

# Certification of e-Learning Courseware Quality: Case Studies in Taiwan

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## 1. Research Background

Monitoring the e-learning quality is an important approach to ensuring effectiveness of e-learning courseware. In the latest decades, many countries have put into great effort and resource on setting up an evaluation standard to e-learning quality. For instance, International Standard Organization (ISO) found a branch of SC36 to monitor e-learning standard. The United States also formed an organization, American Society of Training and Development (ASTD), to develop e-learning standards. In Europe, European Quality Observatory was established for promoting the quality of e-learning materials and environment.

In order to monitor the quality of e-learning effectively, many quality monitoring organizations have developed mechanisms to evaluate quality of e-learning materials. The evaluation results can not only serve as a reference for designing e-learning materials, they also can provide information about how learners think of the e-learning materials. For example, e-Learning Courseware Certification proposed by ASTD evaluates instructional designs based on online platforms, multimedia courseware, as well as un-synchronizing courseware. In addition, e-Learning Competency Centre (ECC), established by Singapore government, is another organization aiming to set up a standard of e-learning courseware quality for promoting e-learning development.

Although establishing a mechanism for certificating e-learning quality has become an important method to monitor and manage e-learning courseware, most current e-learning certifications place their emphasis on evaluating applications. Questions, such as what are the reliabilities and validities of the certificates and what are the executing effects, remain unclear. Since certificating e-learning quality plays a significant role on monitoring the quality of e-learning, researchers should not ignore the importance of the reliabilities and validities of certification systems. There are two purposes of this study. The first one is to introduce the current certification systems of e-learning courseware in Taiwan. Secondly, this study also aims to discuss the reliabilities of these certification systems.

## 2. Criteria and Certification Systems of e-learning service quality in Taiwan

In the year of 2002, Taiwanese government initiated National Science & Technology Program for e-Learning and established e-Learning Quality Service Center. Missions of the Quality Service Center include promoting and providing e-learning courseware as well as building up criteria and certification systems of e-learning quality. The center serves as an information provider, criteria formulator, criteria promoter, and certification provider. Through expert conference, focus groups, and expert discussion meetings, Quality Service Center formulated structures, content, and case studies for the criteria to evaluate e-learning quality. After that, Criteria of e-Learning Service Quality and Criteria of e-Learning Courseware Quality were announced to public in the year of 2004 (version 1.0). Since January 2005, the center also has provided service of e-learning quality certification. Promoting the criteria and certification service are the main tasks. Incorporating reward programs from e-Learning Network Science Park (<http://www.epark.org.tw/>), the center promotes development of high quality e-Learning by conducting quality service workshop, quality certification conference, training courses, quality counseling workshops, and certification service.

## 3. The Content of e-Learning Courseware Certification Criteria

There are four criteria in the certification system, including content, navigation, instructional design, and instructional media. Based on these four areas, the center then developed 15 standards. Under each standard, there are three assessment items used to evaluate e-Learning courseware. These criteria also serve as references for organizations who would like to select or develop e-Learning courseware. There are two types of standards: required and optional. For the required standards, the evaluated courseware might be rewarded seven points (pass three items), five points (pass two items), three points (pass one item). For the optional standards, the evaluated courseware might be rewarded six points (pass three items), four points (pass two items), two points (pass one item).

## 4. The Procedures and Levels of Courseware Quality Certification

The application procedures of e-learning courseware certification were divided into two stages: initial inspection and re-examination. Based on certification needs, e-learning courseware can apply for initial inspection. After the inspection, the passed courseware will be granted a certification logo based on its certification scores. Those which did not pass the initial inspection can revise their courseware, and then applied for re-examination within six months. In order to pass the certification, courseware has to

pass all of the required standards. Based on the scores from the 45 assessment items, a courseware will be granted an A level Certificate (60~74 points), an AA level Certificate (75~90points), or an AAA level Certificate (90~100 points). A certifying logo is also granted.

## 5. Subjects

In 2005 and 2006, the participants of this study included e-learning courseware producers from government, business, and schools. Each participating unit sent one to three pieces of courseware to be evaluated. There were 34 courseware evaluated by version 1.04, and 24 courseware evaluated by version 2.0. Among these 58 courseware, there were 20 pieces did not pass the initial inspection or were not qualified by the certification levels granted on the initial inspection. Therefore, 20 courseware were sent to be re-examination. As a result, there were total of 78 courseware included in this study.

## 6. Results

### 6.1 Courseware certifying results

In the version 1.04, 35.3% of courseware passed the initial inspection. Among which, the majority of courseware were rated AA (20.6%). A rating had 8.8%, and only 5.9% of the passed courseware were rated AAA. The pass rate of version 2.0 was 50%. There were six AA-level and six A-level courseware. For the re-examination, the pass rate of version 1.04 was 44.1%. Among which, AA courseware composed the largest portion (32.4%). There were four courseware rated A and four courseware rated AAA. Each made up 11.8%. In the version 2.0, 70.8% of the courseware passed the re-examination. 50% was rated AA, and 20.8% was rated A.

### 6.2 Item difficulty and discrimination

Using 44 courseware from initial inspection and re-examination in version 1.04 as the sample, the results indicated that the difficulty value of the most items (38%) were between .60 and .70. In general, 80% of the items had difficulty values higher than .50. Item 4.1.2 and item 4.2.2 even had difficulty values of 1.00. For the item discrimination, 65% of items had discrimination value higher than .020 meaning that most of the checking items were able to discriminate the qualities of the evaluated courseware.

For the version 2.0, there were 29 courseware (21 in initial inspection and 8 in re-examination) evaluated. The analyzing results showed that the majority of the items (24%) had difficulty values between .80 and .90. 78% of the items had difficulty values above .50. In the analyzing of item discrimination, 51% of the items had discrimination values higher than 0.20 representing that half of the checking items were able to discriminate the qualities of evaluated courseware. One item had negative discrimination value, and will be assessed the content further in future studies. On average, the difficulty and discrimination values of version 2.0 were .67 and .27.

### 6.3 Reliabilities

The reliabilities of e-learning courseware certification criteria were analyzed based on Generalizability theory. Generalizability coefficient and index of dependability were used to explain the results. In this study, analyzing model design adopted  $p \times (I: H)$  in which each courseware were evaluated by all checking items. Among which, different checking items were under different categories of concepts. In such design,  $p$  represented the evaluated courseware,  $I$  represented the standards, and  $H$  meant assessment items.

The results indicated the generalizability coefficient and index of dependability of 1.04 version were .72 and .67. Based on the scores of 29 courseware graded by 2.0 version, the results showed that the generalizability coefficient and index of dependability were .76 and .69. All of the indexes indicate that the standards for certifying the e-learning courseware have good quality.

## 7 Implications and Conclusions

Except for the quantitative analyses shown above, this study also interviewed six companies or courseware manufacturers for learning their experiences and comments on the certification system. The interviewed data were analyzed according to the grounded theory and 4 themes have been extracted from the data. From the themes and the quantitative data, there are several implications for the implementation of the certification system for e-learning courseware in Taiwan: 1. The certification system can serve as a valid and reliable gate-keeper of e-learning materials. 2. Most elearning courseware under the certification system demonstrated medium to high quality, especially after they revised the design and content according to the comments and suggestions of the reviewers. 3. Further studies should focus on investigating the substantial impacts of the certification system on the merchandisers/producers of those courseware as well as the mechanism for their improvement through such a system.