

**AC 2010-521: EVALUATING UNIVERSITY STUDENTS' WEB
COMMUNICATION COMPETENCY ON MULTIMEDIA APPLICATIONS AND
INFLUENTIAL FACTORS THROUGH INTERNATIONAL
INDUSTRY-ACADEMY COLLABORATION BY USING GLOBAL ACA
CERTIFICATION**

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Evaluating University Students' Web Communication Competency on Multimedia Applications and Influential Factors through International Industry-Academy Collaboration by Using Global ACA Certification

Abstract

Through international industry-academy collaboration with Certiport and Adobe Certified Associate (ACA), using data mining from ACA global score database, this study selected international ACA as a global standard tool to evaluate Northern Taiwanese university students' web communication competency in the domains of web design and multimedia applications, and furthermore to identify the influential factors of web communication competency. The results of this study will be used as references for industrial companies in planning and developing human resources and also for educational academies in cultivating university students' web communication competency. Two hundred and fifty-two sample participants from different departments of Kainan University in Northern Taiwan were tested by web communication domain which includes six authorized competency indicators: (a) setting project requirements, (b) planning site design and page layout, (c) understanding Adobe Dreamweaver interface, (d) adding content, (e) organizing content, and (f) evaluating and maintaining a site. The results indicated that there were significant differences between students of the Information Communications Department and those of other departments in the domain of web communication. Four competency indicators of planning site design and page layout, understanding Adobe Dreamweaver interface, adding content, and organizing content were detected, and the findings were that the IC Department students outperformed the others. The students' background variables on the influence of web communication competency were analyzed and results indicated that background variables such as age, experience using computers, and total credits of computer courses taken played significant roles in students' web communication competency.

Keywords: Industry-Academy Collaborate, Web Communication Competency, Information Literacy, Webpage, Adobe Certified Associate (ACA)

Introduction

The twenty-first century is an era that boasts a knowledge economy; whoever can quickly acquire the right information and transfer it into knowledge will be the biggest winner (Raman, Ryan, & Olfman, 2005)⁸. Universities are the main resources of superior manpower in Taiwan. It is important for modern Taiwanese university students to acquire basic technological competency in this rapidly expanding information age. Therefore, it is necessary to use a standard global platform to evaluate and compare the gap between Taiwan and other countries when it comes to university students' information competency; this evaluation could be the reference for both educational and industrial fields in Taiwan. There were three dimensions of motivation for this study: (a) most countries promote related information literacy education programs in order to equip their citizens with advanced information knowledge to imbue them with strong foundations of development in this information era (Hazzan, 2001)⁷, (b) the purpose of information technology is to educate users on how to search, check, and use the information and apply it to the world. It has also taught people how to solve a problem (Engstrom & Jewett, 2005)⁶. Also, informational education can use modern technology in educational development and aid university students in elevating their information literacy in order to adapt to the trends of global information construction, and (c) it is critical to understand Northern Taiwanese university students' ability to design webpage at the international standard base. Therefore, testing in a global standard platform will assist school administrators in establishing a justified evaluation model to evaluate Taiwanese university students' web communication competency (Dai, Lu, Rau, & Yeh, 2007)⁵.

There were many experts who performed researches to examine Taiwan's information competency from 1994 to 2005, but these researches only used questionnaires to investigate related topics (Dai, 2008)⁴. These kinds of studies lacked experimental evidences and global comparisons, and they failed to use the international standard platform to analyze and compare the data. Therefore, this study was designed to use the Adobe Certified Associate (ACA) (Certipoint, 2009)² as a global standard tool to evaluate Northern Taiwanese university students' web communication competency in the domains of web design and multimedia applications, as well as investigate influential factors such as gender, age, experience using computers, and total credits of computer courses taken. This study will be used as a reference for industrial companies in planning and developing human resources, and for the educational administration of Taiwan in cultivating university students' web communication competency in order to elevate superior manpower's web communication competency to meet the international standard and increase international competency.

Review of Literature

It is the right of the world's citizens to acquire and make use of information. So, the priority of information and communication technology education is to foster self-learners who can acquire information in a learning society (WSIS, 2006)⁹. For this purpose, every country has added webpage design courses to the curricula of web communication competency in order to develop students' knowledge of integrating information (Bereiter, 2002)¹. The United Nation (U.N.) has promoted the Power Users of Technology project to transform web communication competency into one of the key technology indicators for every country in the twenty-first century (Dai, 2008)⁴.

This study specifically focused on using the triangular international academia-industry collaboration model, which targets the academic field, industrial field, and international certification field to analyze, compare, and evaluate Taiwanese university students' performance, based on an international standard platform.

In the academic field, university education should teach students not only basic theoretical concepts and basic abilities but also should educate them for industrial needs in order to prepare the students for their careers (Chaffanjon, 1994)³. Industry-university collaboration is based on integrating university teaching resources and industrial technical resources to reach the goal of developing technologically-skilled professionals (Engstrom & Jewett, 2005)⁶.

Recently, the academic and industrial fields in Taiwan have reached a consensus which indicates that international industry-university collaboration is certainly an efficient partnership model to follow in order to cultivate highly-skilled, quality manpower for Taiwan. Furthermore, the results of these related researches can be shared by the academic, industrial, and international certification fields and can provide research value on an international level.

The transformation of society and the rapid expansion of information technology have created a global educational revolution. Thus, information and communication technology education should not only be preserved to instill knowledge and help students utilize their skills, but also to develop higher levels of web communication competency (Dai, 2008)⁴.

To sum up, web communication competency is already one of the most critical professional abilities for every university student. However, there is still a lack of impartial tools that are recognized by the global standard and are validated in Taiwan to measure Taiwanese university students' web communication competency under global standards.

To help educators achieve these outcomes, Adobe has built course materials focused on career areas in web design, visual and print design, and digital video. These course materials correlate directly to specific Adobe Certified Associate certification objectives. Combined, these courseware materials and certifications provide powerful learning tools (Certiport, 2009)².

Adobe ACA has these objectives: (a) visual communication – the Photoshop application, (b) rich media communication – the Flash application, and (c) web communication – the Dreamweaver application. There are six authorized competency indicators and forty-two competency items for ACA’s Dreamweaver exams of web communication which are admitted by the International Society for Technology Education (ISTE). As noted in Table 1, the six competency indicators are as follows: (a) setting project requirements, (b) planning site design and page layout, (c) understanding Adobe Dreamweaver interface, (d) adding content, (e) organizing content, and (f) evaluating and maintaining a site. Total scores of these six competency indicators of web communication were 1,000 points. The minimum passing score was 630 points in this study, since the passing scores will periodically be adjusted dynamically, based on the total global examinees’ passing scores and could be used to assess students’ learning performance of web communication (Certiport, 2009)².

Table 1

The Six Authorized Competency Indicators for ACA’s Dreamweaver Exams

Objective	# of items	% of exam	Minimum required to pass
Setting project requirements	3	7%	630 (dynamic scores)
Planning site design and page layout	7	17%	
Understanding Adobe Dreamweaver interface	6	15%	
Adding content	7	17%	
Organizing content	11	27%	
Evaluating and maintaining a site	7	17%	

A leading global test center, Certiport, was established in 1997, and is the leading provider

of global, performance-based certification programs and services designed to enable individual success and lifetime advancement through certification. Certiport has been used by 128 countries and had been tested by more than seven million valid exams world-wide at the end of 2009. Certiport also has more than ninety thousand exams delivered monthly and is an exclusive worldwide administrator of the ACA program (Certiport, 2009)². Thus, Certiport is highly credible and was therefore used to examine university students' web communication competency in this study.

Methodology

This study included empirical data research methods and aimed to use international ACA as a global standard tool to evaluate Kainan University students' web communication competency in the domains of web design and multimedia applications and to identify influential factors of web communication competency. The students' background variables, such as gender, age, experience using computers, and total credits of computer courses taken to achieve web communication competency, were analyzed. The participants were 252 students enrolled in a four-year program in Kainan University, located in the county of Taoyuan, Northern Taiwan. To determine the learning performance of the web communication competency of the students, the researchers adopted ACA's Dreamweaver as an instrument that contains a worldwide and ISTE renowned test bank and used a global standard international certification center, Certiport, as the ability assessment platform. The total test time was fifty minutes and included forty-one tests for six authorized competency indicators of web communication; total scores were worth 1,000 points. The minimum passing score was 630 points and could be used to assess students' learning performance of web communication (Certiport, 2009)². The researchers administered all of the student tests.

Results

The students' background information variables are gender, age, total credits of computer courses taken, and experience using computers. Most of the participants (73%) majored in Information Communications and had previously taken computer courses. The ages of the students ranged from 18 to 23 years. The overall ratio of females to males was 6:4. Most of the subjects had basic computer skills and had some experience using the computer. In this regard, they were neither novice learners nor novice computer users.

Table 2 indicates that 125 (49.6%) of the participants in the Information Communications Department passed the Dreamweaver examination while 59 (23.41%) participants failed. This

means that the passing rate for the participants in the Information Communications Department of Kainan University was higher than the failure rate. In other departments of Kainan University, 33 (13.1%) of the participants passed the Dreamweaver examination while 35 (13.89%) participants failed. This indicates that the passing rate for the participants of other departments of Kainan University was lower than the failure rate.

As noted in Table 2, the overall passing rate for Kainan University students was 62.7%; the overall passing rate for global Dreamweaver examinees was 46.35%. This indicates that the passing rate for the participants of Kainan University was higher than the passing rate of worldwide Dreamweaver examinees.

Table 2

Number and Percentage of Participants by Web Communication Competency Exam

Subject	Global standard	Information Communications Department	Other departments	Total	
Dreamweaver	Pass	46.35%	125(49.60%)	33(13.10%)	158(62.7%)
	Fail	53.65%	59(23.41%)	35(13.89%)	94(37.3%)

Note. N = 252

An examination of Table 3 reveals that the differences in scores between the Information Communications Department and the other department participants in the “setting project requirements” category were examined by an independent *t* test. The result showed no significant difference between the means, $t = 1.06, p > .05$. This indicated that the “setting project requirements” competency indicator mean score of the Information Communications Department was not significantly different from other departments’ mean scores.

The differences in scores between the Information Communications Department and the other departments in the “planning site design and page layout” category were examined by an independent *t* test. The results produced a statistically significant difference, $t = 3.03, p < .05$. This indicated that the “planning site design and page layout” competency indicator mean score of the Information Communications Department was significantly higher than other departments’ mean scores.

The differences in scores between the Information Communications Department and the other departments in regard to the “understanding Adobe Dreamweaver interface” category were

examined by an independent *t* test. The result showed a significant difference between the means, $t = 2.62, p < .05$. This indicated that the “understanding Adobe Dreamweaver interface” competency indicator mean score of the Information Communications Department was significantly different from other departments’ mean scores.

Table 3

Independent t Test Results for the Information Communications Department and the Other Departments in Competency Indicator Score Means of Web Communication Competency

Competency Indicator	Department	n	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Setting project requirements	IC Department	184	28.48	1.75	1.06	.075
	Other departments	68	24.28	1.29		
Planning site design and page layout	IC Department	184	112.34	0.75	3.03	.000***
	Other departments	68	84.28	2.29		
Understanding Adobe Dreamweaver interface	IC Department	184	121.62	2.75	2.62	.000***
	Other departments	68	103.28	1.17		
Adding content	IC Department	184	93.26	1.37	2.48	.000***
	Other departments	68	80.78	1.83		
Organizing and modifying content	IC Department	184	169.66	2.07	2.53	.000***
	Other departments	68	154.28	1.42		
Evaluating and maintaining a site	IC Department	184	88.38	2.23	0.65	.28
	Other departments	68	85.24	2.09		

Note. IC = Information Communications; *** $p < .001$.

The differences in scores between the Information Communications Department and the other departments in the “adding content” category were examined by an independent *t* test. The results produced a statistically significant difference, $t = 2.48, p < .05$. This indicated that the “adding content” competency indicator mean score of the Information Communications Department was significantly higher than other departments’ mean scores.

The differences in scores between the Information Communications Department and the other departments in the “organizing and modifying content” category were examined by an independent *t* test. The result showed a significant difference between the means, $t = 2.53, p < .05$. This indicated that the “organizing and modifying content” competency indicator mean score of the Information Communications Department was significantly different from other departments’ mean scores.

The differences in scores between the Information Communications Department and the other departments in the “evaluating and maintaining a site” category were examined by an independent *t* test. The results produced no statistically significant difference, $t = .65, p > .05$. This indicated that the “evaluating and maintaining a site” competency indicator mean score of the Information Communications Department was not significantly higher than other departments’ mean scores.

Table 4
Results of the Stepwise Multiple Regression using Selected Variables of Students’ Web Communication Competency

Variable	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>F</i>
Total credits of computer courses taken	.58	.37	.34	26.73***
Experience using computers	.54	.29	.26	11.34**
Age	.48	.23	.20	6.73*

* $p < .05$. ** $p < .005$. *** $p < .001$.

In order to understand how students’ background variables, such as gender, age, experience using computers and total credits of computer courses taken, will impact their web communication competency, this study was analyzed using a stepwise multiple regression technique. As noted in Table 4, the results of the multiple regression analysis produced a statistically significant *R*² of .89 ($F = 6.73, p < .05$). As shown in Table 4, the results revealed that the variable of total credits of computer courses taken made a significant contribution to the change in *R*². Approximately 37% of the variance affected web communication competency based on the “total credits of computer courses taken” variable. The “experience using computers” variable made a significant contribution to the change in *R*². Approximately 29% of the variance affected web communication competency based on the “experience using computers” variable.

This was followed by the age variable, which made a significant contribution to the change in R^2 . Approximately 23% of the variance affected web communication competency based on the “age” variable. The results indicated that background variables such as age, experience using computers and total credits of computer courses taken played significant roles in students’ web communication competency.

Conclusion

There were many restrictions in terms of subject and geographic factors, not to mention that the researchers could compare the data only amongst domestic students. Using the global standard examining platform tool ACA, Taiwanese researchers can expand not only the data but also the results to global levels. ACA examining tools can monitor web communication competency on the international level in order to help Taiwanese industrial and educational fields understand the difference between Taiwanese university students and students from other countries.

According to the analysis results of this study, the researchers can conclude that there was a 16.35% overage to reach the worldwide standard of web communication competency of ACA professional web design and multimedia applications, and still a 37.3% shortage to reach the worldwide standard of web communication competency of ACA professional literacy. Therefore, there is still a plenty of room for Kainan University’s students to improve their related abilities. One possible reason for the serious drop could be the shortage of related professional certification classes; most of the classes were not to combine with ACA professional literacy certification. The results also indicated that students from the Information Communications Department had a higher level of competency than those from other departments. The main reason for this result may be that the Information Communications Department’s courses were mainly related to multimedia applications. The other reason may simply be there were less samples of students from the other departments, which would affect this result.

The students from the Information Communications Department had significantly higher levels of competency than those from the other departments, especially in the authorized competency indicators of (a) planning site design and page layout, (b) understanding Adobe Dreamweaver interface, (c) adding content, and (d) organizing content. The results also revealed that the highest correct rate of these six competency indicators of web communication was “understanding Adobe Dreamweaver interface”, which had reached 74.59%. However, the lowest correct rate of these six competency indicators of web communication was “setting project requirements”, which had reached 40.39%. In conclusion, the reasons may be that the examinees

were students who had just entered Kainan University recently, and therefore lacked practical industrial experience. Thus, students were familiar with Dreamweaver's interface but were not familiar with designing a web communication project.

Finally, the results indicated that the total credits of computer courses taken, experience using computers, and age are the three independent variables that critically impact students' web communication competency in Kainan University. Thus, the more computer courses students have taken, the more years they have used a computer, and the older they are, the higher the levels of web communication competency students will display.

According to the results shown above, some suggestions have been made for students in Taiwan in regard to their web communication competency:

1. The Minister of Taiwan Education might cooperate with all of the universities in Taiwan to encourage more students to participate in and pass more international web communication competency certification exams in the future.
2. Universities might carefully inspect the web communication competency difference between Information Communications related departments and non-Information Communications related departments in order to adjust and supply adequate courses to reduce the gap between students from different departments, especially for the following authorized competency indicators of web communication such as (a) planning site design and page layout, (b) understanding Adobe Dreamweaver interface, (c) adding content, and (d) organizing content.
3. Because of certain restrictions related to time and manpower, this study only used Kainan University students as the research sample, which did not sufficiently represent the web communication achievement of students all over the world. Further studies can use more samples, more schools, more counties and even more countries in order to understand students' web communication competency by using ACA as a global standard tool.
4. The results of this study will be used as references for industrial companies in planning and developing human resources and for educational academies in cultivating university students' web communication competency. There are still more studies that need to be done on related web communication competency perspectives in the future.
5. There were four background variables in this study: gender, age, total credits of computer courses taken, and experience using computers. For the real learning situation, there were more background variables, such as learning environment, whether the student is familiar with the Internet, socio-economic status, etc., which could also affect students' web communication competency. Therefore, it is critical to use different background variables

and a questionnaire with high validity to investigate related researches in the future.

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