

On-the-Job-Training and Academic Performance of Computer Science Students: A Correlation

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Abstract – *On-the-job training (OJT) is part of the tertiary curriculum which connects the gap between theory and practice as well as between classroom education and real industry life, presenting a more precious learning experience that elevates the importance of the academic program and forms the view of personal and social usefulness. The objectives of internship are to create an opportunity to learn about a profession; and to generate values as well as substance in skills for students.*

The study described the Bachelor of Science in Computer Science (BSCS) students' academic performance in professional courses; presented the OJT evaluation results based on "Work Habits and Behavior", "Work Skills and Knowledge" and "Social and Communication Skills"; determined level of OJT performance of Computer Science graduates of batch 2016-2017; and tested the significant relationship between OJT performance and academic performance.

Findings show that there is no significant correlation between the two variables. This reinforces the fact that industry supervisors and the faculty handling the OJT course do not necessarily assess the students based on their technical skills but instead put greater emphasis on personal characteristics. Attitudes and behaviors included notable traits such as punctuality, motivation to learn independently, confidence, composure, enthusiasm, ability to be a team player, analytical skills, and even foresight. Considering these findings, it is recommended that the BSCS curriculum be updated to include activities that further hone and inculcate the notable traits mentioned above. The activities included in the action plan are workplace simulation workshops, interpersonal skills training, and personality development seminars that are aimed at preparing the students and help them improve their performance as they experience actual immersion in the industry.

Keywords – *Academic Performance, Computer Science, Correlation, Immersion, On the Job Training*

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INTRODUCTION

Learning takes place in different avenues and forms of human existence. Formal education from academic institutions is basically the proper venue for acquiring appropriate knowledge and skills necessary for future employment. On-the-job training (OJT) is part of the tertiary curriculum which connects the gap between theory and practice as well as between classroom education and real industry life presenting a more precious learning experience that elevates the importance of the academic program and forms the view of personal and social usefulness [1].

The Bachelor of Science in Computer Science (BSCS) program focuses on concepts and techniques used in the design and development of advanced software systems. The goal of the program, among other things, is to prepare students for lifelong learning as they undertake professional careers in computing through the development of necessary skills and critical thinking capabilities in solving a wide variety of problems by applying principles of computational thinking [2].

OJT plays a significant role in the curriculum of every degree program, which serves as a venue for the students to practice what they have learned from concepts and principles in developing work ethics, attitude and produce effective, innovative, and globally competitive professionals. The hands-on experience aims to apply the knowledge, demonstrate necessary skills, enhance the attitude, and hone the character of the students towards a holistic appreciation of the actual workplace. This is where the students will be given job assignments that will test their ability to accomplish certain tasks. They are being observed and all their accomplishments are being evaluated based on the criteria set by the academic institution. This is where the "Student Outcomes" of the Computer Science program could manifest through the application of basic and advanced knowledge in computing sciences as well as

the soft skills [3].

The objectives of internship are to create an opportunity to learn about a profession; and to generate values as well as substance in skills for students [4], [5]. It is a part-time job for a specific period, paid modestly or unpaid, in which the interns gain knowledge while contributing to the organization. It provides students an understanding of a real business situation, but with supervision and support [1]. Generally, companies openly lend a hand in providing students with ample opportunities for OJT apprenticeship, acknowledging that training of future employees is not the sole responsibility of the academe but a shared task with the industry. In addition, many companies consider OJT apprenticeship as part of their human capital investment, and like any investment, they gainfully accept that returns to the cost of these investments will occur in future periods.

Lyceum of the Philippines University – Batangas (LPUB) educates and trains students to be competitive by providing them with applied learning opportunities that require knowledgeable and talented workers, and rank among the best in the world in terms of productivity, career, attitude, and technical skills [6]. The institution provides quality educational services in terms of internship programs that cater to the demand of the industries with the support of the quality assurance mechanisms [7]. An Internship Office had been established to assist, endorse, and monitor OJTs. Linkages to credible companies had been formed in which OJTs are deployed.

The Bachelor of Science in Computer Science program of the College of Computer Studies has been in existence since 2004. The college prides itself as being the 1st to offer the program in the region and the 1st to achieve level 4 PACU-COA accreditation status. The BSCS curricula is continuously updated based on the recommendations from CHED, PACU-COA, TESDA, various linkages and its other stakeholders. The college has partnerships with prominent computing companies like Microsoft, IBM, CISCO, and Sun Micro Systems to name a few. Its highly qualified faculty members, and students are active members of computing organizations like Philippine Computer Society (PCS), Computer Science Teachers Association (CSTA), Philippine Society of Information Technology Educators (PSITE), Philippine Society of Information Technology Students (PSITS), Junior Philippine Computer Society (JPCS), Integrated Southern Tagalog of Information Technology Education (iSITE), etc. Faculty members and students have developed research works presented in various

local and international venues. Community extension activities are also laid-out per school year, where students are encouraged to participate, thus ensuring a holistic learning experience.

The study determined the students' level of academic achievement and OJT performance in terms of personal characteristics, attitudes toward job, job performance, adherence to company policies, as well as competencies based on the assessment of immediate superiors of Computer Science student-trainees who are now graduates of Bachelor of Science in Computer Science at LPU-B. The study identified attributes that graduates should possess once they get employed. Determining academic achievement in terms of final grades in the professional courses served as basis for a clearer understanding of performances at work and at school. Analyzing the significant relationship between OJT performance and academic achievement of the respondents would identify the importance of theories and knowledge learned from the university which should be applied through practice in the actual workplace.

OBJECTIVES OF THE STUDY

The study correlated the Computer Science students' academic performance with internship performance appraisals from one academic institution in the Philippines.

Specifically, the study described the Computer Science students' academic performance in professional courses; present the OJT evaluation results based on "Work Habits and Behavior", "Work Skills and Knowledge" and "Social and Communication Skills"; determine level of OJT performance of Computer Science graduates of batch 2016-2017; and test the significant relationship between OJT performance and academic performance.

MATERIALS AND METHODS

Research Design

The study used the correlation research design to determine the extent to which two factors are related, not the extent to which one factor causes changes in another. Correlational studies are stepping-stones to the more powerful experimental method, and with the use of complex correlational designs, allow for very limited causal inferences. The study employed several variables for correlation such as the OJT appraisal report and academic performances based on the students' final grades in professional courses from first year to fourth year.

Respondents of the Study

The respondents of the study are the twenty-eight (28) or 100% BS Computer Science graduates of school year 2016-2017.

Data Collection

The instrument used in the study had been validated by the Internship Office of LPU-Batangas. The “Student Office Trainee Performance Appraisal Report” is being rated by the immediate superiors of On-the-Job trainees immediately after 500 hours of internship training. The instrument is composed of performance areas categorized based on “Work Habits and Behavior”, “Work Skills and Knowledge” and “Social and Communication Skills”.

Data Gathering Procedure

Data were collected from compiled OJT Performance Appraisal Reports rated by immediate superiors of the Computer Science trainees. Academic performances / Final grades in the professional courses were verified and extracted from the online Student Information System.

Data Analysis

Mean was used to present academic performances. Weighted mean was used to determine the levels of OJT performance. Pearson – Product Moment Correlation Coefficient was used to test the significant relationship between academic performances and OJT performances of Computer Science students. All data were treated using a statistical software known as PASW version 26 to further interpret the results of the study using an alpha level of 0.05.

Ethical Considerations

Collected data were treated as confidential and used only for the purpose of the research. Student names were intentionally omitted in the presentation of tables to maintain data privacy.

RESULTS AND DISCUSSION

Table 1 presents the BS Computer Science students’ academic performance in professional courses. Top three mean value of academic performances are CS 25 – Modeling and Simulation (1.29), CS 23 – Free Elective 3 (1.54) and CS 22 – Automata and Language Theory (1.57). Lowest mean values are CS 3 – Digital Design (2.08), CS 13 – Object Oriented Programming (2.08), CS 17 – Project Management (2.08), CS 20 – Software Engineering (2.12) and CS 10 – CCNA1 – Networking 1

(2.27). Over-all academic performance is 1.85 which is interpreted as “Good”. This implies that Computer Science students performed well in their professional courses.

Table 1
BS Computer Science Students’ Academic Performance in Professional Courses

Course Code	Course Title	Mean	Interpretation
CS 1	CS Fundamentals	1.75	Very Good
CS 2	Computer Applications	1.63	Very Good
CS 3	Digital Design	2.08	Satisfactory
CS 4	Computer Programming	2.00	Good
CS 5	Data Structures	2.02	Satisfactory
CS 6	Computer Organization	1.88	Good
CS 7	Operating Systems	1.86	Good
CS 8	Systems Analysis and Design	2.07	Satisfactory
CS 9	Multimedia Technologies	1.87	Good
CS 10	CCNA 1 – Networking 1	2.27	Fairly Satisfactory
CS 11	Algorithms	1.79	Good
CS 12	Discrete Structures	1.89	Good
CS 13	Object Oriented Programming	2.08	Satisfactory
CS 14	Database Management System	1.89	Good
CS 15	CCNA 2 – Networking 2	1.79	Good
CS 16	Free Elective 1	1.80	Good
CS 17	Project Management	2.08	Satisfactory
CS 18	Special Project 1	1.88	Good
CS 19	CCNA 3 – Networking 3	1.68	Very Good
CS 20	Software Engineering	2.12	Satisfactory
CS 21	Free Elective 2	2.01	Satisfactory
CS 22	Automata and Language Theory	1.57	Very Good
CS 23	Free Elective 3	1.54	Very Good
CS 24	Free Elective 4	1.58	Very Good
CS 25	Modeling and Simulation	1.29	Superior
CS 26	CCNA 4 – Networking 4	1.90	Good
CS 27	Special Project 2	1.71	Very Good
	Over-all Academic Performance	1.85	Good

The purpose of education is to equip the citizenry with values, skills and knowledge to reshape their society. Education helps an individual develop his/her capabilities, attitudes and behavior that is acceptable to the society. The benefit of quality education is its ability to adapt to the changing needs of the country as the world

changes and spearhead the development of human resource and the country’s economy. One of the indicators of quality education is cognitive achievement of learners which is evident in students’ academic performance [8]. Academic performance is understood as the result that indicates achievement in education. Pizarro and Clark [9] defined academic performance as “a measure of the response capacity of an individual, that expresses what a person has learned as a result of an instruction or training process; in addition, from the learner’s perspective, it represents an individual’s ability to answer to stimuli, objectives, and educational purposes previously established”.

Acquiring knowledge in a classroom-based environment will never provide students adequate information regarding the complexities, problem analysis and solving that usually happens in a workplace [10] Immersing the students in a wider range of work environment can help them to fully develop their communication skills, work skills, interpersonal skills and management skills. These skills can boost their understanding about the industry setting and gain confidence in their abilities.

that the students were capable of performing work skills and exhibited good performance during their on-the-job training. Time management is the heart and soul of management skills. How a person manages his work depends greatly on how he manages his time. Punctuality and reliability are what the employers are looking for. Time management skills are important because it helps the student-trainees to structure their work in a way that allows them to accomplish their goals [11].

Students adjust to the environment and people that can possibly influence their attitude towards punctuality [12]. Students are informed of the benefits and consequences of getting to school early and late. The habit will later become their routine until they join the workforce of professionals.

Internship program plays an important role in preparing students to recognize the real business and work world. It is an opportunity for applying, enriching, and enhancing the acquired knowledge in the school in their respective field of specialization and it is usually a realistic experiential activity which they cannot learn within the borders of the classroom [13]. Internships provide invaluable professional experience that allows the students to test the theories and concepts that have been introduced to them throughout their college career, not to mention this will increase their chances of being offered a full-time job later on. No matter what major or their preferred industry, employers look for a core set of skills and traits when considering applicants for both internships and entry-level jobs [14].

Table 3 presents the BS Computer Science students’ on-the-job training evaluation results based on “Work Skills and Knowledge”. Among the “Performance Areas”, “B3–Shows flexibility in the process of going through his/her task.” has the highest (4.52) mean value, wherein “B5–Fully understand the linkage or connection between his/her task to previous, intervening, and subsequent tasks.” (4.15) is the lowest. In terms of work skills and knowledge, the composite mean of 4.36 denotes that the students were capable of performing work skills and exhibited good performance during their on-the-job training.

Information Technology (IT) may be the most stimulating program in terms of skill gaps for the reason that there is the fast speed of change in terms of hardware and software development (Patacsil and Tablatin, 2017). Yet, if the trainees have these technical understanding skills, these are entry-level skills that if they possess can provide them long–term careers [15].

Table 2
BS Computer Science Students’ OJT Evaluation Results
WORK HABITS AND BEHAVIOR

CODE	PERFORMANCE AREA	Weighted Mean	Interpretation
A1	Punctual	4.33	Good
A2	Reports regularly. Performs tasks	4.37	Good
A3	without much supervision.	4.07	Good
A4	Practice self-discipline in his / her work. Demonstrates dedication and	4.30	Good
A5	commitment to the tasks assigned to him/her.	4.30	Good
COMPOSITE MEAN		4.27	Good

Legend: 4.50 – 5.00 = Excellent; 3.50 – 4.49 = Good; 2.50 – 3.49 = Fair; 1.50 – 2.49 = Poor; 1.00 – 1.49 = Very Poor

Table 2 presents the BS Computer Science students’ on-the-job training evaluation results based on “Work Habits and Behavior”. Among the “Performance Areas”, “A2–Reports regularly.” has the highest (4.37) mean value, wherein “A3–Performs tasks without much supervision.” (4.07) is the lowest. In terms of work habits and behavior, the composite mean score of 4.27 denotes

Table 3
BS Computer Science Students’ OJT Evaluation Results
WORK SKILLS AND KNOWLEDGE

CODE	PERFORMANCE AREA	Weighted Mean	Interpretation
B1	Demonstrates the ability to operate devices/equipment needed on the job.	4.35	Good
B2	Handles the details of the work assigned to him/her.	4.41	Good
B3	Shows flexibility (whenever the need arises) in the process of going through his/her task.	4.52	Excellent
B4	Manifest thoroughness and precise attention to details.	4.30	Good
B5	Fully understand the linkage or connection between his/her task to previous, intervening, and subsequent tasks.	4.15	Good
B6	Usually comes up with sound suggestions to problems.	4.37	Good
B7	Demonstrates a working knowledge of desktop software and operating systems. Is aware of system updates and coordinates installations as needed.	4.38	Good
B8	Is responsive to the supervisor and direction of supervisor. Actively encourages two-way communication with immediate supervisor and seeks assistance when needed.	4.44	Good
COMPOSITE MEAN		4.36	Good

Legend: 4.50 – 5.00 = Excellent; 3.50 – 4.49 = Good; 2.50 – 3.49 = Fair; 1.50 – 2.49 = Poor; 1.00 – 1.49 = Very Poor

Job instruction training is the demonstration of a task or skill in the work environment by an experienced expert. This systematic process reduces the need for learning transfer because the learning is happening where the task is performed. The key to a successful job

instruction program is consistency in documenting the task. This simple process involves the OJT trainer demonstrating the task while verbally explaining what they are doing. The learner then repeats the instruction back to the trainer, as the trainer performs the task. Finally, the learner performs the task while stating what they are doing. The number of times each phase is repeated depends on the complexity of the task and how fast the learner is able to grasp the concepts. The trainer may need to repeat the task several times before the learner can correctly explain the task and move on to the next phase [16].

Table 4
BS Computer Science Students’ OJT Evaluation Results
SOCIAL AND COMMUNICATION SKILLS

CODE	PERFORMANCE AREA	Weighted Mean	Interpretation
C1	Shows tact in dealing with different people and communicates effectively.	4.44	Good
C2	Shows respect and courtesy in dealing with peers and superiors.	4.70	Excellent
C3	Willingly helps others (whenever necessary) in the performance of their tasks.	4.74	Excellent
C4	Is capable of learning from and listening to co-workers.	4.41	Good
C5	Shows appreciation and gratitude for any form of assistance granted to him/her by others.	4.52	Excellent
C6	Shows poise, self-confidence and is always groomed.	4.44	Good
C7	Shows emotional maturity.	4.41	Good
COMPOSITE MEAN		4.52	Excellent

Legend: 4.50 – 5.00 = Excellent; 3.50 – 4.49 = Good; 2.50 – 3.49 = Fair; 1.50 – 2.49 = Poor; 1.00 – 1.49 = Very Poor

Table 4 presents the BS Computer Science students’ on-the-job training evaluation results based on “Social and Communication Skills”. Among the “Performance Areas”, “C3–Willingly helps others (whenever necessary) in the performance of their tasks.” has the highest (4.74) mean value, wherein “C7–Shows emotional maturity.” (4.41) and “C4–Is capable of learning from and listening to co-workers.” (4.41) are the

lowest. In terms of social and communication skills, the composite mean of 4.52 denotes that the students exhibited excellent performance during their on-the-job training.

Soft skills include abilities in such areas as communication, problem solving, professionalism, interpersonal interaction, work flexibility and adaptability, as well as overall work ethics, attitude and reliability [17]. Self-management which is also referred to as ‘self-control’ or ‘self-regulation’, is the ability to regulate one’s emotions, thoughts, and behavior effectively in different situations. This includes motivating oneself and setting and working towards personal and academic goals [18]. Interpersonal skills are skills in processing and interpreting both verbal and nonverbal information from others in order to respond appropriately. A skilled communicator can select key pieces of a complex idea to express in words, sounds, and images, in order to build shared understanding. Students need to be taught the skills required for interacting effectively with others and then motivated to use these skills if students are to become socially competent. Through awareness of how an individual interact with others and with practice students can improve their interpersonal skills [4].

Table 5
Correlation between OJT and Academic Achievement

Variables	r-value	p-value	Interpretation
OJT and Academic Achievement	0.152	0.429	Not Significant

Table 5 presents the correlation between OJT and Academic Achievement. Results show that the computed r-value of 0.152 between OJT and academic achievement reveals a very weak positive correlation, which was not statistically significant. Thus, there is no significant correlation between OJT and academic achievement.

The study tested the notion that academic performance, specifically in professional courses, would have significant effects on the level of OJT performance of BSCS students. The notion is a valid initial perception since professional courses promote the development of higher order thinking skills that are critically needed in computing and other related work. Results of this exploratory study, however, indicated that this is not the case. Correlation analysis showed that the academic performance of BSCS students in professional courses are weakly correlated to the OJT performance

evaluation. This reinforces the fact that industry supervisors and the faculty handling the OJT course do not necessarily assess the students based on their technical skills but instead put greater emphasis on personal characteristics [2]. Further research is needed to identify the components of these personal qualities more clearly, but for now, results of this preliminary study provide strong implication towards the development of scholarly attitudes and behaviors among students [19].

CONCLUSION AND RECOMMENDATION

Computer Science students performed good in their professional courses. In terms of “Work Habits and Behavior”, and “Work Skills and Knowledge” students were capable of performing work skills and exhibited good performance during their on-the-job training. In terms of “Social and Communication Skills”, the students exhibited excellent performance during their on-the-job training. Academic performance of BSCS students in professional courses is not significantly correlated to the OJT performance evaluation.

To the LPU-B Management, specifically its College of Computer Studies, it is recommended that the BSCS curriculum be updated periodically to include activities that further hone and inculcate into the students notable traits such as punctuality, motivation learn independently, exude confidence, composure, enthusiasm, ability to be a team player, analytical skills, and foresight. These activities can include workplace simulation workshops, interpersonal skills trainings, and personality development seminars that are aimed at preparing the students and help them improve their performance as they experience actual immersion in the industry.

To the Dean and Department Chairman of the College of Computer Studies, to invite employers’ executive ranks as speakers. One of the benefits to student-trainees in having OJT is the access they get to accomplished professionals and experts in their fields. Consequently, speakers from the executive ranks are very popular with student-trainees - it is a great career development and role modeling experience for them.

To the Dean and Department Chairman of the College of Computer Studies, to showcase student-trainees work through presentations, exhibits, and exposition. Student-trainees work very hard at complying and completing their work and are generally proud of their accomplishments. Setting up a venue for them to do presentation is absolutely considered as great motivation to aim higher and be more competent to do more.

To OJT Coordinators of the CCS, on-the-spot visitation and checking of student-trainees and participating offices with respect to the execution of the work assignments of the learners must be conducted.

To the Internship Office, the OJT Manual must be revisited regularly to make necessary updates, improvements and changes to fit into the present needs and demands of the private industry partners or government agencies.

To LPU-B Management, specifically its Management Information System Department (MISD) and the Internship Office (INTO), to develop a website and provide online handbook, manual and/or standardized forms to student-trainees and employers.

For future researchers, advance studies with respect to the topic might be made to enhance and upgrade the BSCS OJT program. Comparative studies using other universities' on-the-job training programs may be pursued for broader understanding of the concern of this study.

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