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EFFECTIVENESS OF WEB-BASED TRAINING COMPLIANCE WITH SEAFARERS INTERNATIONAL TRAINING CONVENTION

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Key words: web-based training, e-learning, seafarer training, STCW training, digital training.

ABSTRACT

There is a rapidly growing demand for training courses in navigation safety; however, seafarers cannot simultaneously work onboard and attend onshore training courses. Therefore, the International Maritime Organization (IMO) set up digital training conventions in 2010 to speed up the waiting time for training courses. The IMO continues to include additional complimentary courses and certificates in training programs. This study proposes that web-based learning should be adopted to fulfill the requirements of the IMO Standard on Training, Certification and Watchkeeping for Seafarers (STCW) training convention standards for seafarer training. The goal of this research is to explore whether web-based training is effective and complies with STCW regulations. It examines web-based training using a quasi-experiment with t-test evaluation, to reveal that digital training is an effective learning method. Based on the results of this study, it is recommended that the corresponding IMO member training organizations should immediately make e-learning policies feasible for seafarers, in order to satisfy training needs and thus make it possible for seafarers to efficiently invest their leisure time.

I. INTRODUCTION

As considerable attention has been drawn to environmental protection, international regulations and safety issues have been growing in relative importance. Seafarers constantly have to attend training programs to meet international standards of safe navigation and environmental protection. Accordingly, the International Maritime Organization (IMO) set up the International Convention Standard on Training, Certification and Watchkeeping for Seafarers (STCW) to satisfy these training demands.

The STCW was first established in 1978, and the current version for digital learning was revised in 2010. This research of digital training for seafarers is based on the model course of STCW 78/10.

As the IMO adds complimentary competence regulations over time, the need for seafarers to recurrently renew their certificates so as to comply with the convention makes onshore training a time-consuming task for seafarers.

For example, the current STCW 2010 convention has added to the deck department a number of compulsory certificates that were not required in the STCW 95, including Security awareness, Basic safety, the Electronic Chart Display and Information System (ECDIS), Bridge Resource Management (BRM), Application of leadership and team working skills, and several other courses. All seafarers are required to complete an approved certificate by 2014 to 2017, depending on the course; i.e., all seafarers and maritime students must complete training in the new courses to receive STCW 2010 certificates (IMO, 2010). As there is an urgent need for seafarers to occasionally renew their certificates, the time-consuming onshore training has an enormous impact on both them and their employers.

Furthermore, the staff of training facilities must be repeatedly trained and re-evaluated once the new courses come out (Ng et al., 2011). Those who work onshore may attend onshore training programs scheduled after work or during holidays. However, it is impracticable for seafarers to take onshore training courses when they are working at sea. Consequently, seafarers cannot help but delay onshore training courses until their work contracts expire or they have disembarked on short vacations. Moreover, seafarers must spend extra costs on food, lodging and transportation while attending these courses. For shipping companies, human resources at sea need to be adjusted to allow all contracted seafarers to receive training before the completion date of the STCW 2010. If training is unavailable due to long queues or other reasons, many seafarers may have no choice but to give up their career at sea and transfer to shore-based work. This causes a loss of maritime assets and wasting years of dedicated seafaring training. As a result, dependence on foreign

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seafarer is inevitable for shipping companies (Inoue, 2011).

One possible solution for these problems is e-learning. The terms e-learning, web-based learning, online learning, digital learning, and distance learning are widely used in an interchangeable manner (Moore et al., 2011). However, e-learning consists of learning activities specifically involving computer networks; it is not merely distance learning. Web-based learning has disadvantages: students feel isolated from the instructor and there is no interaction between them. Research emphasizes effective web-based learning for the crew, since online learning has become very widespread. Training and drills during a voyage can further reduce accidents. For some IMO members, also, vacancies at training centers are limited; this causes long queues for training courses, especially when STCW completion dates draw near. With long waits for training courses, which can reach over a year and a half, some seafarers may switch to work on land due to financial situation from their family. This is particularly true for marine engineers, who can easily apply their skills on land and thus have more opportunities to switch jobs; however, deck officers alike tend to have harder times finding on-land jobs due to the nature of their proficiencies. If they also have to wait long periods for a particular training course, then their financial lives will be devastated. Each year, there are serious shortages of qualified seamen on the market. If the training queues can be reduced by digital learning, this will help rectify the serious shortage of seafarers on deck and in the engine room (Leggate, 2004; Wang and Chung, 2007).

On the other hand, seafarers have plenty of leisure time after duty hours while navigating at sea. Those hours can add up to a vast amount of learning time during one contract. If seamen's leisure time can be used for certified training, then not only can the seafarers improve their professional skills, but the companies which need to arrange onshore training for their seamen can also benefit.

Based on the above factors, this paper presents a practical study of asynchronous training from the viewpoints of seamen both at sea and in onshore maritime school training facilities. IMO members and shipping companies can take the results of this study into account and draw from them the further implication that there is a practical need to reduce the waiting times for training of seamen during vacation time. The objective of this study is to investigate whether digital training is effective with the STCW 2010 regulations. As merchant ships travel for long periods at sea, assistance from land is difficult to acquire and the professional judgment of the officers responsible is required in all situations (Harwood and Farrow, 2008). This emphasizes just how important the professional skills of such seamen are. This study explores the results of digital STCW professional learning courses. How are the learning effects of traditional onshore training and digital learning different? Should the training courses for the STCW be digitized in the future?

This study extends the work of Piccoli and Tarhini (Elida et al., 2012; Tarhini et al., 2013), using their methods and combining them with training courses for the STCW 2010 to learn the associated efficiency and benefits. The experimental results show that there is the same learning effect between the traditional classroom and web-based training. Given these results, maritime-related organizations should develop feasible digital learning.

II. REGULATIONS AND PAPER REVIEW

1. International and Domestic Laws and Regulations

IMO has set up international regulations related to maritime practices. In 2010, the IMO passed the STCW amendment in Manila, adding new regulations for Security awareness, Basic safety, BRM, ECDIS, and Application of leadership and team working skills. In section B-I/6 of the STCW regulations, the party countries are allowed to use digital technology for the remote teaching of seamen (IMO, 2010). International recognition of the rationality of distance education and e-learning has been included in the STCW 2010 amendment. Section 6-12 of section B-I/6 was revised and relevant norms and guidelines were established; specifically, article 12 and the sixth item in section B-I/6 state that e-learning can be certified by each contracting state. The IMO 2010 Manila Amendments regarding training and assessment and the use of distance learning and e-learning are shown in Appendix A.

In section B-I/6 of the STCW 2010 Convention, articles 6-11 set-up guides for remote education and digital learning. According to articles 6 and 12, digital learning courses must be certified by a Bureau of Shipping. Thus, IMO has recognized the legal qualifications of seamen trained via remote education.

In this study, the experiment courses fulfill article 7 of section B-I/6, being provided by an entity recognized by a party to the convention. The design of the experiment should fulfill articles 8, 9 and 10, and the efficacy check should fulfill article 11. According to Articles 6 and 12, National Taiwan Ocean University (NTOU) can provide seaman training courses by the authority of Bureau Veritas of France (BV). However, seamen under the laws of local governments should comply with corresponding government standards while working on a ship. Through asynchronous digital training, seamen can receive training during a voyage. Doing so lowers waiting times for training and allows shipping companies to avoid extra expenses during training periods.

2. Related Studies

Shipping companies can utilize remote training material and courses to meet the needs of onboard crewmen. Company policies should include onboard training courses to sharpen the skills of crewmen, thus further lowering chances of disasters and reducing the employee turnover. With onboard training, seamen can improve the skills and knowledge needed in their proficiency, something also related to future promotions (Håvold and Nesset, 2009; Ng et al., 2011).

Researchers have confirmed that there is the same learning effect in the effectiveness of learning basic skills using traditional teaching methods and using e-learning, and that the e-learning environment enables students to have higher self-efficacy (Piccoli et al., 2001). Experiments do not provide enough signs to judge

Table 1. Summary of STCW courses offered by the NTOU Crew Training Center.

Training Course Title	Subject course	Technical course (simulation)	Technical course (not simulation)
Proficiency in survival craft and rescue boats	○		○
General operator's certificate for GMDSS	○		○
Radar navigation, radar plotting and use of ARPA	○	○	
Radar, ARPA, bridge teamwork and search and rescue	○	○	
Basic training for oil and chemical tanker cargo operations	○		
Advanced training for oil tanker cargo operations	○		○
Advanced training for chemical tanker cargo operations	○		○
Basic training for liquefied gas tanker cargo operations	○		○
Advanced training for liquefied gas tanker cargo operations	○		○
Ship security officer	○		
Leadership and bridge resource management	○	○	
Leadership and engine room resource management	○	○	
Electronic chart and information display systems	○	○	
Security training for seafarers with designated security duties	○		
Medical first aid	○		○
Medical care	○		○
Ro-ro passenger ships	○		○
Passenger ships safety training	○		○

○ Means that the curriculum includes a training project.

whether traditional teaching or e-learning is better, but they do show that students have higher self-efficacy in e-learning (Glogger-Frey et al., 2015; Van der Kleij et al., 2015). According to Khalifa and Lam, the e-learning environment has a superior effect on the learning process and learning performance. They also show that a diversified curriculum has a positive impact on the effectiveness of online learning (Khalifa and Lam, 2002; O´Malley, 2012).

According to many researchers, users' learning attitudes directly affect self-efficacy, and e-learning can improve both self-efficacy and self-learning ability (O´Malley, 2012; De Corte et al., 2013). Scholars have also pointed out that most students are positive and satisfied with online learning (O´Neil and Perez, 2006). In 2001, several companies in the United States began using computer training courses for crew basic training (Jr and Dumbleton, 2001). Non-synchronous learning is when an e-learner can log in and learn at any time and any place, and can use e-mail, discussion boards, message boards or chat rooms to ask questions about the course (Van Laere et al., 2014; Nguyen et al., 2016).

Research shows that the attitude of the e-learner will affect corresponding satisfaction (Torkzadeh and Van Dyke, 2002), and that the ease of e-learning environments can promote satisfaction and self-learning. Most students are positive towards and satisfied with online network learning.

III. METHOD

At present, all STCW training courses for crew members include subject courses and technical courses. The learning methods for subject courses can be directly used for non-synchronized computer training, and the training courses, such as Ro-ro passenger ship training and Ship security officer training, belong to the subject knowledge of training courses and can thus be carried out directly through the use of non-synchronized computer training. Most STCW training courses will also require a certificate of competency after operational simulation. Some of the courses that require operational simulation can make use of analog systems. These include Radar navigation, radar plotting and the use of ARPA, ECDIS, and Leadership and bridge resource management. However, some STCW training courses are not able to use the simulation system for training when it is necessary to implement operational simulations. These include Basic training, Medical first aid, General operator's certificate for GMDSS, Basic training for oil and chemical tanker cargo operations, etc. The STCW training courses flowchart by e-learning as shown in Fig. 1.

There are many long, time-consuming training courses for the crew. Most training courses require an internship on board before the certificate of competency can be issued. Table 1 summarizes the STCW subject and technical courses offered by the NTOU Crew Training Center.

The summary of STCW training courses in Table 1 shows whether technical courses are suitable for e-learning. This study chooses "medical first aid", which is not required for navigation experience and is certified by each crew as an experimental course. The medical first aid course covers basic emergency and medical care. After completing it, all qualified crew mem-

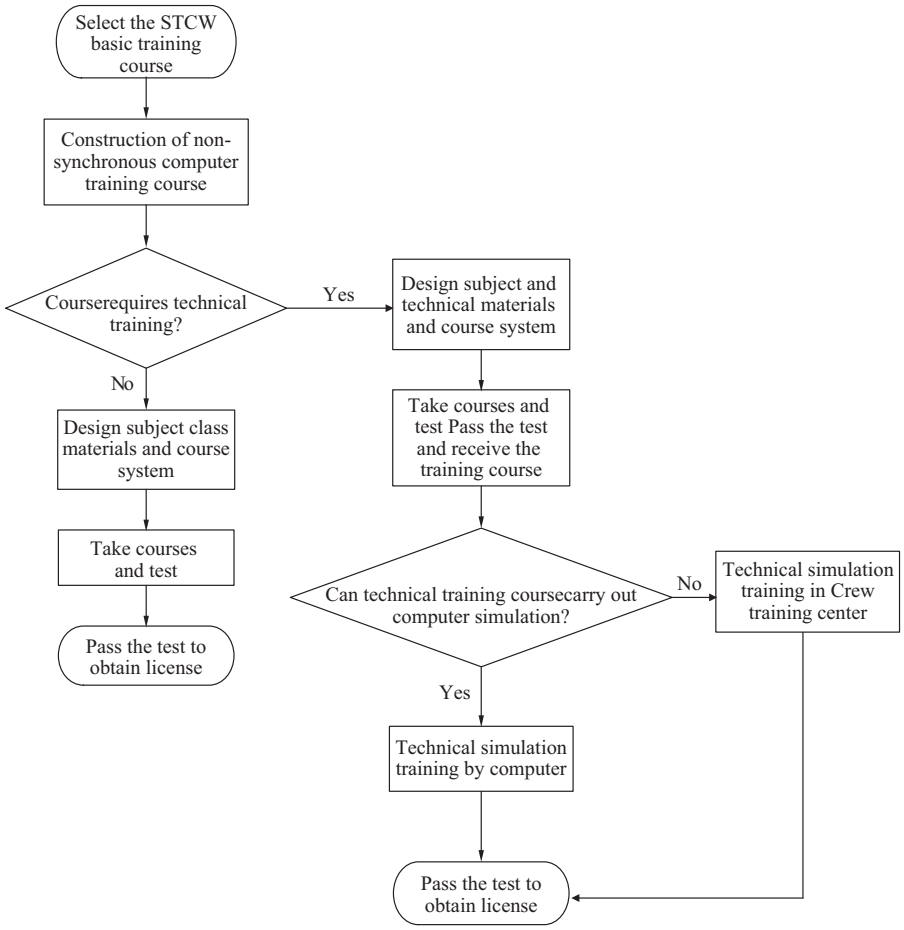

Fig. 1. Flowchart of web-based learning for STCW training courses.

bers who have obtained a certificate of competency are required to take courses. The training course consists of subject and technical sections. For testing purposes, this study considered only about eight hours of the subject courses.

1. Design of the Experiment

This study is an experiment using random analysis. It utilizes variations on the same question, placed in different versions of the examination presented to the learner, so as to avoid the effects of the examination being taken consecutively in short periods of time. This study adopts this approach for the training course "Elementary first aid", which is a mandatory course for all maritime university students, to further analyze the results of such experiments.

2. Research Samples

Conducted in the year 2017, this study uses 38 people as test samples, with 31 males and 7 females. The traditional group includes 18 males and 2 females who take traditional courses, whereas the web-based group includes 13 males and 5 females, who use asynchronous courses as an alternative.

3. Experiment Platform for Digital Learning

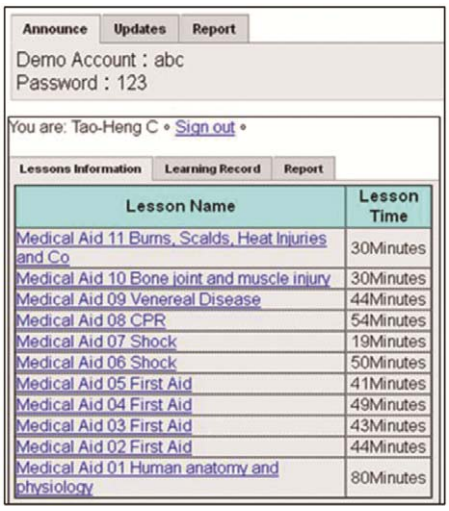

Fig. 2. Log-in screen of asynchronous teaching system.

An asynchronous teaching system is set up in a self-constructed platform rather than in the general Moodle (Modular Object-Oriented Dynamic Learning Environment) digital learning platform. The platform for this study adopts PHP programming

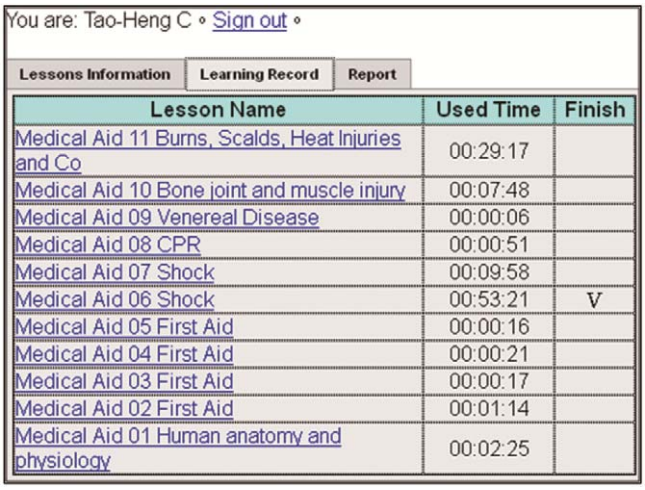

Fig. 3. Learning progress for various lessons.

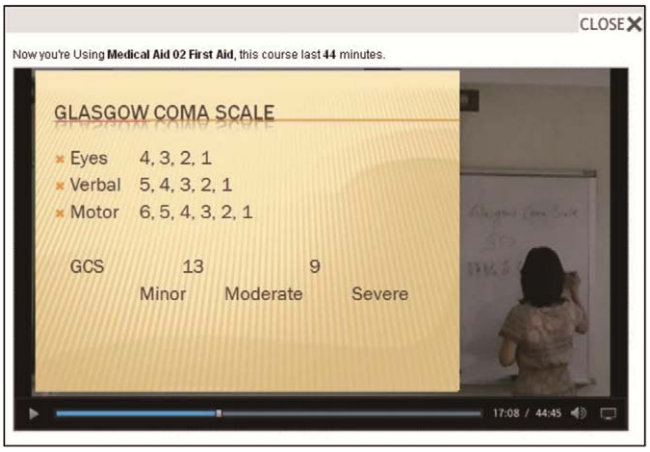

Fig. 4. Screen being watched-1.

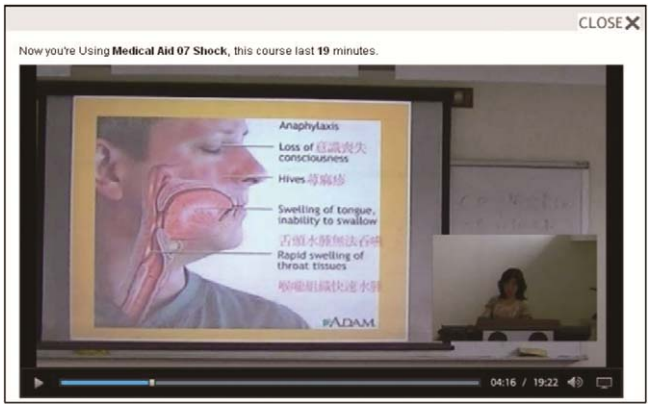

Fig. 5. Screen being watched-2.

Learning Record | Detail Record | Report

Account	Lesson ID	Start Time	End Time	Used Time
abc	28	2017-Aug-03(Thu) 15:46:22	2017-Aug-03(Thu) 15:46:38	00:00:16
abc	29	2017-Aug-28(Mon) 13:02:06	2017-Aug-28(Mon) 13:03:50	00:01:44
abc	34	2017-Oct-01(Sun) 16:43:22	2017-Oct-01(Sun) 16:52:09	00:08:47
abc	29	2017-Oct-01(Sun) 16:02:57	2017-Oct-01(Sun) 16:53:09	00:51:02
abc	24	2017-Oct-04(Wed) 10:10:03	2017-Oct-04(Wed) 10:11:55	00:01:52
abc	33	2017-Oct-04(Wed) 12:11:51	2017-Oct-04(Wed) 12:12:13	00:00:22
abc	34	2017-Oct-05(Thu) 23:51:04	2017-Oct-05(Thu) 23:51:14	00:00:10
abc	30	2017-Oct-06(Fri) 09:25:59	2017-Oct-06(Fri) 09:26:10	00:00:11
abc	26	2017-Oct-07(Sat) 15:52:52	2017-Oct-07(Sat) 15:53:09	00:00:17
abc	34	2017-Oct-26(Thu) 13:00:04	2017-Oct-26(Thu) 13:00:04	00:00:00
abc	33	2017-Oct-26(Thu) 13:00:11	2017-Oct-26(Thu) 13:01:51	00:01:40
abc	33	2017-Oct-26(Thu) 15:46:33	2017-Oct-26(Thu) 15:48:50	00:02:17
abc	31	2017-Nov-18(Sat) 16:29:10	2017-Nov-18(Sat) 16:29:16	00:00:06
abc	30	2017-Nov-18(Sat) 16:33:52	2017-Nov-18(Sat) 16:34:07	00:00:15
abc	24	2017-Dec-06(Wed) 21:24:37	2017-Dec-06(Wed) 21:25:44	00:01:07
abc	25	2017-Dec-06(Wed) 21:25:48	2017-Dec-06(Wed) 21:27:19	00:01:31
abc	25	2017-Dec-06(Wed) 21:27:38	2017-Dec-06(Wed) 21:27:59	00:00:21
abc	33	2018-Mar-14(Wed) 12:54:12	2018-Mar-14(Wed) 12:56:52	00:02:40
abc	34	2018-Mar-14(Wed) 12:56:58	2018-Mar-14(Wed) 13:09:17	00:12:19
abc	30	2018-Mar-14(Wed) 14:00:42	2018-Mar-14(Wed) 14:17:47	00:17:05
abc	33	2018-Mar-14(Wed) 15:25:49	2018-Mar-14(Wed) 15:25:55	00:00:06
abc	34	2018-Mar-14(Wed) 15:26:20	2018-Mar-14(Wed) 15:26:21	00:00:00

Fig. 6. System of learning record.

languages in conjunction with the MySQL operation interface and data bank designs; it uses Adobe Flash Media Server to record the students' learning time, which allows it to avoid pausing the streamed video and offers one-time-only use of a single training course video. Fig. 2 and Fig. 3 show the directory screen.

Fig. 2 shows the log-in screen of this asynchronous teaching system and the screen after logging in; they contain the names of the lessons and the length of time of each lesson. Fig. 3 shows that the system will record how the various lessons were learned. The screen shows the course names and the time spent on each lesson, and students can easily decide whether to continue the lesson within a chosen time.

Fig. 4 and Fig. 5 show the screen being watched, using the lantern function of jQuery. Fig. 4 shows the case where the contents of the whiteboard are electronic, and Fig. 5 shows the case where a screen picture is attached.

Fig. 6 shows the recording results of the system. As one can see, time is captioned in bold, showing that there are overlapping records of simultaneous learning. This may be caused by opening more than one video course at the same time and can be deleted in the data bank to avoid improper usage. This will further increase watching credit for the user.

4. Design of Material

The contents of the experiment material are practical courses taught in the crew training center of NTOU. It is recorded to a streamed film via image process programs for the student to view on the network. The recorded training course in this experiment is the STCW course "Medical first aid." The complete training period for this certified course is 16 hours, including technical practice and theoretical classes. The experiment in this study only contains the 8-hour theoretical classes for the subject, due to the fact that technical practices cannot be evaluated in a streamed form unless further video and recording equipment technology is used. For example, technical CPR practices cannot be properly evaluated unless every ship has the right training equipment and is evaluated by qualified instructors via streamed networks.

"Elementary first aid" is a compulsory course for department of merchant marine students at NTOU. After proper training

Table 2. Group Statistics.

	Group	N	Mean	Std. Deviation	Std. Error Mean
Elementary first aid	Traditional Group	20	78.05	6.411	1.434
	Web-based group	18	79.11	5.940	1.400
Medical first aid	Traditional Group	20	68.60	6.353	1.421
	Web-based group	18	72.89	6.893	1.625

Table 3. One-Sample Kolmogorov-Smirnov Test.

		Elementary first aid	Medical first aid	diff
N		38	38	38
Normal Parameters a, b	Mean	78.55	70.63	7.92
	Std. Deviation	6.132	6.875	8.483
Most Extreme Differences	Absolute	.090	.140	.123
	Positive	.061	.102	.116
	Negative	-.090	-.140	-.123
Kolmogorov-Smirnov Z		.555	.866	.756
Sig. (2-tailed)		.918	.442	.618

[a.] Test distribution is Normal.
[b.] Calculated from data.
If $P \leq 0.05$, the result is significant.

(both technical practice and theoretical classes), one can achieve a competence certificate for the course. The examination questions used in this test are derived from those asked by the instructors teaching the subject and used to evaluate the outcomes of the course.

5. Analysis Method

Before analyzing the continuous variation test data, one must use statistical measures of central tendency and dispersion to describe the characteristics of such variable data, in addition to sorting it out with number distribution. Therefore, analysis and evaluation of the continuous variation is generally related to testing means and variances.

There are different methods of determining the mean value of test methods, depending on whether the mother group deviation is known. Since the deviation of the mother group is not clear, sample deviation is required to estimate the deviation of the mother group and get the t-value. Since the t-test varies depending on the degree of freedom, the t distribution will be similar to the Z distribution when the number of samples is bigger than 30. Thus the t-test will cover the range of the Z-test (Siegel and Castellan Jr., 1988; Gibbons and Fielden, 1993).

After analyzing the experiment, comparing t-test evaluations for previous, similar variations can determine whether the learning efficiency of digital remote learning is different from that of traditional classroom learning methods. The software used for this analysis is the IBM SPSS Statistics 19.

IV. COMPARISON RESULTS

Many researchers use t-test to analyze the results of e-learning and traditional learning, and the results obtained are confirmed by all parties (Harwood and Farrow, 2008; Tseng et al., 2011; Bazelais and Doleck, 2018; Hwang et al., 2018). In the analysis of the mean test, two means are obtained from two samples (traditional group and web-based group) in Table 2. In addition to the sample distribution, which must be normalized, the difference of the two mean samples should also fulfill the presumption of normalized distribution. From Table 3, we can see in the Kolmogorov-Smirnov (K-S) experiment that the values of Z are 0.555, 0.866 and 0.756; and the values of P (double tail gradual obviousness) are 0.918, 0.442 and 0.618. As they are all bigger than 0.05, the test distributions are theoretically normal distributions, and t-test methods can be used to analyze the samples.

In Table 4, one can see that the significance of the Levene evaluation, with an assumption of equal variances, is 0.743 and 0.458. Both are bigger than 0.05, thus one can assume the variances are equal. Therefore, the t-test of this column is taken here. The (2-tailed) significance is 0.601 and 0.054; both are larger than 0.05, meaning they have not reached significant standards for evaluation. One can deduce that there is the same learning effect in the abilities of students who take "Elementary first aid" with similar variations on questions, and that there is no obvious difference in efficacy between the traditional (traditional teaching) and the web-based group (asynchronous training).

In the Table 4, t-test examinations show that there is the same learning effect between students in the two different learning environments. This further indicates that students using asynchronous digital remote training can comply with IMO STCW

Table 4. Independent Samples Test.

		Elementary first aid		Medical first aid	
		Equal variances assumed	Equal variances not assumed	Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	.109		.562	
	Sig.	.743		.458	
T-test for Equality of Means	t	-.527	-.530	-1.996	-1.987
	df	36	35.963	36	34.754
	Sig. (2-tailed)	.601	.600	.054	.055
	Mean Difference	-1.061	-1.061	-4.289	-4.289
	Std. Error Difference	2.012	2.004	2.149	2.158
95% Confidence Interval of the Difference	Lower	-5.142	-5.125	-8.647	-8.671
	Upper	3.020	3.003	.069	.094

standards and shows that the students with asynchronous computer training are able to acquire the same competence after learning.

V. CONCLUSION

The design of this study is based on training courses which comply with the International Convention of STCW 2010. Training centers need to classify which STCW courses are suitable for e-learning. The experimental results show that there is the same learning effect between the traditional classroom and web-based training. It is recommended that corresponding IMO member training organizations immediately make e-learning websites for class lessons such as Security awareness and Basic safety, in order to make full use of seafarers' time. In future, relevant organizations can use the conclusions of this study as a basis for formulating policies. The results also suggest that, to further investigate whether the efficacy of academic and practical learning is identical, future studies of asynchronous digital training can be extended to digital simulation platforms for navigation instrument uses, such as training in the "Electronic Chart Display and Information System" and in "Automatic Radar Plotting."

APPENDIX A

The Manila Amendments to the Seafarers' Training, Certification and Watchkeeping (STCW) Code Part A, provides the recommended guidance provisions regarding the use of distance learning and e-learning, and training by distance learning and e-learning as follows:

1. Section B-I/6

Guidance regarding training and assessment

2. Qualifications of Instructors and Assessors

Each Party should ensure that instructors and assessors are appropriately qualified and experienced for the particular types and levels of training or assessment of competence of seafarers, as required under the Convention, in accordance with the guidelines in this section.

3. In-Service Training and Assessment

(1) Any person, on board or ashore, conducting in-service training of a seafarer intended to be used in qualifying for certification under the Convention should have received appropriate guidance in instructional techniques*.

(2) Any person responsible for the supervision of in-service training of a seafarer intended to be used in qualifying for certification under the Convention should have appropriate knowledge of instructional techniques and of training methods and practice.

(3) Any person, on board or ashore, conducting an in-service assessment of the competence of a seafarer intended to be used in qualifying for certification under the Convention should have:
   1. Received appropriate guidance in assessment methods and practice*; and
   2. Gained practical assessment experience under the supervision and to the satisfaction of an experienced assessor.

(4) Any person responsible for the supervision of the in-service assessment of competence of a seafarer intended to be used in qualifying for certification under the Convention should have a full understanding of the assessment system, assessment methods and practice.

4. Use of Distance Learning and E-learning

Parties may allow the training of seafarers by distance learning and e-learning in accordance with the standards of training

[1] The relevant IMO Model Course(s) may be of assistance in the preparation of courses.

and assessment set out in section A-I/6 and the guidance given below.

5. Guidance for Training by Distance Learning and E-learning

Each Party should ensure that any distance learning and e-learning programme:

(1) Is provided by an entity that is approved by the Party;
(2) Is suitable for the selected objectives and training tasks to meet the competence level for the subject covered;
(3) Has clear and unambiguous instructions for the trainees to understand how the programme operates;
(4) Provides learning outcomes that meet all the requirements to provide the underpinning knowledge and proficiency of the subject;
(5) Is structured in a way that enables the trainee to systematically reflect on what has been learnt through both self assessment and tutor-marked assignments; and
(6) Provides professional tutorial support through telephone, facsimile or e-mail communications.

Companies should ensure that a safe learning environment is provided and that there has been sufficient time provided to enable the trainee to study.

Where e-learning is provided, common information formats such as XML (Extensible Markup Language), which is a flexible way to share both the format and the data on the World Wide Web, intranets, and elsewhere, should be used.

The e-learning system should be secured from tampering and attempts to hack into the system.

6. Guidance for Assessing a Trainee's Progress and Achievements by Training by Distance Learning and E-learning

Each Party should ensure that approved assessment procedures are provided for any distance learning and e-learning programme, including:

(1) Clear information to the trainees on the way that tests and examinations are conducted and how the results are communicated;
(2) Have test questions that are comprehensive and will adequately assess a trainee's competence and are appropriate to the level being examined;
(3) Procedures in place to ensure questions are kept up to date;
(4) The conditions where the examinations can take place and the procedures for invigilation to be conducted;
(5) Secure procedures for the examination system so that it will prevent cheating; and
(6) Secure validation procedures to record results for the benefit of the Party.

7. Register of Approved Training Providers, Courses and Programmes

Each Party should ensure that a register or registers of approved training providers, courses and programmes are maintained and made available to companies and other.

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