OAKLAND
COMMUNITY
COLLEGE

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DRAFTING ADVISORY COMMITTEE

January 29, 1999

Members Present:

David Barran, Technical Consultant
Louis Beafore, DaimlerChrysler
Charles Rondeau, Saturn Corporation
Henry Sommerstorfer, General Motors Truck Group
Bruce Sutton, North Farmington High School

OCC Ex Officio Members Present:

Sharon L. Blackman, Ed.D., Dean of Technology
Phillip Crockett, Workforce Development Services
Sally Kalson, Coordinator of Cooperative Education
Tahir Khan, Chair, Technology Department
Pat May, Counselor
Tom Sawasky, Faculty
Ruth Springer, Secretary

Introductions and Review of Minutes

Dr. Sharon Blackman welcomed the group and invited the members to introduce themselves. The minutes of the Drafting Advisory Committee meeting held on June 12, 1998, were reviewed and approved as written. Dr. Blackman referred to the minutes of the follow-up meeting of OCC staff members held on July 17, 1998, stating that certain items from those minutes would be discussed in detail later in the meeting.

Presentation on Saturn Idea Sketching Class

Mr. Charles Rondeau gave a presentation on the Saturn Idea Sketching Class, which he said is one of the more popular in-house classes offered to employees at Saturn Corporation. Every Saturn employee is required to participate in 92 hours of training per year. The Idea Sketching

Class is designed to train people to convey a thought by means of sketching. This is an important skill in the design business.

The class is taught using visualization aids, such as simple wood models and wireform models. The instructor explains the theories of perspective and simple two-dimensional views. Students learn the manual skills of drawing freehand forms, then progress to multiple views of a part. The focus is on communicating ideas, using sketching to speed the process of refining ideas. The emphasis is not on creating pretty pictures. Students are not allowed more than 10-30 minutes per sketch. They are not allowed to use pencils with erasers. They must use markers, so they can't go back later and make it prettier. Students are in class for two hours a day for four days. There are 20-25 people in each class. Classes are not geared to a specific group of Saturn employees, but are open to all who want to brush up their skills or learn a new skill.

Mr. Tom Sawasky pointed out that, at previous advisory committee meetings, we have discussed the fact that instruction in visualization skills seems to be lacking in many educational programs. Mr. David Barran agreed, stating that not long ago, a good designer couldn't talk without a pencil in hand. Now the exact opposite is true. The computer is now the dominant tool, and visualization skills are lacking. We need to build that communication tool back into our educational programs. Mr. Barran asked whether there are good students who are unable to visualize and put ideas down on paper.

Mr. Sawasky responded that even good students lack the ability to visualize and draw. As the design industry is moving more and more in the direction of 3D, this skill will be more important than ever. Mr. Sawasky believes we need to include more instruction in these skills in our introductory classes.

Mr. Louis Beafore commented that sketching is taught in DDT 100, Fundamentals for the Drafting Industry. However, because of the amount of material to be covered in the course, only one three-hour class period is spent on sketching. Mr. Beafore suggested evaluating students coming into the program and having a beginning class for those who have no drafting background. Presently, there are students in DDT 100 who have a good background in drafting and others with no background at all. For those with no background, the material covered in the class can be overwhelming.

Mr. Bruce Sutton was asked what is being taught at the high school level. He responded that he still believes in the importance of teaching basic concepts using drafting boards. Today many believe that everything should be done on the computer. Middle schools that used to have drafting classes don't have them anymore. When he gets students in high school, he requires that they take an 18-week introductory class to get into his program. Many high schools are being told by industry that they do not need to use drafting boards, so high school students are not getting these needed skills.

Mr. Henry Sommerstorfer reported that at General Motors, they offer the same sketching class that Saturn does, and it is popular among their employees as well. Even though employees are working on a computer, the sketching class really helps them. The mental skills developed in order to do things manually help people use the CAD system more effectively. When Mr. Sommerstorfer used to teach TED 103, Basic Blueprint Reading, a few of his students went on to take Drafting or CAD classes. They told him that TED 103 helped them because it forced them to take a 2D orthographic drawing and visualize what it would be in 3D. This is what a designer must do constantly, work in 2D but visualize in 3D. Mr. Sommerstorfer doubts that these skills can all be learned on the computer.

Mr. Beafore pointed out that not everyone who graduates from OCC will get a job at a large company and work on a computer. In the small design shops, even those that are heavily into CAD, they are still doing 60 percent of the work on the board and 40 percent on the computer. Students will need board experience to get a job in those shops.

Mr. Barran commented that someone can be technically astute and good on a CAD system, but not be a good designer. If students want to be good designers, not just good CAD operators, they must have good visualization skills.

Mr. Rondeau agreed with Mr. Beafore that, at least for a period of time, there will still be a need for board draftspersons. However, the tendency in the automotive industry is to get lean and fast. Currently, the engineer gets an idea, the designer draws it, then the mold maker makes it. However, in the future, there will be more combining of these positions.

Mr. Sommerstorfer reiterated the importance of being able to communicate through drawing ideas. This should preferably be a skill which is second nature, acquired long ago in middle or high school. However, this is often not the case. The manual dexterity, thinking and reasoning process must be learned. The designer spends a great deal of time at the computer, but the real designing goes on in the head. That is why basic sketching or drafting classes are important, so that these concepts and mental skills can be learned.

Consideration of Curriculum Proposal

Dr. Blackman reminded the group that the reason we have a specific program at OCC is to prepare people for the workplace and/or assist them to upgrade their skills. She will be taking all the Technology Department programs through an assessment process in the coming year. Currently the Drafting courses are considered to be required supportive courses for the CAD Program. We need to look at why we are offering the Drafting courses. We need to consider offering courses in nontraditional modes. Currently we have one-year certificate programs which cannot be completed in a year. We have two distinct groups of students in our programs, those

who are just beginning, and those who are working in the field and coming back for retraining. Accountability measures within the College place a great deal of emphasis on the number of people who complete a program and graduate. However, a large number of our students come for a semester or two, obtain some skills, and then get a beginning job in the field. They may come back later to take more classes to improve their skills. We need to consider how we can design our programs to include natural stop-out points, allowing students to complete a short program or certificate in a short amount of time. The average amount of time it takes students to complete a two-year associate degree is seven to eight years. It takes an average of three to five years to complete a certificate. We need to look at how we offer our programs so they are attractive to students, so we do not lose students to the many competing institutions which exist today. We normally deliver our courses in 15-week increments. Perhaps we could offer some courses in a shorter time frame that would be appropriate for students who just need to brush up their skills. This would allow students to complete a course in just a few weeks and then go on to another.

Mr. Sawasky distributed copies of a proposed curriculum model which he stressed was only a discussion piece (see attachment). He pointed out that the business is requiring more of the entry level person all the time, which means our graduates need to know more and more when they graduate. This causes us to add more and more courses to the associate degree program. His proposal suggests that there be program prerequisites which students would have to meet before entering the program. Tech Prep students would have these incoming skills. This would relieve us of the burden of having an associate degree program which requires more than 80 credits to graduate.

If students had these prerequisite skills, they could begin the first certificate program, Drafting and Design Technology, by taking the second Drafting course. Mr. Sawasky explained that, since our long-term goal is for students to earn the associate degree, he has included some General Education courses in each certificate, to get them started in that direction.

Mr. Sawasky raised the question of what to do with students who have taken courses at Baker. Should we be giving equivalencies for those courses? Some are equivalent, while others are not. Also, should we be giving credits for work experience, or allowing those with work experience to take higher level courses?

The second certificate, in Computer Aided Design, would include experience with three different types of software, as well as an English and a Math course. Mr. Sawasky believes that offering these two certificates would give us more program completers. Of course, students could take courses in both certificates at the same time if they wished.

Mr. Tahir Khan reported that CAD 135 has been renumbered to become CAD 219.

Mr. Sawasky pointed out that the second certificate would provide students with two classes each in AutoCAD, Unigraphics, and CATIA. Currently, the upper level CAD classes are all CATIA classes. In the past, the advisory committees have discussed the question of how much math a CAD designer must have. Mr. Sawasky's proposed curriculum offers students the choice of taking either theoretical or applied trigonometry, with a footnote stating that if they plan to pursue a degree in Mechanical Manufacturing Engineering, they should take MAT 156.

In regard to listing General Education courses as part of the certificates, Dr. Blackman pointed out that employers tell us they want people who can speak, read, think, and solve problems. If these types of courses are included in the certificates, students will be obtaining these skills early, rather than taking all their technical courses without gaining the needed communication skills.

Mr. Pat May questioned the inclusion of POL 151, American Government, in the first certificate. She wondered how that would benefit the student. Dr. Blackman responded that this is only a draft proposal. We may want to include only the English and Math classes in the certificate, and leave POL 151 to be taken later when students complete their associate degree. Mr. Barran suggested that another writing or speaking class might be better. He stressed that speaking is an important skill for students to have. Dr. Blackman suggested that perhaps an applied psychology course could be included, since working with people is an important workplace skill. Ms. May suggested PSY 263, Psychology of Organizational Behavior.

Dr. Blackman asked whether a student could expect to get any kind of a job with the Drafting certificate or just a high school program. Mr. Khan suggested that CAD 120 be added to that certificate. This would provide students with more experience in AutoCAD, which would help them get a starting position in industry.

Dr. Blackman suggested that we need to spell out the competencies students will get in each class. This information can become part of their portfolio, so the employer knows what skills they have when they apply for a job. Mr. Sawasky agreed, stating that one of his goals would be to distribute to industrial partners a list of the competencies for each course, so the employer would know what skill level students should have.

Ms. Sally Kalson suggested that co-op classes should be added to the proposed program. This type of work experience is critical, as it motivates students to continue their studies when they see what skills they still need to obtain to be successful in the workplace. Ms. Kalson also suggested that the General Education courses which provide the student with training in written and oral communication skills should be technically oriented in order to better prepare them for their future work in industry.

Mr. Sawasky explained that, upon completion of the CAD certificate, students would be eligible for co-op. We currently require 27 credits for co-op.

Mr. Sommerstorfer expressed the view that it is good to include General Education requirements early in the program. Currently, some students finish their technical courses, but do not complete the degree because they have problems with the General Education courses. Including these requirements early in the certificates could help avoid that problem.

Ms. May suggested that SPE 129, Interpersonal Communication, might be included in the first certificate, rather than POL 151.

Dr. Blackman pointed out that a typical associate degree program requires 60-72 credits. These two options would require 75 and 76 credits as they are listed in this proposal. She wondered whether co-op could be substituted for another class, so as not to add any more credit requirements to the programs. Mr. Sawasky responded that co-op would be in addition to what is listed now. He suggested that we may need to look at possible course revisions and/or combinations of courses. Perhaps the Technology Department could develop industry-related courses which would count as General Education courses.

Mr. Khan suggested that, at the higher levels, perhaps students do not need both board Drafting classes and CAD classes. In the higher level CAD classes, the focus is on concepts, not just the use of the software.

Mr. Sawasky referred the group to his "Proposal for Teaching Drafting" (see attachment). He stated that OCC is in the minority by continuing to teach manual drafting. Macomb Community College and Mott Community College also teach manual drafting. Some textbooks are now being produced which use manual drafting in conjunction with the computer to teach basic theory.

Mr. Khan commented that that is how we are doing it now, except that we have the students in two separate classes, one teaching board drafting, and the other teaching the computer. These classes are pre- or corequisites for each other. Mr. Khan believes that, for the sake of the students, we need to merge the higher level classes together.

Mr. Sawasky reported that he is currently reviewing three textbooks which are all appropriate for different levels, which he believes could meet our needs, emphasizing the need for theoretical visualization in the beginning. There is a problem currently in the CAD 110 and CAD 120 classes, when students come in with no drafting background and no understanding of the basic concepts. It is difficult to teach the concepts using a CAD software package.

Mr. Khan responded that allowing students to begin with a CAD class is a marketing tool. Students become interested in using the computer and then go on to take other classes. If they were required to take board drafting classes first, they might not continue their studies.

Mr. Sawasky pointed out that, in the proposed Machine Tool and Die Design Option, all the CAD courses are taught using Unigraphics. Mr. Beafore commented that, at DaimlerChrysler, all the tooling is done on CATIA.

Mr. Khan responded that students take two CATIA classes as part of the CAD certificate, as well as two Unigraphics classes. So wherever they end up, they should be able to adapt to the software in use there. Many companies also do in-house training of their employees. Mr. Sommerstorfer agreed, saying that General Motors puts everyone through a six-week Unigraphics class. As long as they learn the basics at OCC, they will be all right.

Dr. Blackman told the group that they would receive follow-up information on the proposals, so they can provide input and approval as the curriculum revisions are developed.

Conclusion

Ms. Kalson informed the group that OCC's annual co-op day would be held on March 11, 1999. She explained the purpose of this event, which provides employers with an opportunity to come to campus and have half-hour scheduled interviews with prospective co-op students. This year an evening job fair is being added in an effort to involve evening students as well.

Mr. Sawasky announced that the annual high school drafting contest would be held on March 12, 1999. Judges are needed, as well as gifts and prizes for the students. Anyone interested in helping will be greatly appreciated.

Dr. Blackman thanked everyone for coming. She explained that we are trying to build up all the advisory committees to have a broader representation from their respective industries. We will be asking committee members to nominate others they might recommend to become members of the committee. Perhaps we can add representatives from smaller companies to the committee as well.

Respectfully submitted,

Ruth Springer
(advw99:ddt012999)

DRAFTING AND DESIGN TECHNOLOGY
CERTIFICATE
(step 1)

Program Prerequisites: MAT 114 or High School Geometry
DDT 100 or Tech Prep Advanced Placement
CAD 110 or Tech Prep Advanced Placement

Major Requirements

DDT 105	Product Drafting	3
DDT 115	Descriptive Geometry	3
MEC 101	Introduction to Manufacturing Processes	3
QAT 104	Geometric Dimensioning and Tolerancing	3

General studies : (count toward assoc. degree gen. Ed . requirements)

English / Communications	3
Math	3
Political Science	3
	21
	Credits

COMPUTER AIDED DESIGN
CERTIFICATE
(step 2)

Program prerequisite : Completion of the Drafting Certificate or equivalent

Major Requirements

CAD 135	Assemblies and Components	4
CAD 120	CAD Applications in Engineering Drawing and Design	3
CAD 210.1	Three Dimensional Wireframe Design and Surface Generation Techniques	4
CAD 211	Topics in Design and Drafting Applications	4
CAD 215	Advanced Curves and Surfaces	4

General studies:

English	3
Math	3
	25
	(46)

COMPUTER AIDED DESIGN AND DRAFTING

ASSOCIATE DEGREE OPTIONS

Option Prerequisites: Completion of Drafting and CAD certificates or equivalents. 46

TRANSPORTATION DESIGN TECHNOLOGIES OPTION
Option Requirements***

Credits

CAD 260	Body Print Interpretation and Detailing	4
CAD 270	Body Layout Applications	4
CAD 280	Applications of Vehicle Body Surface Development	4
ADT 110	Introduction to Body Drafting	3
MAT 156*	Trigonometry	3
OR		
APM 821	Plane Trigonometry	3
ADT 230	Body Layout II - Surfacing	3
APD 838	Template and Fixture Layout	3
		24

General studies ***(required for all associate degree programs)

Credits as needed to complete degree requirements. 5

75

*MAT 156 recommended for students who want to pursue a degree in Mechanical Manufacturing Engineering .

MACHINE TOOL AND DIE DESIGN OPTION

Option Requirements***

CAD 135	Assemblies and Components	4
CAD 220	Product design and layout	
CAD 230	CAD Applications in Machine Tool Fixtures and Gauges	3
CAD 235	CAD Applications in Die Design	3
APD 826	Die Design II	3
APD 845	Tool Design It	3
MAT 156*	Trigonometry	3
OR		
APM 821	Plane Trigonometry	3
ADT 110	Introduction to Body Drafting	3
APD 838	Template and Fixture Layout	3
		25
General studies:		5
		76

*MAT 156 recommended for students who want to pursue a degree in mechanical Manufacturing Engineering

---PROPOSAL FOR TEACHING DRAFTING ---

CONCEPTS
STANDARDS
THEORY
&
PRACTICAL APPLICATION
by
using the computer with a CAD software application package in conjunction with the traditional drafting board, triangles, and other instruments of the trade.

The drafting field as we have known it down through the ages has really changed very little. Most of the drawing instruments are basically the same. The pencil is still a graphite based material & the paper a rag content medium. The drafter still places his design down one line and a time and must erase one line at a time or re-draw to make changes.

The first real change in the drafting field has been the appearance of the computer. While the computer replaces the traditional drawing instruments, pencils, and paper with digitizing pad & puck, CRT display, keyboard, hard drive & storage devices, it can not think for us, apply standards or make design decisions. It can however, relieve us from the mundane and repetitive tasks of lettering, dealing with line quality, tedious erasures and re-draws. The computer can make changes faster, compare various design ideas easier, have more accuracy & precision dimensions and increase productivity.

The idea is to:

- introduce students to the career of drafting and design by using the computer in conjunction with the traditional drafting board and drawing instruments method.
- teach the concepts of two dimensional view representation by using the computer in conjunction with the *"T"* square, triangle, and divider method.
- tap the storage and retrieval capacity of the computer to access the industry standards
- teach the concepts of geometric construction ,sectioning and primary auxiliary views.

spend more time on the theory and its application to problem solving

help keep us current with the drafting field movement toward total computer aided drafting and design.

keep the TECH PREP concept of a seamless and continual learning process.

help area drafting instructors to stay current and "up to speed".

have students prepared and well qualified to step into the job and be productive without additional in-house training.

To implement the proposal, course content would have to be developed that would integrate the concepts of drafting, the computer hardware, and its software. Handouts, drawing assignments, and work sheets that integrate the drafting and computer would need to be developed, tested and verified.

Currently three textbooks are being evaluated. Eac one develops basic drafting skills using traditional instruments and the CAD as the basic tool.

The equipment and supplies requirements would be for one classrooms equipped with twenty-seven work stations. Cost would include the setup of the computer, and a network to connect the twenty-seven work stations to a master file ~ demo station. The present tables, reference desk, and chairs would be utilized. Roughly, for approximately $1,000 per work station, plus roughly $2,000 for the network installation, the cost for a classroom setup of twenty-seven (and one computer for the file server - $1,500.00) would be about $30,500 x 2 labs = $61,000 .

This would enable the students to become more proficient at a faster rate in CAD 110 and CAD 120.

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