

Industry Feedback-Based Mechatronics Program Enrichment

Joseph C. Pepito

Associate Professor V, Cebu Technological University, Cebu City, Philippines

The main thrust of the study was to assess the industry feedback of Mechtaronics OJT Program of Cebu Technological University, Main Campus, Cebu City during the academic year 2015-2016 in order to enrich the existing mechatronics curriculum. The study utilized the descriptive method research. The target respondents were industries in the Philippines that accepts Mechatronics OJT Program. It was found out that the trainees' technical capabilities were good enough to operate, repair, modify and maintain different automated devices, equipment or machineries. Their capabilities have mostly responded to the industry demand of employees that had multidisciplinary skills. Likewise, the managerial capabilities of the trainees were very high, enough to qualify themselves to assume higher position in the near future. And they are potential leaders that can effectively and efficiently manage people in the organization. Based on the findings, it was concluded that CTU Mechatronics Program have responded to the industries' demand of mechatronics experts who can effectively manage both the technical problem of industrial automation and human resource management of a highly technical people. It was furtherely concluded that the University must improve the technical skills of the students particularly those identified in the survey in order attain excellent performance.

Keywords: Managerial Capability, Mechatronics, Multidisciplinary, Technical Capability

INTRODUCTION

Mechatronics nowadays plays an increasingly important role in the world economy particularly industrialization wherein social changes and economic development are closely related with technological innovation. Its program of activities are many and varied and can involve a wide range of activities, tools, situations, and venues; from conceptual design of processes that do not yet exist to forensic study of automation that have failed to perform as expected; from advanced simulation of complex systems to the management of people and

projects. By the near future there is a possibility that the Artificial Intelligence could replace and improve a human brain and the robots would become not only fully automated but fully autonomous from the human beings. In the industrial setting, we typically use robots for situations that we call the four Ds of robotics; dull, dirty, difficult or dangerous. These conditions were driving force behind the robot's acceptance by both management and workers in industry [1].

However, as robots take over more complicated production tasks, there is a high demand for a skilled workforce who can make repair and manage automation machinery. Likewise, difficulties may be created for the unskilled, those least qualified to find new work or enter the labour force. They need to be trained and re-tooled to meet the required skills in repair and maintenance of mechatronics equipment or devices.

Many of the engineering products designed and manufactured in the last 30 years integrating mechanical and electrical systems can be classified as mechatronics systems. Yet, many of the engineers and researchers responsible for those products were never formally trained mechatronics per se [2]. Furtherly, the design, development, manufacture, assembly, commissioning, fault analysis and support of modern products and production systems increasingly requires an approach in which the classic or traditional disciplines of mechanical and electrical engineering and electronics converge. In essence, the requirement for a tradesperson/technician that has the understanding of all mechanical, fluid power, electrical, and electronic componentry and how they combine into a system [3].

Fitness of graduates to these industry demands and requirements is a great challenge of every academic institution. As the Cebu Technological University offered the degree of Bachelor of Science in Mechatronics, careful considerations was done to ensure that the graduates of the program will be employed according to its area of specialization. The program was also design to meet the educational and industrial challenge by emphasizing fundamental knowledge, functional competencies and lifelong learning.

One of the very important subjects offered to the Mechatronics Program is On-the-Job Training (OJT). It is where the trainees expose to actual workplace that will enhance the theories and skills learned in the classroom. This will also provide a familiarization with the range positions and labor force requirement of industry. On-the-Job Training honed technical and managerial skills in a specialized aspect of technology in cooperation with the linkage industries [4].

As mentioned by the 2011 State of the Nation Address by the Philippines President Benigno C. Aquino III. The President said, "The number of jobs

generated in our country can only grow from here. According to philjobnet website, every month there are 50,000 jobs that are not filled because the knowledge and skills of the job seekers do not match the needs of the companies. We will not allow this opportunity to go to waste curricula will be reviewed and analyzed to better direct them to industries that are in need of workers and students will be guided so that they may choose course that will arm them with the skills apt for vacant jobs” [5]. Hence, to ensure the quality and fitness of this program/course to industry demand and possible improvement, it is the burning desire of the researcher to conduct study on industry feedback of the Bachelor of Science in Mechatronics On-the-Job Training Program of the cooperating agency/industry in all areas where BS Mechatronics OJT are taking their industry training. This findings of which will provide a good idea that will enhance, modify, improve and enrich the existing program in Bachelor of Science in Mechatronics.

The main thrust of the study was to assess the industry feedbacks of the Bachelor of Science in Mechatronics On-the-Job Training Program of Cebu Technological University, Main Campus, Cebu City during Academic Year 2015-2016 in order to enrich the existing curriculum. These cover the technical and managerial capability of the Mechatronics Trainees. The findings in this study are believed to be beneficial to CTU Administration as baseline information to determine and prioritize the equipment and other instructional materials needed for the mechatronics course. It also benefit the students and parents as guide them in choosing a course.

METHODOLOGY

The main method of the research used in this study was descriptive method using the researcher-made questionnaire duly adapted from the previous studies of the researcher. This was appropriate to comprehensively explore the assessment of the industry feedbacks of the Bachelor of Science in Mechatronics On-the-Job Training Program in order to enrich the existing curriculum. The study was conducted in the nineteen companies from different provinces of the Philippines where the OJT deployed particularly in Cebu for the Visayas, Surigao del Sur for Mindanao and Laguna in Luzon. These include the manufacturing companies that produced food, medical, electronics, semiconductors, electrical, garments, mining and shipbuilding products and in product research development. The respondents were the 55 company representatives that directly mentor the OJT of CTU Mechatronics Program.

RESULTS AND DISCUSSIONS

The industry feedback of the CTU Mechatronics OJT Program is very needed in order to sustain and improve its quality and reliability to the demand of industry. The first area being evaluated is their technical capabilities that includes the following skills; theories and practices, system designing, identification of components/parts and system maintenance. Table 1 provides the summary of the industry feedbacks on technical capabilities of Mechatronics OJT Trainees. In the theories and practices capability rated 3.64 weighted mean; system designing capability rated 3.67 weighted mean; identification of components/parts rated 3.89 weighted mean and system maintenance rated 3.92 weighted mean. All these capabilities fall under the verbal description of **very good**. The Table also showed that an average of 21.32 percent of the respondents were rated **excellent**, 43.64 percent were rated **very good**, 28.04 percent were rated **average**, 6 percent were rated **fair** and only 1 percent was rated **needs improvement**. The average weighted mean was 3.78 with corresponding verbal description of **very good**. Although it resulted an overall rating of very good, we can't deny the fact that there are specific technical skills that needs improvement. These include the following skills; expertise in operating the Supervisory Control and Data Acquisition (SCADA) Technology, understanding on CAD/CAM operations, fabrication, assembly and repair on industrial/servo motors. But overall, Mechatronics OJTs have still enough

Table 1
Summary of Responses on Technical Capability
of Mechatronics OJT Trainees

n= 55

Technical Capability	E	VG	A	F	NI	WM	VD
1. Theories and Practices						3.64	VG
%	13.82	48	29.27	6.55	2.36		
2. System Designing						3.67	VG
%	16.91	43.27	31.27	7.27	1.27		
3. Identification of Components/Parts						3.89	VG
%	24.36	43.09	30.18	2.18	0.18		
4. System Maintenance						3.92	VG
%	30.18	40.18	21.45	8	0.18		
Average Mean						3.78	VG
Average Percentage	21.32	43.64	28.04	6	1		

Legend: WM – Weighted Mean E – Excellent A – Average NI – Needs Improvement
VD – Verbal Description VG – Very Good F – Fair

qualifications to operate, repair, modify and maintain different automated devices, equipment or machineries. Their capabilities truly responded the industry demand of employees that has multidisciplinary skills.

Another areas evaluated by the industry is the managerial capabilities of the trainees that includes the following behavior; work attitudes, relating to others, leading characteristics and decision-making. Table 2 provides the summary of the industry feedbacks on managerial capabilities of Mechatronics OJT trainees. In the work attitudes rated 4.38 weighted mean; relating to others rated 4.43 weighted mean; leading characteristics rated 4.32 weighted mean and decision-making rated 4.24 weighted mean. All these capabilities fall under the verbal description of **very good**. The Table also showed that an average of 48.65 percent of the respondents have rated **excellent**, 39.63 percent have rated **very good**, 8.77 percent have rated **average**, 2.95 percent have rated **fair** and none of the respondents have rated in the **needs improvement** category. These were resulted an average weighted mean of 4.34 with corresponding verbal description of **very good**. This means that CTU Mechatronics OJT trainees have very high qualifications to manage people in the organization. Their learning in

Table 2
Summary of Responses on Managerial Capability of CTU
Mechatronics OJT Trainees
n= 55

Capability	E	VG	A	F	NI	WM	VD
1. Work Attitudes						4.38	VG
%	51.27	38.18	7.45	3.09	0		
2. Relating to Others						4.43	VG
%	52	39.27	8	0.73	0		
3. Leading Characteristics						4.32	VG
%	46.55	42.18	7.82	3.45	0		
4. Decision-making						4.24	VG
%	44.78	38.91	11.82	4.55	0		
Average Mean						4.34	VG
Average Percentage	48.65	39.63	8.77	2.95	0		

Legend: WM – Weighted Mean E – Excellent A – Average NI –Needs Improvement
VD – Verbal Description VG – Very Good F - Fair

school particularly in management subjects had contributed much to their managerial skills. They can be considered as one of the few who are equipped of both technical and managerial skills that the industry required.

CONCLUSION

Based on the findings, it was concluded that CTU Mechatronics Program have responded to the industries' demand of mechatronics experts who can effectively manage both the technical problem of industrial automation and human resource management of a highly technical people. It was furtherly concluded that the University must improve the technical skills of the students particularly those identified in the survey.

REFERENCES

- [1] Dinwiddie, Keith. **Basic Robotics**. Cengage Learning, Boston MA 02210 USA, 2016, pp. 24-33.
- [2] Bishop, Robert H. **The Mechatronics Handbook: Mechatronic Systems, Sensors, and Actuators**. Second Edition: CRC Press, Boca Raton, FL 33487-2742, 2008, pp. 1-3.
- [3] Hoey, David and Festo Staff. **Fundamentals of Mechatronics**, Festo Pty Ltd.: PO Box 261, Noble Park, Victoria 3174, 2007, pp. 1-2.
- Unpublished
- [4] **Cebu Technological University On-the-Job Training Manual**. 2012, pp. 6-10.
- [5] **State of the Nation Address of the President of the Republic of the Philippines** His Excellency Benigno C. Aquino III. 2011.



JOSEPH C. PEPITO is the Campus Director of Cebu Technological University, Naga Extension Campus, City of Naga, Cebu, Philippines with an Academic Rank of Associate Professor V. He is a graduate of Bachelor of Science in Industrial Technology major in Electronics Technology and Master of Public Administration at the Cebu State College of Science and Technology, Cebu City, Philippines. He also graduated his Master of Science in Industrial Technology and Doctor of Philosophy in Technology Management from the Cebu Technological University. He wrote his dissertation entitled “MECHATRONICS TECHNOLOGY AT CEBU ECONOMIC ZONES: INDUSTRY-ACADEME LINKAGE ROADMAP”. He was formerly a Surface Mount Technology (SMT) Technician of NEC Technologies Philippines and Operations Engineering Support II of Celestica Philippines. For his eleven years in electronics assembly companies, he was tasked to do the maintenance, repair and programming of automated pick and place machines (robotics) and that he was trained in Othawara, Japan for SMT Technology. He is a passer of the Licensure Examination for Teachers and recipient of the following awards; Top Scorer (Rank 1) in the Written Examination during the training of NEW AACCCUP Accreditors and Best Oral Research Presentation Award during the 3rd International Conference on Multidisciplinary Research. And as a Mechatronics Practitioner, he is a holder TESDA Mechatronics Servicing NC II and NC III.