OAKLAND
COMMUNITY
COLLEGE

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DRAFTING

ADVISORY COMMITTEE MEETING

June 12, 1998

8:00 a.m. - 10:00 a.m.

Room T-6

AGENDA

8:00 a.m.	Breakfast
	Welcome and Introductions
	Review of Minutes of Last Advisory Committee Meeting
8:15 a.m.	Review of Minutes of Follow-Up Meeting: Progress Report
9:15 a.m.	Current and Future Trends: Feedback from Industry
9:45 a.m.	Action Plans
	Next Meeting: _____

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DRAFTING ADVISORY COMMITTEE MEETING

June 12, 1998

Present: David Barran, Modern Engineering
Michael L. Clancy, Educational Technology Consultant, OCC
Phil Crockett, Manufacturing & Technological Services, OCC
Tahir Khan, Chair, Technology Department, OCC
Margaret McNeal, Virtex International
Charles G. Rondeau, Saturn Corporation
Tom Sawasky, Faculty, OCC
Grant Sherman, General Motors Metal Fab Division
Henry Sommerstorfer, General Motors Truck Group
Ruth Springer, Secretary, OCC
Robin Stewart, Universal Flow Monitors, Inc.
Bruce Sutton, North Farmington High School
Donald P. Tinsley, Hawtal Whiting Inc.

Preliminary Matters

Mr. Michael Clancy welcomed the group and asked the members to introduce themselves. Mr. Clancy thanked the members for their two years of service on the advisory committee and presented each member with a certificate of appreciation and a small gift.

The minutes of the Drafting Advisory Committee meeting held on May 30, 1997 were reviewed and approved as written. The minutes of the follow-up meeting of OCC members of the advisory committee held on July 14, 1997, were reviewed, and a progress report was given on each committee recommendation, as follows:

Progress Report on Advisory Committee Recommendations

1. **That OCC continue to provide the instruction in manual drafting which is essential to successful work on a CAD system.**

Mr. Tom Sawasky reported that this is currently being done and will continue to be done. This recommendation has been completed and will not appear in future follow-up minutes.

2. That OCC attempt to provide students with the opportunity to make a drawing of an actual part as it would be done in industry.

Mr. Sawasky reported that the projects done in CAD 120, Product Detailing, and in DDT 105, Product Drafting, are being evaluated with the goal of carrying out this recommendation in these two classes. Two projects have been selected, a brake cylinder and a caster assembly project. Feedback has been received from some recent graduates and current students that they have difficulty with actually measuring and visualizing parts. More work needs to be done on this.

3. That OCC provide more instruction in stacking tolerances.

Mr. Sawasky reported that he is attempting to include this in DDT 105. He has been doing research over the internet and through contact with other community college instructors in an attempt to evaluate the instruction being given in DDT 100, Fundamentals for the Drafting Industry, and DDT 105. He is considering restructuring DDT 105 to become basically a standards class.

4. That OCC consider deleting instruction in lettering and line work from the Drafting curriculum.

Mr. Sawasky reported that instruction in lettering and line work is being de-emphasized. Students are still required to use upper case freehand lettering, and emphasis is still placed on types of lines, line weight and contrast. However, students are not required to spend time on numerous lettering and line drawing sheets as was done in the past. This allows them to spend more time on geometry, dimensioning practices, and projection systems. This recommendation has been completed.

5. That instruction in the application side of drafting be included in the Drafting curriculum.

Mr. Sawasky reported that OCC staff believe that application should be taught on the CAD system, in CAD 120. He also referred to what was reported under Recommendation 2 in regard to the projects which will be done in CAD 120 and DDT 105. This recommendation has been completed.

6. That visualization skills be emphasized in the Drafting curriculum.

Mr. Sawasky agreed that visualization skills are still essential and must be emphasized. The research he is currently doing includes an evaluation of how to incorporate an emphasis on visualization skills into the Drafting Program.

7. That instruction in freehand sketching be included in the Drafting curriculum.

Mr. Sawasky reported that this is included in the restructuring process he is currently evaluating. Students do a minimal amount of freehand sketching in DDT 100. Perhaps freehand sketching could also be included in the CAD classes. Mr. Sawasky explained that this recommendation refers to freehand sketching as a communication skill which can be used to quickly sketch a part to convey an idea for communication in group settings.

The group pointed out that some people have this as a natural ability, but that it can also be learned. Someone born with the talent will have more finesse than someone without the natural ability who has learned to do it.

Mr. Charles Rondeau reported that at Saturn Corporation, they have illustrators teach 12-hour sketching classes, which are very popular. Those who take them say they can visualize and sketch much better than they could before. They have llustrators teach the classes because illustrators have the background of being able to convey images to others, plus they have been exposed to the design side as well.

8. That a simulation class be added to the curriculum, using real industry problems.

Mr. Sawasky reported that this is being done in the Product Detailing classes and in the ADT (Auto Drawing) classes. Students learn theoretical projection and drawing. Then they are given the actual parts to draw or complete views. Models of parts are also available.

Mr. Tahir Khan mentioned that in CAD 260.1, Principles of Body Design, CAD 270.1, Applications of Body Design, and CAD 280.1, Vehicle Body Surface Development, instructors bring in products from Chrysler, so students are working on actual applications from industry.

Mr. Sawasky commented that he sees CAD 220, Product Design and Layout, as a simulation class in which students are given an industry-based project and are required to design in an industry situation.

9. That ENG 151 be deleted from the program, and that the English Department work with program instructors to include English instruction in the other courses which students are required to take.

Mr. Sawasky and Mr. Khan reported that one of the English instructors has developed a new English class, ENG 145, Writing and Reading for Problem Solving, which will be offered for the first time in Fall 1998. Drafting and CAD students are being encouraged to substitute this new course for any other English course currently required in their program of study.

Mr. Henry Sommerstorfer asked whether students are allowed to test out of DDT 105. Mr. Sawasky replied that students are able to test out of it. Both DDT 100 and DDT 105 are courses

for which students participating in Tech Prep can receive advance placement. Someone with industrial experience may also request to test out of those courses. However, when students see what is included in DDT 105, they usually choose to take it. The course includes a great deal of application of geometric dimensioning and tolerancing (GD&T). Symbols are explained, so students know how to use them on drawings. Students in CAD 120 do the same type of project using GD&T.

Mr. Clancy asked how much designers in industry need to know about GD&T. Mr. Sommerstorfer responded that, where he works, there is a GD&T group which decides tolerances and makes the actual decisions. However, the entry level designer should know what critical surfaces are and what spaces are important, in order to be able to discuss these things with the GD&T people.

Mr. Clancy asked where people get that instruction in OCC's program. Mr. Sawasky responded that students get some awareness in Drafting and CAD classes. QAT 104, Geometric Dimensioning and Tolerancing - Principles and Applications, is not required in either the CAD or Drafting Program. Mr. Sawasky suggested that we may need to consider adding it to the curriculum, based on the need for it in industry. There is some feeling that it can be taught a little at a time in several classes, but then students have no continuity. Mr. Sawasky believes students need to be totally immersed in it for 15 weeks in order to fully absorb the concepts.

Mr. Sommerstorfer mentioned that General Motors has a one-day, eight-hour GD&T overview class which is taken by employees early in their employment at GM. They receive a reference book, and certain basic concepts are explained. Some co-op workers who have taken a GD&T class at another college comment after taking GM's eight-hour class that now they understand what they had previously studied in their college class.

Mr. Khan asked whether OCC staff might be able to look at the materials used in the GM class, in order to make sure our CAD 120 and DDT 105 classes are at least covering all that is covered in that class. Mr. Sommerstorfer said he would share that material with OCC.

Mr. Don Tinsley commented that entry level designers do not need to know how to apply GD&T. However, they need to know why it is applied and why it is important, so they are aware of those things while they design the part. Mr. Sawasky responded that we are currently showing the application and how it looks on the drawing without teaching the theoretical background on why it is being done. There is not enough time in DDT 105 and CAD 120 to do the needed theoretical instruction.

Mr. Dave Barran pointed out that, without the theory behind it, learning to put the symbols on the drawings does not mean much. Ms. Margaret McNeal agreed, adding that today each designer is responsible for all aspects of following the part through the entire process. Students need to learn not just the symbols, but also why they are used.

Ms. Robin Stewart mentioned that, when she took DDT 105, tolerancing was covered, but it was all working on problems, not drawing and dimensioning. She received an A in the class and had all the symbols memorized, but she did not know how to use them. When she got on the job, her supervisor had to explain a lot of things to her so she could do her job.

Mr. Sommerstorfer commented that that is typical of many school courses. Students learn a formula in class, then learn how it is applied later on the job. It is essential that students understand the manufacturing side in order to be effective designers. It is important for students to have experience actually cutting metal and shaping something in the foundry. Doing it is much better than just talking about it.

Mr. Rondeau agreed that it is better to have hands-on experience if possible. He also suggested that students be taken on as many field trips as possible, so they can see what actually happens in manufacturing. Mr. Sommerstorfer agreed about the importance of field trips. However, Ms. McNeal pointed out that it is hard to do field trips unless it can be done at the time students are normally in class.

Mr. Phil Crockett pointed out that students get a great deal of hands-on experience in MEC 101, Introduction to Manufacturing Processes, and MEC 102, Manufacturing and Fabrication Practices. Both of these classes are part of the Drafting Certificate Program.

Mr. Clancy asked whether the instruction in MEC 101 and 102 is related to the drawing, showing that the project is being fixtured a particular way because of what the drawing says. Ms. McNeal responded that she does not believe it is currently being done that way. Mr. Crockett commented that it would be great to take a project from DDT 105 and produce it in the MEC class. However, there are students from other programs besides CAD in the MEC classes, so perhaps this would be hard to do.

Mr. Clancy suggested that students be given a project that is intentionally set up so they dimension it incorrectly. Students would try to make it and see that it is impossible. This would be a good real-life experience for them.

10. That the advisory committee meet again in May or June, preferably on a Friday morning.

The advisory committee met again on May 30, 1997. This recommendation has been completed.

11. That competencies determined by industry be linked with each course, so that a competency certificate could be given, rather than a certificate that just shows that certain courses were taken.

Mr. Sawasky reminded the group that there was a great deal of discussion at the last advisory committee meeting about this. Under the current program, the Drafting Certificate can be used as

a stepping stone to get into the CAD Program, then the CAD Program can be used as a stepping stone to go on to higher things. We need to discuss how to go about offering a competency certificate that would be recognized by industry. To have its instruction recognized by the industries being served is one of the toughest things for a college. This is an important subject which needs to be discussed further.

12. **That the last sentence in the description of the Drafting Certificate Program on page 82 of the catalog be deleted: "A graduate may be employed in either a large industrial establishment or a small business drawing parts and products."**

Mr. Sawasky reported that he will be taking this change through OCC's curriculum process. Since these types of job opportunities are no longer available, the advisory committee had agreed that this statement should no longer be in the catalog.

13. **That OCC consider testing students for competencies prior to their admission to the CAD/Drafting Program, with those not possessing the necessary competencies being required to take a remedial Drafting course before continuing to more advanced courses.**

Mr. Sawasky reported that Dr. Carlos Olivarez is exploring this with the Counseling Department. There are other curricular areas, such as English and Math, in which competency placement is required. This could be a way to bring people into the program at a higher level, so they would have more time to take more advanced courses.

14. **That the Drafting Certificate Program be made up of the following courses:**

DDT 100	**Fundamentals for the Drafting Industry**	**3 Credits**
DDT 105	**Product Drafting**	**3 Credits**
DDT 115	**Descriptive Geometry**	**3 Credits**
MEC 101	**Introduction to Manufacturing Processes**	**3 Credits**
MEC 102	**Manufacturing and Fabrication Processes**	**3 Credits**

Mr. Sawasky reported that he is working on determining the minimum number of courses required for a certificate program. Under this recommended certificate program the following courses which are included in the current program would be deleted : DDT 125, Advanced Descriptive Geometry Applications, which is no longer being offered; the English and Math courses; and ELT 101, Applied Electricity. Mr. Sawasky would like to replace ELT 101 with QAT 104. All of these proposed changes would need to go through the curriculum revision process. They would take effect in Winter 1999.

15. **That the Drafting Certificate Program be linked with the CAD Certificate and the CAD Associate Degree Program by being located on adjacent pages in the catalog or linked by a footnote, or by being indicated on the CAD page in the catalog with a mark other than an asterisk indicating the courses in the Drafting Certificate, while an asterisk indicates those in the CAD Certificate.**

Mr. Sawasky reported that there are rules related to how things are to be organized in the catalog. The new Dean of Technology will need to work on this.

16. **That OCC consider requiring aptitude testing for students entering the CAD/Drafting Program, the results of this testing to be used for advisement purposes only.**

Mr. Barran reminded the group that this recommendation was designed to be of assistance to prospective students who may begin taking classes without having the creative skills to advance and be successful in the field. Without those skills, they may graduate and get a job, but never be able to advance. It was suggested that students could take an aptitude test and then be advised as to their potential for success. This would be different from the placement testing which was suggested in Recommendation 13.

Report on Research Regarding Drafting Instruction

Mr. Sawasky reported to the group on research he has been doing regarding a question which was raised at the last advisory committee meeting: How much theoretical background in manual drawing does a student need before going on to a CAD system? Could instruction in manual drawing be totally eliminated? Could manual and CAD drawing instruction be integrated so they would be taught simultaneously? Or should we continue with the current system in which manual drafting and CAD are taught in completely separate classes?

Mr. Sawasky reported that these are questions with no firm answers. He has done a great deal of research regarding textbooks. There are textbooks which teach both manual drafting and CAD in the same class. Students learn manual drafting theory and complete some assignments manually. They also do assignments on the CAD system. Mr. Sawasky has done research on the internet to learn how schools across the country are doing it. He found that the majority of colleges teaching drafting are teaching it manually followed by CAD instruction or are teaching it manually with CAD work stations also available. At the university level, the trend is not to teach manual drafting at all. Very little drafting is being taught in engineering programs. If any drafting instruction is provided, it is done on a CAD system and is very basic. Students from these programs usually end up at a community college getting more manual and/or CAD instruction. Private schools are advertising heavily on the internet and are probably one of our major competitors. They teach very little, if any, manual drawing. Their goal is to get students on the job in industry as quickly as possible, so they teach entirely on a CAD system.

Mr. Sawasky asked for direction from the advisory committee. The group has agreed that it is important that we teach the theory of drafting, including geometry, visualization, dimensioning principles, and projection skills. These topics could be taught entirely on the board or in conjunction with a CAD work station. However, teaching manual drafting and CAD in the same class would require a restructuring of our courses.

The CAD Advisory Committee is asking why we teach any manual drawing at all. They would especially like to delete DDT 105 from the CAD Program. The Drafting Advisory Committee has expressed itself as believing that it is absolutely necessary to teach theoretical skills manually. However, DDT 105 is an application class, covering basic drafting theory, manufacturing materials and processes, an introduction to GD&T, precision dimensioning, the relationship of parts, and dimensional stack-up. Mr. Sawasky's research on the internet shows that no one is teaching an applications class manually. As soon as they have taught the basic theory on the boards, they move students on to a CAD system. Mr. Sawasky believes our DDT 105 should probably be a drafting conventions and standards course, including more GD&T and drafting conventions, and less application. It could be a corequisite or prerequisite for the CAD applications class. However, there is nothing in OCC's computer registration system that insures that students have taken the prerequisites before registering for a class.

Mr. Khan pointed out that the computer is set up to stop students from registering in certain Math, English, and Allied Health classes if they do not have the prerequisites. We would need to convince the Registrar that it is necessary for our classes as well. We have been told that if we ask the computer to do a prerequisite check on students, it will bring the computer system to a standstill. However, with the new systems that are planned for the future, it should be feasible to do prerequisite checks. Even with the present system, it could be done if the Registrar was convinced it was truly necessary for the sake of the students, to prevent them from getting into classes for which they are not prepared.

Mr. Clancy stated that this should be discussed at the next meeting of the Technology Department faculty.

Mr. Sawasky pointed out that OCC is feeling the pressure of advancing technology and how to get students prepared for entry level jobs in the short time we have them here. The Tech Prep program helps us do that. Students from 24 high schools in Oakland County can come in with advance placement through at least the first Drafting class and the first CAD class. While we have students here, we must get them to the place where they can visualize advanced level projects. With the move to solid modeling as a design tool, students are lost without visualization and descriptive geometry skills. Students must also know about manufacturing materials and processes. Mr. Sawasky plans to continue his research. He is trying to add more visualization skills to the beginning classes. He has found that one college is teaching descriptive geometry on a CAD system. He will contact them to see what software they are using. All the other colleges he has researched are teaching it manually. Right now, Mr. Sawasky believes that the best way to teach descriptive geometry is manully.

The group commented on the competitive pressure OCC may be feeling from private schools with short training courses. They expressed the view that people who have come through those programs are not being hired at the Big Three, although they may get jobs in tool shops or other small shops. Such programs may be good for someone who has a background in manual drafting or another CAD software and already has the fundamentals. However, people without that background need to learn the fundamentals in a program that is more thorough than such short courses can provide.

The group agreed that the basic skills need to be taught manually. Mr. Barran suggested that it might be good to do the manual and computer work side by side earlier in the program.

Mr. Clancy asked what the Drafting Certificate leads to. The group responded that it leads to the CAD Program, not to a job. Mr. Clancy then asked why there is a separate Drafting Certificate if it only leads into the CAD Program.

Mr. Barran explained that the program was created originally as a pathway to the work world. The advisory committee stated last year that it is no longer a pathway to the work world. If it exists at all, it should be as a progression to the CAD Program. Many students are taking classes part-time while they work full-time. A certificate program provides the student with a reward after a shorter period of study than is required to earn a full Associate Degree. It is also something an employer could recognize.

Mr. Khan added that some companies prefer to train their employees themselves on their particular software. Students from those companies can receive their basic instruction at OCC in the Drafting Certificate Program and then receive their CAD training on the job.

Ms. McNeal reminded the group that the instructor of a 3-credit class has only 45 contact hours with the students. She does not believe that is enough time to try to teach both manual and CAD in the same class. Mr. Sawasky responded that we would need to consider reengineering the structure of our classes in order to teach both in the same class.

Mr. Bruce Sutton commented that OCC needs to come up to the speed of high school. As a high school instructor, he deals daily with the kind of students OCC has coming into its program. He does not believe that students can begin drawing on a computer. They have no concept of space if they begin immediately to work on a computer. Colleges need to require instruction in board drafting. Mr. Sutton teaches using both board and computer during his time with the students. He believes we need to de-emphasize lines and lettering and emphasize sketching more. He has his students work in teams, working with a real thing, measuring and working with someone else to create a product. He would like to see OCC work with another university, perhaps Central Michigan, so students have the experience of dealing with someone they can't see, working on a project with someone in another location. Students also need to understand the technical writing portion of the work experience. Mr. Sutton believes that all colleges and companies need to

emphasize to high school counselors that students need to take high school drafting classes if they are going into engineering.

Mr. Sawasky mentioned the need for simulation to make sure students are prepared for the work world. Some schools have a capstone course which is required for graduation. This is a final seminar course that ties together everything they have learned. Students do group projects in which they design a gage or fixture and then actually build the part. OCC has the facilities that would be necessary to offer such a course.

Mr. Khan expressed the view that the co-op classes provide some of this on-the-job experience. Mr. Clancy pointed out that many students substitute another course for the co-op course, so they do not get the co-op experience. Mr. Khan responded that this is usually done when students are already working as designers.

The group agreed to meet again during the month of October, 1998.

Mr. Clancy explained that the Michigan Board of Education requires that all community college occupational programs be evaluated once every five years. He asked the group to fill out advisory committee evaluation forms.

Mr. Rondeau asked whether there is a web site for advisory committees as a part of the OCC web site.

New Advisory Committee Recommendations

17. That OCC consider adding QAT 104, Geometric Dimensioning and Tolerancing - Principles and Applications, to the Drafting curriculum.

18. That Drafting students be taken on as many field trips as possible, so they can see what actually happens in manufacturing.

Respectfully submitted,

Ruth Springer

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