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ROBOTICS/AUTOMATED SYSTEMS TECHNOLOGY

ADVISORY COMMITTEE MEETING

October 10, 1996

Present: Eric Anderson, FANUC Robotics North America Inc.
Linda Casenhiser, Manufacturing & Technological Services, OCC
Doug Cicchini, Robotic Production Technology
Dr. Gary L. Clement, General Motors Corp.
Darlene Currier, Counselor, OCC
Caitlin Hawkins, Research Analyst, OCC
Sally Kalson, Coordinator of Cooperative Education, OCC
Lisa Klein, Robotic Production Technology
Dr. Carlos L. Olivarez, Dean, Academic and Student Services, OCC
Thomas R. Rice, Oakland Technical Center - Northeast
Randy Schroeder, FANUC Robotics North America Inc.
John Sefcovic, Paraprofessional, OCC
Ruth Springer, Secretary, OCC
Doug St. Clair, Faculty, OCC
Carl Traynor, Dynalog, Inc.

1. Welcome and Introductions

Dr. Carlos Olivarez welcomed the group and thanked them for their participation as members of the advisory committee. He asked those present to introduce themselves.

2. Needs Assessment

Ms. Caitlin Hawkins gave an overview of the Robotics Needs Assessment which was published by OCC's Office of Institutional Planning & Analysis in June, 1995. In preparing the Needs Assessment, Ms. Hawkins found that future employment prospects in the field of robotics are bright. The education required for a career in robotics varies depending on the particular needs of the employer.

Many employers reported that previous work experience in the field was at least as important as formal training. Employers indicated that safety skills, interfacing, and troubleshooting skills are very important for employment. About half of the employers surveyed stated that they were currently hiring new employees, primarily due to company expansion. However, many employers also cited a need for employees with up-to-date technology training and employee turnover within the organization as reasons for hiring. Tuition assistance and on-the-job training are both common practices among the employers contacted. The study found that employers in southeast Michigan appear confident that the robotics market will continue to grow over the next ten years.

The group agreed with the findings of the Needs Assessment with regard to high turnover in the field. This is largely due to the long hours and extensive travel which are required of robotics service personnel. Service technicians may be required to work 60-70 hours a week, 6-7 days a week, all shifts, and holidays. After a few years, people hired as technicians tend to seek other work within the company in order to pursue a more settled lifestyle. Thus, there are constant job openings in the service area.

The group agreed that troubleshooting skills are very important, and that greater emphasis needs to be placed on teaching those skills. People often want to look busy and begin pushing buttons when there is a problem, rather than having the confidence and composure to go slowly and analyze the problem situation before attempting to fix it. Dr. Gary Clement commented that Mr. Doug St. Clair attempts to teach troubleshooting skills by putting bugs in the robotic system for students to find and repair.

Mr. Eric Anderson spoke of an excellent program at a school in Minnesota which provides hands-on experience with excellent instruction in troubleshooting and programming. He would like to find a school in Michigan which has a similar program to which he could send his employees. He stressed that it is the hands-on experience, not classroom time, which makes the difference in training a person with troubleshooting ability.

3. Co-ops

Dr. Olivarez asked the group whether a co-op experience would be beneficial for Robotics students. The group agreed that this would be beneficial, and some expressed a willingness to accept OCC co-op students in their companies. Ms. Sally Kalson stressed the need for co-op students to have a strong work experience, as well as mentoring by an experienced employee. The group agreed that accepting co-op students is usually good for the company and its customers, as it develops a group of people who know the work and will be available for full-time employment.

4. Equipment Needs

After a tour of the Robotics Lab, the group asked what kind of budget is available for lab equipment. Dr. Olivarez explained that the course fees paid by students are used for lab equipment. In addition, the campus has a capital equipment budget which is currently being reviewed. Programs submit requests for equipment, which are reviewed, and as many as possible are honored, within the the limits of available funding. The College is also happy to accept donations, and the Robotics Program has received a number of donations in the past.

Mr. Carl Traynor asked about the possibility of putting equipment in the Robotics Lab on a consignment basis. Mr. John Sefcovic responded that this would be possible and beneficial if the equipment could be left at OCC for specified periods of time, such as when a particular class was being offered. Students in each class could be exposed to the equipment, while it would be used more extensively in the more advanced classes. Mr. Traynor asked about the possibility of providing a system for a semester at a time. Mr. Sefcovic agreed that this could be worked out. He will work with Mr. Traynor on this.

5. Recommendations Regarding Curriculum

The group suggested that it would be good if students could be given some instruction in simulation.

The group agreed that students should be given some instruction in blueprint reading and schematic reading. Mr. St. Clair suggested that in ROB 240, Automated Systems Applications, students could be required to use cell blueprints. This would at least expose them to blueprints, although it might not make them proficient in their use.

The group suggested that an advanced Programmable Logic Controller (PLC) class should be added to the curriculum, as there is too much material to cover in just one class. Some felt that ECT 208, Introduction to Microprocessors, could be deleted from the program in order to add the advanced PLC class. Others felt that at least some of the material covered in that class is needed for employment in the robotics field. It was suggested that perhaps the pertinent material from ECT 208 could be incorporated into another class.

It was suggested that it would be good if classes in the repair of personal computers and in C programming could be added to the curriculum.

Mr. St. Clair reminded the group that the Robotics Program is already designated as an Extended Degree Program because the student must complete a minimum of 73 or more required credit hours.

This means that if classes are to be added to the curriculum, other classes must be deleted to allow room for them.

The group agreed that students need to be taught the basic color code for wiring, as this is a requirement for hiring. Mr. Sefcovic responded that he is in the process of making changes in ROB 166, Sensor Technology, to include instruction in that area.

A question was raised as to whether it would be possible for students to run wiring in class as a part of ROB 204, Programmable Controller Applications.

The group suggested that the material needed by Robotics students in the areas of Pneumatics and Hydraulics could be taught in a single class, rather than requiring ATF 140, Introduction to Hydraulics, and ATF 147, Fundamentals of Pneumatics. The group also suggested that AC and DC Fundamentals be taught as a single class. Mr. St. Clair responded that these suggestions were made at a 1995 advisory committee meeting. However, he has not been able to do the necessary curriculum development in order to combine these classes, because his time has been taken up with a complete revamping of all his class materials in order to integrate the use of the new robots donated by FANUC. Dr. Olivarez commented that perhaps Mr. St. Clair could be granted release time to do the curriculum development work.

Mr. St. Clair explained that end effectors are covered in ROB 152, Robot Manipulator Drives and Linkages. Blueprints are included in ROB 240. In ROB 250, electrical diagrams are covered, using RJ electrical prints. Mr. Sefcovic developed the prints and the labs that go with them. Mr. Sefcovic explained that system architecture, end effectors, and system layout are covered in ROB 250. He suggested that if any members of the group have prints that could be released to be used in Robotics classes, that would be helpful.

The group commented that communication skills, including both written and verbal skills, are often weak in people in the field of technology. Service technicians need to be able to explain what they have done clearly and simply and be sure they have been understood by the listener. The group stressed the need for speech and listening skills, as well as the written skills which are taught in ENG 135, Business Communications.

6. Tours

The group suggested that tours of area companies would help to expose students to robots other than those in the Robotics Lab. Tours would also help students become excited about a prospective career in the robotics field. Mr. St. Clair responded that it is usually hard to arrange for classes which meet at night to go on tours. Mr. Randy Schroeder stated that his company runs two shifts and

offered to take classes on a tour of his work area if Mr. St. Clair would like to do this. Mr. Doug Cicchini stated that many of his customers run three shifts at their companies.

7. Tech Prep

Mr. Tom Rice reported that major revisions are taking place today in secondary education. More importance is being place on Tech Prep articulation programs in which students who follow a particular vocational program in high school can be granted advanced placement credits at community colleges. Students who have followed this type of program will have more skills and background than traditional students coming out of high school. They will be experienced in problem solving and working in teams. Mr. Rice suggested that business should be involved in the entire process, including helping high school students to obtain jobs in the technical area.

Ms. Sally Kalson commented that she places a large number of CAD students who have been involved in Tech Prep in high school. They are usually the first to be hired because of the experience they have had in high school.

8. Conclusion

Dr. Olivarez pointed out that each member's packet includes a copy of OCC's new statement of Mission and Purposes. He requested that the members send back to the College any feedback which they would like to give after reviewing this document.

Dr. Olivarez thanked the group for coming, and for their information and comments which will help the College to keep the Robotics/Automated Systems Technology Program current with the needs of today's robotics industry.

The next meeting of this advisory committee will take place in either the Winter or Spring term, 1997. Agenda items not covered at this meeting will be covered at that time. He suggested that members contact Ms. Ruth Springer if they would like to add agenda items for the next meeting.

Committee Recommendations

1. That a strong emphasis be placed on the teaching of troubleshooting skills.

2. That OCC explore the possibility of including a co-op experience in the Robotics Program.

3. That OCC explore the possibility of placing equipment from Dynalog, Inc. in the Robotics Lab on a consignment basis.

4. That OCC attempt to provide some instruction in simulation as a part of the Robotics Program.

5. That instruction in blueprint reading and schematic reading be included in the Robotics Program.

6. That an advanced Programmable Logic Controller (PLC) class be added to the curriculum.

7. That OCC explore the possibility of adding classes in the repair of personal computers and in C programming to the curriculum.

8. That instruction in basic wiring be included in the Robotics Program.

9. That the material needed by Robotics students in the areas of Pneumatics and Hydraulics be taught in a single class, rather than requiring ATF 140 and ATF 147.

10. That AC and DC Fundamentals be taught as a single class for the Robotics Program.

11. That OCC explore the possiblity of including more instruction in communication skills, including writing, speech, and listening skills, as a part of the Robotics Program.

12. That tours of area companies be included as a part of the instruction offered in the Robotics Program.

Respectfully submitted,

Ruth Springer, Secretary

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