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**ASSESSING THE INFLUENCES OF THE  
COMPUTER LITERACY COMPETENCE OF  
COMPUTER SCIENCE STUDENTS TO EVALUATE ITS  
CURRICULAR PROGRAM**

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**ABSTRACT**

*Program quality poses a challenge to the academic community along all the area of its implementation, thus its evaluation is necessary. This paper aimed to determine the computer literacy competence of computer science students focusing on six computing tasks: (1) computer hardware; (2) file management; (3) network and the internet; (4) wordprocessing; (5) spreadsheet; and (6) presentation. The variables affecting the competence along these tasks were also investigated which include the factors relating to students, teachers and the school. The descriptive-correlational method of research was followed in this study. Data was collected using questionnaire with the participation of students and their instructors. Results of the study revealed that students perceived themselves to have a positive attitude towards computer education subject and very good study habits. Instructors were seen to have that integrative verbal-communicative behavior in the classroom and have the outstanding instructional skills. As to competence of the students, they were rated to have "very satisfactory" performance. On the test of relationship between variables, student factors significantly related with students' competence in computer literacy with gender as the most significant variable. Also, there are teacher variables which accounted for differences in the students' competence, the most important of which was their instructional skills and adequacy of instructional facilities was found to significantly contribute to the students' competence in computer literacy.*

**KEYWORDS:** *computer literacy, computer competence, computer competence factors, ICT education, computer competence correlates*

## INTRODUCTION

The educational system stakeholders in its interest to prepare individuals adequately for the challenges of the current and future workplace environment mandated all institution of learning to integrate computing courses, if not encourage to offer program in computer education.

Responsive to the need of times, the Eastern Samar State University offered programs in information technology, computer science and engineering. Although there are felt evidences that the University is able to address the demands of its service clientele, but to live up to this responsibility is a big challenge. With the looming ASEAN economic community, the responsibility of every school is to prepare everyone face the opportunities and challenges of the regional landscape. They must equip graduates with the skills and competencies required by the regional market place and ensure employability for it is the most measure that they will benefit from economic integration. Graduates must be ready for the jobs that will be created, and the responsibility for this preparation falls on education (del Rosario, 2015).

Computer literacy competence is a synonym describing the understanding and skill in using ICT facilities (computer, internet, networking, and communication media) and working knowledge on the common productivity tool software like word processor, spreadsheet, and presentation (Easton and Addo, 2006). And according to Criteria (2015) a web-based pre-employment testing the competence level on computer literacy has been shown to predict job readiness and in some cases overall job performance for a various job opportunities for which basic computer skills are an essential job requirement.

In order to assess the capability of the University to supply such demand for computer knowledge workers in the global economy an account therefore of the computer literacy competence of its students as well as the elements and determinants of their competence in terms of the students' attributes (student factor) human resource who are directly involve in the provision of instruction (teacher factor) , and the material resource (school factor) used by the students and teachers as provided for by the University and on the interrelationship of these variables is deemed necessary. It is at this premise that this study was conceived.

## HYPOTHESIS

It is hypothesized that:

1. There is no significant relationship between students' level of competence in computer literacy and each of the variables under each of the following factors:
  - 1.1 Student Factors
    - 1.1.1 Gender

- 1.1.2 Attitude towards computer education
- 1.1.3 Study habits
- 1.2 Teacher Factors
  - 1.2.1 Gender
  - 1.2.2 Educational attainment
  - 1.2.3 Verbal-communicative behavior
  - 1.2.4 Experience in computer science teaching
  - 1.2.5 In-service training attended
  - 1.2.6 Instructional skills
- 1.3 School Factors
  - 1.3.1 Quality of computer science curriculum
  - 1.3.2 Adequacy of instructional facilities
  - 1.3.3 Utilization of laboratory facilities
  - 1.3.4 Class size

## THEORETICAL FRAMEWORK

Literature and studies on students' achievements and the factors associated with this achievement which provided the researcher enough background materials for this study may be synthesized to serve as framework for this study are presented hereunder.

**Students' Achievement.** In teaching the most important objective is obviously some kind of learning. It is manifested in terms of knowledge attained, attitudes built up and skills mastered (Gonzales and Romero, 1991; Adam, 2004).

Achievement is used to describe school-based learning. In the statement of Borg and Gall (1963), achievement tests are aimed at measuring the student's understanding and mastery of basic principles related to the subject. They further averred that the administration time for different achievement tests are varies greatly; some test batteries take as little as 50 minutes, while others require two days of testing to administer the entire battery.

In computer education, this involves three levels of competencies (De Cellar, 1989). These are computer awareness, which is the appreciation of how computers affect us in our daily lives, individually and collectively as society; computer literacy, which is the ability to perform a particular task using a computer and such task may or may not require knowledge of computer programming; and computer aided instruction, which is the use of computer in learning a subject other than computing.

This study borrows the concept of computer literacy in measuring students' achievement in computer science or education.

## METHODOLOGY

Data on students, human and material resources were gathered using questionnaire with the participation of the all the fourth-year computer science students and all the computer education teachers of these students. The data on adequacy of instructional facilities as perceived by the participants were validated by getting the actual physical count of the instructional facilities from the records on file at the Supply Office, University Library and at the office of the In-charge of Computer laboratory Facilities. On the other hand, the data on the level of students' competence in computer literacy were obtained from the evaluation given the three raters on their performance of the test conducted to them. The test is

around six computing tasks – basic computer hardware, file management, networks and the internet, spreadsheets, presentations and word processing;

Frequency counts and percentages were used in describing the profile of the students, teacher and material resource. In addition, the mean was used to describe ore quantitative data. The general perception of the participants were determined and organized by getting the weighted mean. In testing the hypothesis of the study, the stepwise multiple regression analysis was employed and the test was set at .05 significance level. All data analysis was performed using statistical software.

A table of specification for the computer literacy test is presented in Table 1.

**Table 1. Table of Specification**

TASK	CONTENT/ DESCRIPTION	SKILL/ABILITY	FORMAT	
			Stimulus	Response
<u>Computer Hardware</u> Identifying computer components and its functions.	Exposure to an actual computer with attached peripherals.	Identify the components and description of its function.	An actual display of computer.	Operate the computer and describe the functionality of the components.
<u>File Management</u> Manipulating the computer desktop configuration and creating, copying, renaming and deleting files and folders.	Instructions to identify the computer settings, sorting files, relocating files with a different file name and restoring deleted files.	Describe computer setting by accessing the appropriate icons and executing the appropriate file command tools.	An open computer with a blank desktop.	Execute the correct command tool.
<u>Network and the Internet</u> Identifying communication peripherals and using web browsers and creating and sending mails.	Instructions to identify the network peripherals, search for information using different web browsers and sources as well as opening and sending email messages.	Search for online information using web browser application and sending mail using an electronic mail application.	Assignment on cyber bullying and a letter to be mailed to <a href="mailto:essu.ccs@gmail.com">essu.ccs@gmail.com</a>	Download material from an online source and demonstrate appropriate use of electronic application.
<u>Word Processing</u> Create and edit documents including formatting using the different word processing tools.	Formatted document.	Format text with special effects, working with tables and bulleted lists.	Colored and highlighted paragraphs with inserted images, charts, tables and numbered and bulleted list of items.	Create and apply the required document formatting styles.
<u>Spreadsheets</u> Organize and edit	Sample Office Payroll	Organize information	Computation of	Compute and apply

worksheet including data manipulation using formulas, functions and charts.	with Graphical Analysis.	and create the required chart.	Net Pay and Graph for the Employees' Salary.	the appropriate worksheet tools.
<u>Presentation</u> Create and format presentations.	Document for an Oral Presentation.	Prepare presentation applying the necessary formatting tools.	Animated presentation with transition and graphics.	Create presentation and apply the appropriate tools.

## RESULTS

### Students' Competence in Computer Literacy

The students' level of competence in computer literacy was evaluated by three judges of raters who are at the same time their instructor including the researcher.

The data show that, in general, the students have a "very satisfactory" level of competence in computer literacy as could be implied from the overall mean of 3.52. As for the six computing tasks, the data further show that the students have "very satisfactory"

level of competence in file management (mean = 4.04), in describing computer components (mean = 3.82), in creating and editing documents (mean = 3.57), and in creating and formatting presentations (mean = 3.44) but were rated "satisfactory" only in organizing and editing worksheets (mean = 3.12) and familiarization of network peripherals and use of internet tools (mean = 3.09). It could be implied from these findings that the students need more reinforcement in the six computing tasks specially with networking and internet tools and in organizing worksheets.

**Table 1. Students' mean competence level in computers.**

COMPUTING TASKS	MEAN COMPETENCY LEVEL				OVERALL MEAN
	Use of Appropriate Commands	Accuracy	Speed	Work-manship	
Computer Hardware (Describing Computer Components)	4.02	3.87	3.75	3.67	3.82
File Management	4.53	4.11	3.93	3.79	4.04
Network and Internet (Familiarization of Network Peripherals and Use of Internet tools)	3.19	3.07	3.18	2.91	3.09
Wordprocessing (Creating and editing documents)	3.76	3.59	3.67	3.26	3.57
Spreadsheets (Organizing and editing worksheets)	3.31	3.07	3.07	3.02	3.12
Presentation (Creating and Formatting Presentations)	3.70	3.36	3.39	3.32	3.44
<b>OVERALL MEAN</b>	<b>3.75</b>	<b>3.51</b>	<b>3.50</b>	<b>3.33</b>	<b>3.52</b>

The reliability of consistency or agreement of the rating of the three judges which is termed as inter-rater was determined using Alpha Reliability model and a summary of the correlation coefficients are given in Table 2. These reliability coefficients were interpreted like the Kendall coefficients of concordance W which is used to determine the relationship among three or more sets of ratings in terms of ranks (McClave and Dietrich, 1988).

Data from Table 2 show that alpha reliability coefficients are in range from 0.5 to 0.9 and all these

were found to be significant ( $p < .01$ ). It was only in creating and editing documents, particularly on accuracy which yielded rather low reliability coefficient (0.2821) but this was observed to be significant at .01 probability level. Borrowing the idea of Downie and Heath (1970), the finding showed that the rating given by the three rater judges on the six computing tasks based on the four performance criteria are more homogenous. Simply put the raters have given reliable or consistent performance rating to the



competence level in computer literacy of the student-participants.

**Table 2. Summary of the reliability analysis on the raters' proficiency rating on the students' competence level in the six computing tasks along each of the four performance criteria.**

COMPUTING TASKS	ALPHA RELIABILITY COEFFICIENTS			
	Use of Appropriate Commands	Accuracy	Speed	Work-manship
Computer Hardware (Describing Computer Components)	0.6533	0.8227	0.8693	0.7841
File Management	0.8264	0.8586	0.8662	0.8536
Network and Internet (Familiarization of Network Peripherals and Use of Internet tools)	0.8959	0.8435	0.8548	0.8474
Wordprocessing (Creating and editing documents)	0.7170	0.2821	0.6334	0.7997
Spreadsheets (Organizing and editing worksheets)	0.8728	0.8874	0.8941	0.8715
Presentation (Creating and Formatting Presentations)	0.8751	0.9047	0.8736	0.8542

### Relationship of Variables

The hypothesis in the study was tested employing the stepwise multiple regression analysis. Table 3 presents the summary of the regression of the students' competence level in computer literacy on the independent variables. In reaching statistical decision, the observed significance level was used.

**Relationship Between Students' Level of Competence and Student Factors.** Of the set of student factors, gender was found to be predominantly related to the students' level of competence in all but file management (Table 3). In fact, not even one of the independent variables was observed to be significantly related with students' competence level in file management. This is indicated by the computer result printout/result "no variable entered/removed from this block." This finding may be taken to mean that variation in students' competence in this one computing task is not attributed to any one the three student factors considered together with the other independent variables but maybe to some other most important student factors not considered in the model building of the present study.

There were two sets of major findings on the relationship between students' level of competence and student factors which can be summarized as follows:

First, the level of students' competence in computer hardware is significantly influenced by their gender and attitudes; word processing by their gender and study habits. Secondly, the relationship between the following variables were found not significant at 0.05 level: students' gender, attitude and study habits and their level of competence in file management; students' attitude and study habits and their level of competence in networks and internet, computer hardware and in presentation skills; students' attitude and their level of competence in word processing; and students' study habits and their performance level in spreadsheets.

**Table 3. Summary of regression of the students' competence on the independent variables.**

	REGRESSION COEFFICIENT BY COMPUTING TASKS					
	Computer Hardware	File Management	Network and Internet	Word processing	Spread-sheet	Presentation
<u>Student Factors</u>	-0.373915*		-0.570378**	-0.577437**	-0.901654**	-0.919574**
Gender	0.044650		0.085342	0.082603	0.805951	0.126441
Attitude Towards Computers	0.067451		0.166619	0.559993**	0.075006	-0.014624
Study Habit						
<u>Teacher Factors</u>						
Gender	0.112358		-0.024840	-0.060234	0.065563	0.157510
Educational Attainment	0.098278		-0.050603	-0.070546	0.045278	0.079633
Teaching Experience	0.051403		-0.040227	-0.062512	0.024861	0.089284
Level of In-Service Training Attendance	0.41697		-0.001828	-0.02830	0.029008	0.102212
Number of In-Service Training Attendance	-0.060619		-0.022991	-0.019333	-0.039206	-0.030271
Verbal-Communicative Behavior	0.000184		-0.062436	-0.055965	0.144140	0.102920
Instructional Skills	0.794278**		0.085551	-0.054334	0.091178	0.585948*
<u>School Factors</u>						
Quality of Curriculum	-0.016691		-0.203054	-0.093129	-0.142834	0.050669
Adequacy of Instructional Equipment	2.030135**		0.093391	0.115007	1.677866**	0.145011
Adequacy of Instructional Materials	1.954855**		0.098163	-0.111307	-0.173251	0.019337
Utilization of Laboratory Period	-0.099511**		-0.197938	0.034747	-0.195754	-0.140521
Class Size	0.015128		-0.013102	-0.019149	0.015411	0.008867
Multiple R	0.70142		0.36621	0.58440	0.63021	0.51467
R Square	0.49199		0.13411	0.34152	0.39717	0.26489
Adjusted R Square	0.44015		0.11777	0.31619	0.36171	0.23662
F	9.49080		8.20872	13.48487	11.20015	9.36885
Significance of F	0.0000		0.0060	0.0000	0.0000	0.0003

\*p<.05; \*\*p<.01

Therefore, based on these two sets of major findings, the hypothesis was not accepted on account of the first set of major findings but the hypothesis was accepted with respect to the second set of major findings.

**Relationship Between Students' Level of Competence and Teacher Factors.** There were seven factors considered for the test of relationship. Of these seven variables only teachers' instructional skills were observed to exert so much influence on students' level of competence yielding regression coefficient of 0.794278 ( $p < .01$ ) for their competence in computer hardware and 0.585948 ( $p < .05$ ) for their competence in creating and formatting presentations. The hypothesis was thus not accepted with this finding in as far as teachers' instructional skills are concerned.

Although the other six teacher factors (gender, educational attainment, teaching experience, level of in service training attended, number of in-service training attended and verbal-communicative behavior) have entered in the model building, all these were found not significant at  $p = .05$ . This finding supported the hypothesis, thus, with reference to this finding, the hypothesis is accepted.

**Relationship Between Students' Level of Competence and School Factors.** Considering the impact of the five school factors on students' level of competence, the data in Table 3 show that the impact was not significant to the computing tasks of file management, network and internet, knowledge in computer hardware, wordprocessing and in creating and formatting presentations. Thus, the hypothesis which states that there is no significant relationship between students' level of competence in computer literacy and each of the school factors is accepted.

The stepwise multiple regression analysis also yielded other statistics like multiple R, R square, adjusted R square and F values as reflected in Table 3. Of the relationships tested, the multiple R value of 0.70142 suggests that it was the relationship between the students' level of competence in computer hardware and all the fifteen independent variables which was observed to have a somewhat moderate relationship and the F values (F and the significance of F) in the analysis of variance show that the relationship mentioned indicate that this is significant at  $p < .01$ . the R square value points out that about 49.20 percent of the variance in the level of competence of in computer hardware is explained by the combined influences of students attitude, teachers' instructional skills, adequacy of instructional equipment and materials as well as the utilization of laboratory facilities. The unexplained variance of about 51 percent means that other important variables other than those considered in the

present study could adequately explain the relationship.

## CONCLUSIONS

1. Generally the students perceived themselves to possess the characteristics of responsible students, that of having a "favorable attitude" toward the subject and "very good" study habits.
2. The Computer Science instructors are all educationally prepared to teach computer science as all of them have obtained a college degree relevant to the discipline. They were generally perceived to possess the characteristics of an effective teacher, that of having an integrative verbal-communicative behavior in the classroom and of having "outstanding" instructional skills.
3. One of the basic goal of computer education program is competence in computers. Since the students were generally rated to have either "very satisfactory" or "satisfactory" competence, it could be inferred that the Computer Science program is able to relatively attain its primary goal.
4. With practice, the students can become effective and efficient workers in the future and they were rated overall as "very satisfactory" in the different computing tasks.
5. Student factors like gender, attitude towards the subject and study habits as well as teachers' instructional skills and the adequacy of instructional facilities in the schools are significant correlates to the computer competence of the students.

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