.008, p= .928>.05. Hypothesis One was rejected since there was no significant difference in employees' learning achievement between employees who received online distance-learning instruction and employees who received face-to-face instruction.

TABLE I.
Frequencies and Percentages for Employees' Characteristics

Descriptor	Experimental N (%)	Control N (%)	Total N (%)
Gender:			
Males	8(57.1%)	6(46.1%)	14(51.9%)
Females	6(42.9%)	7(53.9%)	13(48.1%)
Total	14(100%)	13(100%)	27(100%)
Level of Computer Experience:			
1 year and below	2 (14.29%)	2(15.39%)	4(14.81%)
1 to 3 year	4 (28.57%)	5 (38.46%	9(33.33%)
3 to 5 year	4 (28.57%)	5(38.46%)	9(33.33%)
5 year and above	4 (28.57%)	1 (7.69%)	5(18.59%)
Total	14 (100%)	13 (100%)	27 (100%)
Socioeconomic' Status:			
24,000 to 95,999	2 (14.29%)	1 (7.69%)	3 (11%)
36,000 to 47,999	2 (14.29%)	6 (46.15%)	8 (29.62%)
48,000 to 59,999	3 (21.43%)	3 (23.07%)	6 (22.22%)
60,000 to 71,999	3 (21.43%)	1 (7.69%)	4 (14.81%)
72,000 to 95,999	3 (21.43%)	2 (15.38%)	5 (18.51%)
96,000 and above	1 (7.14%)	0 (0%)	1 (3.70%)
Total	14 (100%)	13 (100 %)	27 (100%)

TABLE II
INDEPENDENT T-TEST ACHIEVEMENT PRETEST SCORES AND ACHIEVEMENT POSTTEST SCORES FOR EMPLOYEES BY GROUP

Group	N	Mean	SD	F	p
Pretest Scores					
Experimental	14	44	12.83	.03	.170
Control	13	51.46	14.62		
Posttest Scores					
Experimental	14	79.57	9.95	.017	.928
Control	13	79.92	10.00		

TABLE III
ONE-WAY ANOVA LEANDERING ACHIEVEMENT POSTTEST SCORES FOR EMPLOYEES

Source	SS	df	MS	F	p
Group	0.843	1	0.834	.008	.928
Error	2488.352	25	99.534		
Total	174171.00	27			

TABLE IV
ANCOVA OF GENDER, COMPUTER EXPERIENCE AND SOCIOECONOMIC STATUS FOR EMPLOYEES

Factors	DF	F	p	Error
Gender	1	2.017	.251	3
Computer experience	3	.262	.85	3
Socioeconomic status	5	1.64	.363	3

TABLE V
CORRELATIONS OF SELF-EFFACACY SCORES FOR EMPLOYEES WHO RECEIVE FACE-TO-FACE INSTRUCTION AND DISTANCE-LEARNING INSTRUCTION

Instrument	r	p
Face-to-face Instruction		
OTSES	.922	.000
Self-Efficacy Toward Classroom Learning	.844	.000
Distance-Learning Instruction		
OTSES	.930	.000
Self-Efficacy Toward Classroom Learning	.946	.000

In Hypothesis Two, in order to test for differences in employees' learning achievement between gender, employees' experience of using computer, and socioeconomic status for employees who receive online distance-learning instruction and employees who receive face-to-face instruction, a one-way analysis of Covariance (ANCOVA) was conducted. The independent variable was distance-learning instruction and the dependent variable was employees' learning achievement. Table IV shows that there was no statistically significant difference between gender, employees' experience of using computer and socioeconomic status of employees and learning achievement. F (1,3)=2.017, p=.251>.01; F(3,3)=.262, p=.850>.01; F(5,3)=1.64, p=.363>.01.

In Hypothesis Three, In order to test for a relationship of employees' learning achievement between employees who received online distance-learning instruction and employees who receive face-to-face instruction, the Pearson correlations was conducted. Correlation coefficients were computed for the relationship between employees' learning achievement and self-efficacy. Results revealed a statistically significant relationship between learning achievement and The Online Technologies Self-Efficacy Scale (OTSES), (r = .922) in control group. Results also show a statistically significant relationship between learning achievement and Self-Efficacy Toward Classroom Learning, (r = .844) in the control group. The descriptive statistics for these test scores are presented in Table V.

Results revealed a statistically significant relationship between learning achievement and The Online Technologies Self-Efficacy Scale (OTSES), (r = .930) in the experimental group. Results also show a statistically significant relationship between learning achievement and Self-Efficacy Toward Classroom Learning, (r = .946) in the experimental group. The descriptive statistics for these test scores are presented in Table V.

In Hypothesis Four, in order to test for difference of employees' satisfaction between employees who receive online distance-learning instruction and who employees receive face-to-face instruction; the independent simple t-test was conducted. The .05 level of significance was selected for analysis of data. Results of the analysis revealed no statistically significant differences in satisfaction between two groups, F=1.91, P=.693>.05. The means of experimental and control group were 87.57 and 88.46. The descriptive statistics for these test scores are presented in Table VI.

In order to test for difference in employees' satisfaction between employees who received online distance-learning instruction and employees who received face-to-face instruction. A one- way ANOVA was conducted. The .05 level of significance was selected for the analysis of data. Results of the analysis revealed no statistically significant differences in satisfaction between two groups, F (1,25)=0.159, P=.693>.05. The descriptive statistics are presented in Table VII. Hypothesis Four was rejected because there was no significant difference in satisfaction between employees who received online distance-learning instruction and employees who received face-to-face instruction.

In Hypothesis Five, Correlation coefficient was conducted to test the combined effects of self-efficacy and/or gender and/or satisfaction and/or computer experience and/or socioeconomic status on the employees' learning achievement in the Taiwanese manufacturing industry. The Bonferroni approach control for Type I error across the correlations. The descriptive statistics for these test scores are presented in Table VIII.The correlation between satisfaction and computer experience was significant, r (27)=. 603.The correlation between socioeconomic status and satisfaction was significant, r (27)=. 541. Results revealed there is a significant relationship between satisfaction and self-efficacy, r (27)=. 946; r (27)=. 902. (See Figure 1 and 2). The correlation between gender and socioeconomic status was no significant, r (27)=-.077. Results revealed there is no significant relationship between gender and self-efficacy, r (27)=-.078; r (27)=-.198. The correlation between computer experience and socioeconomic status was significant, r (27)=. 620. Results revealed there is no significant relationship between socioeconomic status and self-efficacy, r (27) =. 497; r (27) =. 461.

TABLE VI
INDEPENDENT T-TEST OF SATISFACTION SCORES FOR EMPLOYEES BY GROUP

Group	N	Mean	SD	F	p
Experimental	14	87.57	6.58	1.91	.693
Control	13	88.46	4.78		

TABLE VII
ONE-WAY ANOVA OF SATISFACTION SCORES FOR EMPLOYEES

Source	SS	df	MS	F	p
Group	5.341	1	5.341	.159	.693
Error	838.659	25	33.546		
Total	209932.00	27			

TABLE VIII
COLORATION OF COMBINED EFFECT SELF-EFFACACY AND/OR GENDER AND/OR SATISFACTION AND/OR COMPUTER EXPERIENCE AND/OR SOCIOECONOMIC STATUS FOR EMPLOYEES

Factors	OTSES	SETCL	Gender	CE	SS	Satisfaction
OTSES			-.078	.511	.497	.946
SETCL			-.198	.559	.461	.902
Gender	-.078	-.198		-.172	-.077	-.053
Computer Experience(CE)	.511	.559	-.172		.620	.603
Socioeconomic Status(SS)	.497	.461	-.077	.620		.541
Satisfaction	.946	.902	-.053	.603	.541	

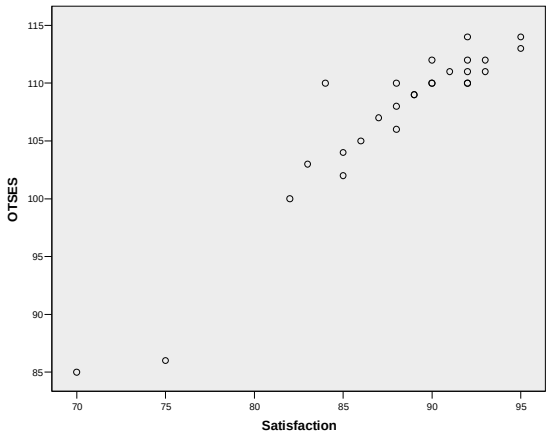

Figure 1

Slopes between Satisfaction and OTSES of Employees

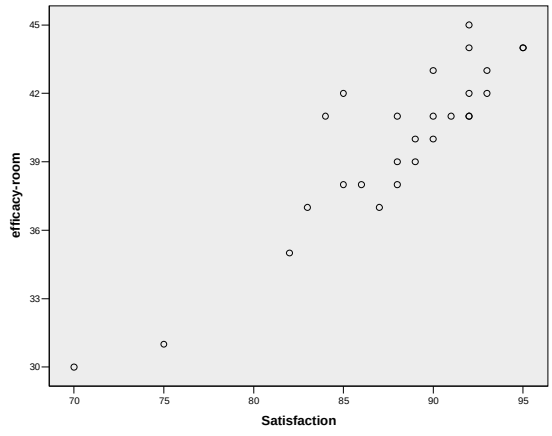

Figure 2.

Slopes between Satisfaction and Self-Efficacy Toward Classroom Learning of Employees

V.DISCUSSION

Results of Hypothesis One indicated that there was no significant difference in learning achievement between employees who received online distance-learning instruction and employees who received face-to-face instruction. The achievement pretest revealed no statistically significant difference between two groups. The statistics showed that the groups had equivalent ability in the beginning of this training program. The findings supports several previous studies conducted by Lockyer et al., and Clark , which indicated that there is no significant difference between distance-learning instruction and face-to-face instruction [5,18].

Results of Hypothesis Two indicated that there is no significant difference in employees' learning achievement between gender, employees' experience of using computer, and socioeconomic status for employees who receive online distance-learning instruction and employees who receive face-to-face instruction. Data showed that there was no statistically significant difference between gender, employees' experience of using computer and socioeconomic status of employees and learning achievement. This finding, which is opposite of what Meelissen and Drent found, are a relatively small sample size and the short-term training program. A relatively sample size is a possible reason for this finding [19].

Results of Hypothesis Three indicated that there is a significant relationship in employees' learning achievement and self-efficacy between employees who received online distance-learning instruction and employees who received face-to-face instruction. The results showed a statistically significant positive relationship between employees' learning achievement score and self-efficacy scores (Self-Efficacy Scale (OTSES) and Self-Efficacy Toward Classroom Learning). The self-efficacy score had an effect on employees' learning achievement scores. It might be inferred that employees who had higher self-efficacy scores than the other employees tended to achieve higher learning achievement scores by the end of the training program. The findings support several previous studies [2,14,12,24], in which a positive relationship between self-efficacy and employees' learning achievement was found the higher employees' self-efficacy, the greater the possibility of higher employees' leaning achievement at the end of the training program. Researcher accepted the research hypothesis.

Results of Hypothesis Four indicated that there is no significant difference in satisfaction between employees who received online distance-learning instruction and employees who received face-to-face instruction. Results of the analysis revealed no statistically significant differences in satisfaction between two the groups. Although the mean difference in satisfaction scores was not statistically significant, the satisfaction scores for the control group were slightly higher than those of the experimental group. This finding, which is opposite of what Sahin and Drennan, Kennedy, and Pisarski found, are a relatively small sample size and the short-term training program [9, 23].

Results of Hypothesis Five indicated that there is a significant combined effect of self-efficacy and/or gender and/or satisfaction and/or computer experience and/or socioeconomic status on the employees' learning achievement in Taiwanese manufacturing industry.

Results from data organized revealed there was a significant relationship between satisfaction and self-efficacy. The correlation between satisfaction and computer experience was significant. The correlation between socioeconomic status and satisfaction was significant. The correlation between gender and socioeconomic status was no significant. Results revealed there is no significant relationship between gender and self-efficacy. The correlation between computer experience and socioeconomic status was significant. Results revealed there is no significant relationship between socioeconomic status and self-efficacy. The findings showed satisfaction has a positive relationship with self-efficacy supported by Lim, computer experience and socioeconomic status supported by Meelissen and Drent [15, 19]. It might be inferred that employees who have higher self-efficacy, computer experience and socioeconomic status have higher satisfaction with instruction. The results also inferred that employees who have higher level of socioeconomic status have more computer experience. There are two possible factors contributing to this finding: a sample size and the other short-term training program.

VI. CONCLUSIONS

This study referred that the importance of the way in which technology is employed in the design the curriculum to meet learners' needs. The use of online distance learning in training has had a great impact on learners. Understanding the self-efficacy for learners may allow distance educators and training developers to develop and consider strategies that better meet the learners' needs. This study could provide the basis for better understanding the needs of distance learners and lead to the design and the development of more effective distance-learning environments. The outcome of this study has widespread implications for educational institutions and individualized instruction.

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