THE ATTRIBUTES OF BSIT GRADUATES IN RESPONSE TO INDUSTRY NEEDS

Joanna Marie De Vera[1], Jessa Mae Laguerta[2] and Winston G. Domingo[3*]

[123]College of Information Technology and Engineering, Cagayan Valley Computer and Information Technology College, Inc., Santiago City, Philippines

Abstract

In today's day and age, it is undeniably apparent that nearly every industry's success relies on the use of technology. As a result, business owners are starting to view Information Technology in a different light. To cater to these industry needs, the higher education aims to equip future IT professionals with adequate knowledge and essential skills by maintaining a relevant curriculum that focuses on the development of job-related attributes of the graduates. Thus, this study aims to evaluate the relevance of the BSIT curriculum implemented in CVCITC to the CHED Memorandum Order (CMO) number 25 series of 2015 in pursuance of a quality outcome-based education that shall provide the target BSIT graduate attributes that goes in line with the needs of the industry. The study utilized a Quantitative Research Method to gather data. It presents the results of an empirical study where forty-five (45) BSIT graduates and twenty-six (26) local stakeholders from various technology companies in Santiago City were asked to answer questionnaires. The BSIT graduate participants were asked about their demographic profile, the attributes that they have acquired from their course, and their preferred learning style. On the other hand, the local companies were asked regarding the attributes or skills they require towards hiring BSIT graduates. The results of this study generally revealed insignificant results between the expected BSIT graduate attributes and the demographic profiles such as age, sex, marital status and employment status except in terms of the BSIT graduates' sex and their individual and teamwork skills and the BSIT graduates' sex and their communication skills wherein both results yielded mean scores that were in favor of females. This suggests that females excel in terms of communicating and cooperating skills. Meanwhile, in terms of the BSIT graduates' learning style, findings reveal that most of them were visual learners. This means that they learn best when information is presented visually and in a picture or design format. On the other hand, the study reveals results regarding the industry's requirements towards BSIT graduates. It was found that what industries require the most are soft skills, followed by individual and teamwork skills and communication skills over hard skills like computer problem analysis and design and development of solution skills.

Keywords: BSIT graduate attributes, learning styles, IT industry requirements, IT skills and attributes required by industries, BSIT curriculum

1. Introduction

The nature of the field of study of Bachelor of Science in Information Technology program as defined by the Commission on Higher Education (CHED) includes the study of the utilization of both hardware and software technologies involving planning, installing, customizing, operating,

managing and administering, and maintaining information technology infrastructure. In today's day and age, it is undeniably apparent that nearly every industry's success relies on the use of technology, and as a result, business owners are starting to view Information Technology in a different light. To cater to these industry needs, the higher education aims to equip future IT professionals with adequate knowledge and essential skills by maintaining a relevant curriculum that focuses on the development of job-related attributes of the graduates. Thus, the Commission on Higher Education advocates the implementation of the CHED Memorandum Order (CMO) in pursuance of a quality "outcome-based education" which is believed to be the way to prepare the individuals and strengthen their computing capabilities and be at par with global excellence. BSIT students are expected to graduate with standards that are mapped out and expressed in the following set of outcomes or attributes and this includes the ability to apply computing knowledge to address real-world problems; analyze complex problems; design and develop appropriate solutions; utilize modern computing tools; work alone effectively or as a leader or a member of a team; communicate effectively orally and in writing; recognize professional, social, and ethical responsibility; and engage in a life-long learning endeavor.

According to an article in The Balance Careers written by Alison Doyle, one of the industry's most highly regarded job search and career expert, the most important attributes that most employers seek towards IT candidates are skills in communication (oral, written, collaboration), creativity, imagination, forward-thinking, problem solving, strategy, open-mindedness, analytical skills, resilience, stress management, brainstorming, troubleshooting, process improvement, flexibility, fast learner, prioritizing, quick thinking, attention to detail, leadership, project management, team building, collaboration, decision making, mentoring, integrity, presentation, public speaking, computer skills (coding, networking) and more IT skills (logical thinking, organization, innovation, ability to work independently, integration, accuracy, building and managing expectations.

The proficiency among students shall be aimed to achieve as early as they are still on their training ground so they will be prepared and armed with knowledge and adeptness once they are on the actual battlefield. An appropriate inculcation of education plays an integral part of cultivating excellence and reshaping the tech industry in the years to come. Hence, this study entitled "The Attributes of BSIT Graduates in Response to Industry Needs" was conducted to take the step and measures necessary to aid in the production and achievement of desired outcomes - the globally competent and innovative IT professionals who are engaged in life-long learning endeavors in pursuit of continual development. The field of computing is ever dynamic; its advancement and development had been rapid and its evolvement is a continuous process (O'Brien, 2008). This overwhelming shift should come as no surprise to a massive demand of the industry. However, there are studies already that proved how companies are having a hard time finding enough skilled individuals to fill in IT positions. Hence, it makes sense to study and evaluate the BSIT graduates' attributes by assessing whether the school particularly, the CVCITC has succeeded in producing qualified candidates with the right skillsets.

1.1. Objectives of the Study

This study aimed to evaluate the relevance of the BSIT curriculum implemented in CVCITC to the CHED Memorandum Order (CMO) in pursuance of a quality outcome-based education that shall provide the target BSIT graduate attributes that goes in line with the needs of the industry. Specifically, it endeavored to present the following objectives:

1. Determine the demographic profile of the BSIT graduates in terms of:
    1.1 Age
    1.2 Gender
    1.3 Marital Status
    1.4 Employment Status
2. Specify and evaluate the expected BSIT graduate outcomes or attributes according to the CHED Memorandum Order (CMO) No.25 Series of 2015:
    2.1 Knowledge for solving computer problems
    2.2 Problem Analysis
    2.3 Design/Development of Solutions
    2.4 Modern tool usage
    2.5 Individual & Team Work
    2.6 Communication
    2.7 Computing Professionalism, and Ethics
    2.8 Life-long learning
3. Recognize and evaluate the learning styles of the respondents in terms of:
    3.1 Visual
    3.2 Auditory
    3.3 Kinesthetic
4. Attributes or skills requirements of the industry toward BSIT graduates.
5. Significant relationship on the BSIT attributes requirements of industry towards BSIT graduates.

2. Materials and Methods

This study used a Quantitative Research Method as it emphasized objective measurements and numerical analysis of gathered data regarding the acquired attributes, the learning style preferences, and the demographic profiles of the BSIT graduates of Cagayan Valley Computer Information and Technology College (CVCITC). Moreover, this study also collected information regarding the industry's expected attributes among the graduates that made them qualified for an IT position. Among quantitative design, the descriptive, comparative and correlational designs were employed in this study as well. The utilization of a descriptive design method aimed to describe and specify the expected attributes of the BSIT graduates based on the CHED Memorandum Order no. 25 Series of 2015. Likewise, it was intended to distinguish the characteristics or qualities that the industry seeks towards the graduates. On the other hand, the

comparative design method was used to point out the significant difference in the attributes of BSIT graduates when grouped according to their demographic profiles. And finally, the correlational design method was also used to figure out the relationship on the BSIT attributes requirements of industry towards BSIT graduates.

2.1. Participants

This study had two sets of participants: the graduates and the industry. The respondents for the graduates were the Bachelor of Science in Information Technology (BSIT) graduates batches 2017, 2018, and 2019 from Cagayan Valley Computer and Information Technology College (CVCITC) at Santiago City. There were forty-five out (45) out of fifty-five (55) or 80% of the target BSIT graduates participated during the survey or floating of questionnaires.

On the other hand, a total of 26 companies located in Santiago City had been the respondents who represented the industry's response regarding their requirements towards hiring an applicant for an IT position. The respondents selected were tech-related companies who employ IT staff and the following are the list of these companies who participated: Amazing Computer Systems and Enterprises, Maxsaver, Infoworx Inc., PLDT, McDonald's, Martone Mall, Santiago Water District, Hotel Amancio, Pru Life, CVCITC, Southern Isabela Medical Center, La Patria College, Farm-On Agri Community Corp., FabLab, Agrigrowth International Corp., Laicom Cagayan, Best Picture Digital Photo Studio, Ara G. Captures, Pics, and Graphics Photo Studio, Aljay Agro Industrial Solutions, Inc., Pepsi-Cola Products Phil. Inc, LBC Express, Smart, Tronix, AK Photoshop, and The Sun Shop.

2.2 Research Environment

This study was carried out in Santiago City and in its neighboring municipalities where the Bachelor of Science in Information Technology (BSIT) graduates of Cagayan Valley Computer and Information Technology College (CVCITC) from batches 2017 to 2019 commonly reside and work as well. Furthermore, to make the study more feasible, it was also conducted through an online survey to be able to connect and reach out to the alumni in the most possible and easiest way. On the other hand, industry survey was conducted among the local stakeholders of Santiago City as they are the most probable employers of these graduates.

2.3. Research Instrument

The study used a patterned questionnaire that went through validation processes such as Expert pooling, Refinement, Field-test, and Final Refinement. Three experts were consulted for initial validation. Their comments and suggestions were incorporated into the instrument for the field test. The trial test of the research instrument was conducted as a preliminary test of the final version of the questionnaire with a total of 30 respondents for the industry. Reliability and validity were tested through Cronbach alpha (a=.935).

Patterned questionnaire was chosen because the pre-existing questionnaires from published studies were already validated and standardized and therefore, it is much more reliable to use as

a basis to create a new one. The survey questionnaire section one (1) that was used in gathering the demographic data of the respondents (graduates) was patterned from the article written by Fontanella (2019) entitled "The 14 Best Demographic Questions to Use in Surveys". The section two (2) of the questionnaire determined the attributes of the BSIT graduates and it was patterned from the CHED Memorandum Order (CMO) Number 25 Series of 2015 and from the study by Habon (n.d.) entitled "Employability of the 2014 and 2015 Information Technology Graduates of Cagayan State University at Lal-Lo". On the other hand, the section three (3) of the questionnaire which determined the learning styles or preferences of respondents (graduates) were acquired from the study of O'Brien, L. (1989) entitled "Learning Styles: Make the Student Aware" and finally, the section four (4) of the questionnaire determined the attributes or skills required by the industry toward BSIT graduates and the survey questions were created based on the article written by Doyle (2019) entitled "Top Skills and Attributes Employers Look For."

2.4. Data Gathering Procedure

Before the actual data gathering, a permission letter was first sent online to the BSIT graduates of CVCITC and on the other hand, the permission letter for the local stakeholders was also sent personally. After receiving back an approval from the target respondents, the study was officially carried out. Subsequently, after all the necessary data were collected, consultation with the research adviser was made so that the researches will be assisted with proper analysis and interpretation of the data gathered.

3. Results and Discussion

Demographic Profile of the Respondents

Table 1. Profile of the Respondents

Demographic Profile		Frequency	Percentage
AGE	18 - 20 YEARS OLD	1	2.2
	21 - 29 YEARS OLD	42	93.3
	30 - 39 YEARS OLD	2	4.4
	TOTAL	**45**	**100**
SEX	MALE	21	46.7
	FEMALE	24	53.3
	TOTAL	**45**	**100**
MARITAL STATUS	SINGLE	36	80.0
	MARRIED	9	20.0
	TOTAL	**45**	**100**
EMPLOYMENT STATUS	Employed, Working in Related Field	20	44.4
	Employed, Not Related	14	31.1
	Searching For A Job	8	17.8
	Not Employed, Not Searching	3	6.7
	TOTAL	**45**	**100**

The figure above shows the Demographic profile of the respondents. Findings reveal there are a total of 45 respondents and the majority of them are 21-29 years old and it is quite evident that they yielded the highest percentage which is 93.3 or 42 out of the 45 respondents. The statistic also shows that only one is on the age group of 18-20 and two are on the 30-39 age

group; 24 of them are female while 21 are male. In terms of percentage, females cover 53.3 percent while males cover 46.7 percent of the total respondents. It can be observed that 80 percent or 36 out of 45 respondents are still single while only 20 percent or 9 out of 45 are already married. This implies that most of the respondents are still enjoying their single lives. Results also revealed that the majority which is 75.6 percent or 34 out of 45 respondents were already employed. It can be noted that the respondents who were employed in the related field have the highest rate which is 44.4 percent (20/45), while 31 percent (14/45) were employed but not working in the related field. On the other hand, it is also shown on the table above that the 17.8 percent (8/45) respondents were still looking for a job and very few or only 6.7 percent (3/45) of the respondents are neither employed nor searching for a job.

Expected BSIT Graduate Outcomes or Attributes

Table 2. Mean Score on the Expected BSIT Graduate Outcomes or Attributes according to the CHED Memorandum Order (CMO) No.25 Series of 2015

BSIT Graduate Attributes	MEAN	D.I.
1. Knowledge for Solving Computer Problems	3.56	Strongly Agree
2. Problem Analysis	3.31	Agree
3. Design/Development of Solutions	3.25	Agree
4. Modern Tool Usage	3.37	Agree
5. Individual and Teamwork	3.37	Agree
6. Communication	3.25	Agree
7. Computing Professionalism and Ethics	3.38	Agree
8. Life-long Learning	3.32	Agree

Results revealed that the majority of BSIT graduates 'strongly agreed' that they have acquired knowledge for solving computer problems with an average mean of 3.56. The result implies that the BSIT course had helped the respondents develop their skills in terms of computer problem-solving skills most particularly in terms of computing, science, and mathematics. Further, the majority of BSIT graduates 'agreed' that they have acquired knowledge for analyzing problems with weighted mean of 3.31. This result implies that the BSIT course had helped almost all the respondents to develop their skills in terms of analyzing problems, being able to identify the problem, and address an appropriate solution to it. Furthermore, it can be gleaned on the table above that majority of BSIT graduates 'agreed' that they have acquired knowledge in designing and developing solutions with a weighted mean of 3.25. This result implies that the BSIT course had helped the respondents develop their skills in terms of design and development most particularly in effectively integrating IT-based solutions into their user environment. The results also revealed that the majority of BSIT graduates 'agreed' that they have acquired knowledge in modern tool usage with a weighted mean of 3.37. This result implies that the BSIT course had helped the respondents develop their skills in terms of modern tool usage most particularly in creation, selection, and application of appropriate techniques, resources, and modern IT tools including prediction and modeling to complex engineering activities with an understanding of the

limitations.

In terms of individual and teamwork, results show that majority of the respondents 'agreed' that they attained individual and teamwork skills with a weighted mean of 3.37. The result implies that CVCITC has produced IT graduates with a stronger ability to work independently in comparison to working as a cooperative member of a team. From this result, it could be concluded that the school may lack a bit of a better strategy on how to make students develop cooperative skills. When it comes to communication, the results reveal that in general, respondents 'agreed' that they have developed their communication skills. The table also shows that communicating though writing and giving instructions has the highest means score whereas presentation and public speaking have the lowest mean which means that more respondents can communicate better in writing than speaking. Thus, the results indicate that the course had generally developed the communication skills of the students.

Meanwhile, if it is on the computing professionalism and ethics, majority of BSIT Graduates have 'Agreed' that they have learned to analyze the impact of computing information technology to individuals and organizations as well as understanding social and professional issues and responsibility in using technology. Lastly, the respondents agreed that their course has helped them acquire lifelong learning skills yet need to further improve this attribute.

Learning Styles of the Graduates

Table 3. Mean Score on the Learning Styles of the BSIT Graduates

Learning Styles	MEAN	D.I.
1. Visual	3.48	Often
2. Auditory	3.06	Often
3. Kinesthetic	2.84	Often

Results show a high general weighted mean of 3.48 with a descriptive interpretation of 'often' in terms of the Visual, Auditory and Kinesthetic Learning Style of the respondents. According to a study entitled "A Study of the Preferred Learning Styles of Students Taking the English 1119 paper in SMK Tengku Intan Zaharah: Are the Teachers Aware of These Learning Styles?" learners who are visual-linguistic like to learn through written language, such as reading and writing tasks. They remember what has been written down, even if they do not read it more than once. They like to write down directions and pay better attention to lectures if they watch them. Also, a study entitled "Listen Well, Learn Well: Working with Auditory Learners" supported the results as it has been emphasized that auditory learners are students who tend to learn best when instruction or information is delivered orally. Other characteristics include a preference for talking, listening, and other social interactions; as ease of remembering names and songs, and a need for verbal praise and support. Lastly, a study entitled " Learning Styles and Learning preferences " stated that Kinesthetic learners learn best through touch, movement, imitation, and other physical activities. They remember best by writing or physically manipulating the

information.

Attributes or Skills Requirements of the Industry towards BSIT Graduates Skills

Table 4. Mean on the Attributes or Skills Required by the Industry for BSIT Graduates

Attributes and Skills Requirements of the Industry	MEAN	D.I.
1. Skills in Computer Problem Solving and Analysis	3.46	Required
2. Design and Development of Solutions	3.29	Required
3. Individual and Teamwork Skills	3.72	Very Much Required
4. Communication Skills	3.50	Very Much Required
5. Other Skills	3.78	Very Much Required

Results revealed that all skills in Computer Problem Analysis had much required in the industry. Further, majority of BSIT Graduates have obtained the knowledge for Design and Development solutions and this skill is required by the industry. The industry very much requires also the individual and teamwork skills as it is very beneficial for every employee within a company to develop these skills for a more harmonious work environment. On the other hand, it is very much required for a BSIT Graduate to possess communication skills and other skills on the weighted mean that they vouched.

According to Harris & Harris (1996) a team has a common goal or purpose where team members can develop effective, mutual relationships to achieve team goals. Teamwork replies upon individuals working together in a cooperative environment to achieve common team goals through sharing knowledge and skills.

Aptly, an article entitled "Assessment of the effectiveness of teamwork skills learning in Collaborative Learning" stated that teamwork skills play a vital and often determining factor in any successful collaborative activity. This article provides an example of an assessment method employed to check the effectiveness of learning the teamwork attributes in the engineering and science sophomore course. Thus, the article assesses the learning effectiveness of teamwork attributes using hypothesis testing based on student self-evaluation.

Test of Relationship between the BSIT Attributes Requirements of Industry and the BSIT Graduates' Attributes

Table 5. Test of Relationship between the BSIT Attributes and Requirements of Industry among BSIT Graduates		SKILLS IN COMPUTER PROBLEM SOLVING AND ANALYSIS	DESIGN AND DEVELOPMENT SOLUTION	INDIVIDUAL AND TEAMWORK SKILLS	COMMUNICATION SKILLS	OTHER SKILLS
SOLVING COMPUTER PROBLEMS	Correlation Coefficient	.031	.096	.201	-.052	-.053
	Sig. (2-tailed)	.843	.550	.245	.754	.751
PROBLEM ANALYSIS	Correlation Coefficient	-.192	-.172	-.193	-.335*	-.417*
	Sig. (2-tailed)	.223	.280	.263	.044	.012
DESIGN & DEVELOPMENT OF SOLOLUTION	Correlation Coefficient	-.179	-.102	-.326	-.295	-.057
	Sig. (2-tailed)	.248	.516	.054	.072	.730
MODERN TOOL USAGE	Correlation Coefficient	.041	.205	.042	-.138	.034
	Sig. (2-tailed)	.795	.201	.808	.412	.840
INDIVIDUAL & TEAMWORK	Correlation Coefficient	-.014	.021	-.106	-.314*	-.239
	Sig. (2-tailed)	.928	.892	.519	.049	.135
COMMUNICATION	Correlation Coefficient	-.183	-.125	-.018	-.098	-.048
	Sig. (2-tailed)	.235	.422	.917	.547	.770
COMP, PROF, SOC.RESP	Correlation Coefficient	-.214	-.062	-.107	-.210	-.117
	Sig. (2-tailed)	.167	.695	.528	.199	.476
LIFELONG LEARNING	Correlation Coefficient	-.164	-.140	-.023	-.191	-.101
	Sig. (2-tailed)	.300	.381	.893	.254	-546
**. Correlation is significant at the 0.05 level (2-tailed).						

Presented on the table above is the test of relationship between the skills required by the industry and the skills acquired by the BSIT Graduates. It can be seen that there is no significant relationship between most of the variables which means that the null hypothesis is accepted. However, communication skills showed significant results with problem analysis and individual and teamwork. This only means that communication skills really play a big role on the career of the graduates as it helps in the analysis of problem and communicating the possible solution. Also, it can be a key to a stronger teamwork within the organization that they may belong to in the future.

4. Conclusion

Based on the findings of the study, the following items were concluded (1) Determining the demographic profile of the BSIT Graduates is important as it provides necessary data regarding research participants to know whether the character of the participant has something to do with learning and employment; (2) The CMO No.25 Series of 2015 is the standard guideline for computer courses such as BSIT. Hence, it is important to specify and evaluate graduate outcomes

and attributes according to it; (3) VAK learning Style uses the three main sensory receivers (Vision, Auditory, and Kinesthetic) so it is important to be recognized and evaluate to determine a person's dominant or preferred learning style; (4) It is crucial to know the attributes or skills requirements of the industry towards the BSIT graduates so that the latter will be able to prepare appropriately and meet these requirements; (5) There are some significant differences in the attributes of BSIT graduates when grouped according to demographic variables, and these are in terms of the BSIT graduates' sex and their individual and teamwork skills and the BSIT graduates' sex and their communication skills. Both results yielded mean scores that were in favor of females; (6) There is a significant relationship on the BSIT attributes requirements of industry such as communication skills, problem analysis and individual and teamwork.

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