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DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Baharudin Ujang, M.I.D.

*****

The Ohio State University
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ABSTRACT

Research shows design education is concerned with providing an educational experience that helps develop skills and prepare responsible professionals. It has been suggested that collaboration between industrial design departments and industry provides an enriched educational experience for industrial design students. Studying the collaborative project is a step toward gaining a general understanding (a) to look at how the collaborative project contributes toward an enriched educational experience; (b) to examine how design issues are addressed in the collaborative project; and (c) to identify the problems and conflicts that emerge. While every situation has unique qualities and requirements, it is feasible to take findings from one study and apply them to another similar situation, thus this study provides a perspective for the University Technology of MARA (UiTM) in Malaysia. It may help guide curriculum development that balances student needs, educational goals and objectives, and industrial development of Malaysia. The case study method is used to present the collaborative project experience conducted between university design departments and industry. Data is gathered through review of literature, documents, observations and interviews of participating students, instructors and client. The outcomes of the study that are applicable to the industrial design department at UiTM, Malaysia are that the collaborative project experience builds the students’
design skills in terms of problem solving, material usage, and working within particular limitations. However, educational objectives need to become a part of the shared vision between industrial design departments and industry that need to be negotiated through the collaboration process. Careful selection of collaborative projects can significantly contribute to design education experience for industrial design students, including the type of product to be designed, the complexity project and the commitment of industry partners. Collaboration can provide a holistic approach opportunity to educate designers and industry.
ACKNOWLEDGMENTS

I wish to express my deepest gratitude to my adviser, Dr. Sydney Walker for her patient guidance, unfailing support and encouragement throughout this long, challenging process. I am also grateful to the members of my committee for their guidance and support. A special thanks to my family for their patience, understanding, and encouragement. This research was supported by a scholarship from UiTM, Malaysia.
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INTRODUCTION

Background to the study

I am a faculty member of the School of Art and Design at University Technology MARA (UiTM) and I taught in the Industrial Design Department for seven years prior to coming to The Ohio State University (OSU). I also served as the Head of the Industrial Design Department from 1994 to 1996. I was awarded a scholarship by University Technology MARA and it is my intent that my study here at The Ohio State University will benefit the Industrial Design Department at UiTM who is in the process of improving the curriculum to answer the needs of students and the country's vision of industrialization.

Set against this scenario, is the larger picture of Malaysia's vision for the future and design education at the School of Art and Design at University Technology MARA. In essence, Malaysia's vision for the future, or "Vision 2020", as it is popularly called, is a plan of how Malaysia's is going to transform into a fully developed nation economically, socially, spiritually, psychologically, culturally, and politically. In Malaysia, higher education aims to produce professionals to meet the nation's demand for human resources and provide facilities for research and consultancy services. Universities, colleges, and other institutions of higher learning provide education and training and there are plans for the expansion of post-graduate programs as related to and in keeping with Malaysia's vision for the future.
My intent is that my study can contribute to industrial design education in Malaysia and specifically to the industrial design program at UiTM. In this regard, I am interested in understanding the experience of collaboration between industrial design departments and industry. The research can be helpful in providing a perspective and in raising possibilities and suggesting alternatives for the Malaysian situation. However, I am also cautious about offering any real solutions for an actual collaborative program for UiTM until more information is available and more research has been conducted.

School of Art and Design, UiTM

The School of Art and Design at UiTM has grown to become the foremost Art and Design institution of higher learning in Malaysia. It is the pioneer art and design school in Malaysia. It is also the only government-sponsored school of art and design. The school produces nearly 80% of the country's industrial designers.

Department of Industrial Design at UiTM

The industrial design program, a component of the School of Art and Design, is a four-year undergraduate program leading to professional employment or graduate study. The objective and goal of the department is to produce competent professional industrial designers who are equipped with design skills, and basic management, and entrepreneurial skills for the professional world. In their first year, students in the program take
foundation studies in art and design, conducted by the Department of Foundation Studies. The following three years are mostly studio-based classes and other liberal art studies, including classes in art history, humanities, art and design theory, and other interdisciplinary classes. Areas of specialization in the Department of Industrial Design are product design, furniture design, and transportation design.

Even though the primary educational objectives have been identified by the department, strategies and solutions to fully achieve these goals are still vague. There is a need to reevaluate the steps that should be considered in order to focus on the real need of industrial design students, which is to move closer to the professional world. This is a central goal that has been stated by the Department of Industrial Design at UiTM.

Industrial Design Today

Industrial design is a broad term that encompasses a multitude of the products from industry. These products range from furniture, toys, sports equipment, to machinery and automobiles. Industrial design involves a process of analyzing, creating, planning, and developing articles for mass manufacture (Lindbeck, 1963, p.89).” Today, industrial design practice is changing. There is a need for industrial designers to reexamine their roles and redefine what design means in today’s world. The issues that designers face are concerned with giving products meaning or soul and thus moving away from disposable commodities. Additionally, designers are challenged by global design, new technologies, and ethics in design. The three major authors used in my study to investigate industrial design today are Bruce Tharp (1997), Richard Buchanan (1998), and Victor Papanek (1984). The
writings and ideas presented by these three authors primarily deal with the issues of what is considered good design and what are the responsibilities of industrial designers. In my study, I use Tharp's (1997) definition of 'soul' as a quality that is related to a product's value in terms of personal substance and humanity. Buchanan (1998) discusses design and culture and Papanek (1984) investigates ethics, responsibility, and new technologies in industrial design. As an industrial designer and an educator, I am interested in the issues that concern industrial design today and also their implications for industrial design education.

In general, most industrial designers would agree that design education is concerned with providing a learning experience that can help develop skills and prepare responsible professionals. It has been suggested that collaboration between industrial design departments and industry may be an approach in design education that contributes to these objectives. Studying the collaborative experience is a first step towards examining this premise and asking the questions, What is accomplished? and What difference does it make in the lives of design education students and the society they live in?

Collaboration

I share the view of Mattesich & Monsey (1992) that collaboration is a mutually beneficial relationship, a relationship built on trust and respect, a relationship with shared responsibility and a relationship that allows for professional development and the achievement of new ideas and results.
I have discovered that while there is much literature about collaboration in general, there are only a limited number of studies that deal specifically with industrial design and industry (MacDonald and O’Neil, 1997; Visser and Gattis, 1997; Wilson, 1997). MacDonald and O’Neil (1997) examine and discuss the collaborative effort between education and industry at Glasgow School of Art’s Department of Product Design. This particular product design department provides students with the experience of partnerships with industry. The students work in a wide range of industries, from communication technologies to product development.

The works of Johnston (1997), Rath (1978), Taylor (1997) and Powers and Powers (1988) are general works on collaboration, but nevertheless added to my understanding of the challenges that can occur in collaboration. For example, in Johnston’s (1997) study, she described collaboration as an untidy business. Like Rath (1978), Johnston (1997) also expresses similar concerns over a confusion about how collaboration should work, what role participants' are to play, how to construct relationships, and how to dispell a distrust of the motives of participants.

Finally, the literature review also revealed studies that deal with the advantages of collaboration. In many fields, collaboration has been touted as a way to improve efficiency, build better programs, and solve complex problems. Proponents of collaboration have extolled the virtues of collaboration and have stated that collaboration is a phenomenon that can empower people and systems to change, bringing together people and resources to achieve new ideas and results (Winer & Ray, 1994; Rath, 1978; Mattessich & Monsey, 1992; MacDonald and O’Neil, 1997). Perhaps one of the best notions to come out of collaboration from an educational
perspective is that collaboration can be a rich context for learning for educators and professionals. Mattessich and Monsey (1992) state that because collaborative work is action oriented, where groups jointly solve problems, create change and accomplish shared goals and where much of the work requires deliberation and discussion, this can provide fertile ground for learning. They argue that discussions between people of different backgrounds, attempting to accomplish common goals promote learning. This is because as the people involved discuss and work together, they must work to understand different points of view which can lead to self-reflection and examination as well as help with the ability to solve complex problems.

Statement of Problem

Through my experience as a design educator and practicing designer, I feel that in order to produce a better prepared student for the professional world at the School of Art and Design at UiTM, one must examine the current situation and future needs of the nation for industrialization. The answer does not lie in blindly duplicating or adopting any existing curriculum from other institutions; however, studying programs from institutions that have long standing experiences may help to provide needed insights.

As an educator, I strongly feel that the primary objective of the Industrial Design Department at UiTM is to provide students with as rich and optimum a professional educational experience as possible. By providing such an educational experience students may be better equipped to enter the professional world. One way in which the department could provide professional experience for the student is to consider having educational programs with industries and corporate organizations. Presently, at the
Industrial Design Department at UiTM, programs such as internships and practical training are part of the curriculum; however, other educational programs like collaboration with industries and corporate firms should also be considered. The experience of working collaboratively with industries may be helpful in fulfilling a major goal of the industrial design department at UiTM which is to produce competent professional students.

Thus, the central research question of my study is, How does collaboration contribute toward an enriched educational experience for industrial design students? To investigate this question, I will conduct a case study of a collaborative project between The Ohio State University Department of Design and the Dynacraft Golf Products Inc.

There are three primary factors to be considered in my study: 1.) educational practices at UiTM and OSU, 2.) design philosophies of the industrial departments of UiTM and OSU; and 3.) issues of collaboration between university industrial design departments and industry.

Purpose of Study

The purpose of this study is to develop an understanding of collaboration between industrial design departments and industry using a case study approach. I would like to understand what the collaborative project experience is and to consider its potential for UiTM in Malaysia. Conducting a case study of a collaborative project study may help provide this understanding. The result of the study may provide possible guidelines for developing a similar program that takes into careful consideration the situation and the needs in Malaysia. A case study can, according to Stake
(1994), advance our understanding, illustrate a condition, and extend an experience (Merriam, 1988; Donmoyer, 1990; Schofield, 1990, Yin, 1989; Perakyla, 1997). My aim is not to generalize or transfer, each case study is unique in and of itself, however, researchers such as Stake (1994) and Schofield (1990) agree that it is possible to take findings from one study and apply them to understand another similar situation provided there is thick description of the two sites.

My proposed study will focus on gaining perspectives from students, faculty, and industry involved in the case study, about the collaborative process as it occurs between the university and industry. I have chosen to study OSU because I learned through discussions with faculty members and students of the Industrial Design Department that the department has a history of collaborative projects with industry and is in good standing with the area’s industries. The Industrial Design Department is also accredited by the Industrial Designers Society of America (IDSA) as one of the top ten industrial design programs in America.

Methodology

I plan to use a multiple research approach, triangulation, where data can be obtained to strengthen and validate the study. According to Reinharz (1992) “multiple methods increase the likelihood of obtaining scientific credibility and research utility...[and] work to enhance understanding both by adding layers of information and by using one type of data to validate or refine another (p.197, 201).”
In order to collect the data, I plan to use the case study approach, interviews and observations. According to Stake (1994) case studies are useful when researchers need to understand a particular situation in great depth and where one can identify cases rich in information.

I plan to observe an industrial design class at OSU that has a collaborative design project with Dynacraft Golf Products Inc., a company that specializes in manufacturing golf clubs. It is one of the leading manufacturers of golf clubs in the USA. The company's headquarters are in Newark, Ohio. As the researcher, I plan to observe the participants engaging in activities and the physical aspects of the situation. Observation data will be recorded in written and audio taped field notes. I also plan to conduct interviews with selected students, faculty members, and representatives of the client, Dynacraft. I further plan to interview selected faculty members and the head of the industrial design department of UiTM through written correspondence, electronic mail, and audio-taped responses. I will also collect data about UiTM and OSU through literature from written documents such as curriculum materials and syllabi. The research will be conducted at the OSU Industrial Design Department and also on site at Dynacraft headquarters in Newark, Ohio.

Methods of Data Analysis

I plan to use content analysis and identify categories, emergent patterns, themes, issues from the data collected. Multiple data collection methods will contribute to the trustworthiness of the data (Glesne and
Peshkin, 1992). Connecting similar themes and patterns will be through the literature review and a preliminary data analysis.

The primary research questions that will guide the analysis are:

1) How does the collaborative project contribute toward an enriched educational experience for industrial design students?

2) How are the design issues addressed in the collaborative project conducted between The Ohio State University Industrial Design Department and Dynacraft Golf Products Inc?

3) What are the problems and conflicts which emerge when university design education departments collaborate with industry?

The analysis will be presented in narrative style through the chronology of the fieldwork events.

Significance of the study

The purpose of this study is to gain general understanding of the experience of the collaborative project between industrial design at the university level and industry in the real world. At the same time, there is also an awareness that there is a need for the involvement of collaborative partnership between education and industry in Malaysia today because of the country’s vision for industrialization. The study can act as a guide in providing a perspective, raising possibilities and suggesting alternatives for the Malaysian situation. The study may also be useful in proposing guidelines for developing an industrial design education curriculum that balances student needs, educational goals and objectives, and the country’s goals for
cultural and industrial development. While every situation has unique qualities and requirements, as Stake (1994) and Schofield (1990) comment, it is feasible to take findings from one case study and apply them to another similar situation if there is thick description of the two sites. As previously suggested, the findings from the OSU cannot be blindly duplicated in the Industrial Design Department at UiTM, but can provide needed insights for curriculum development and educational practice that offers UiTM students greater opportunities to enter as more competent professionals.
CHAPTER 1
COLLABORATION: DEFINITION AND CHALLENGES

Introduction

Mattesich and Monsey (1992) define collaboration as a process that allows one to reach goals that otherwise may not be reached or achieved singly or may not be reached or achieved as effectively singly. Rath (1978) considers collaboration as involving individuals, partnerships or corporation. Yet another definition of collaboration is:

Collaboration is a mutual beneficial and well-defined relationship entered into by two or more organizations to achieve common goals. The relationship includes a commitment to: a definition of mutual relationships and goals; a jointly developed structure and shared responsibility; mutual authority and accountability for success; and sharing of resources and rewards (Mattessich & Monsey, 1992).

In general, these authors seem to be propose similar ideas about the benefits of the collaborative process involving shared needs and responsibilities. I agree that collaboration is established, as elaborated by Rath, when one seeks another party to provide a needed service or resource. I also concur that it is a process that allows one to reach their goals that may not be reached if one were not in partnership or collaborating together and I further share the view of Mattesich & Monsey (1992) that
collaboration is a mutually beneficial relationship built on trust and respect. I further agree that collaboration allows for professional development and the achievement of new ideas and results.

I have discovered that while there is much literature about collaboration in general, there are only a limited number that deal specifically with industrial design and industry (MacDonald and O'Neil, 1997; Visser and Gattis, 1997; Wilson, 1997). MacDonald and O'Neil (1997) examine and discuss the collaborative effort between education and industry at Glasgow School of Art's Department of Product Design. This particular product design department provides students with the experience of partnerships with industry. The students worked in a wide range of industries, from communication technologies to product development.

According to the department, "the challenge lies in devising a truly interactive relationship between industry and education... (p.27)." Through their experience, the department stresses that it is vital that the academic integrity of the student's involvement is protected, meaning that students would be allowed to show the end products at examinations or presentations. I also find that the protection of the students' academic integrity should be related to the ongoing process as well as the end product. Overall, the Glasgow Art Department is positive about collaboration with industry. They stated that partnership between education and industry appears to be vital for both parties.

The Glasgow Art Department was able to build up case studies that allowed them to show the benefits that resulted from collaboration with industry. Among other things, the case studies were also useful in demonstrating to students how "the students are exposed to real life
situations which provide them with valuable skills and experience, not only with a company’s organization and culture but with its technologies when seeking those first crucial jobs (p.33).” In other words, the collaboration developed both competence and professionalism in the students. The department reported that a particular company had this to say about a student who had participated in such a collaboration, “...she had a better understanding of the design process than others...a valuable asset for our company, (p. 32).”

Another promising potential for collaboration projects with industry, is in the area of research and development. Such projects allow companies to explore concept future products, conduct product improvement and to further the development of current projects. These companies, it is stated, very often have little or no time or staff motivation to handle these areas.

I have also found reports, from Wilson (1997), an Associate Professor at Pratt Institute, a presenter at the 1999 Industrial Designers Society of America (IDSA) Design Education Conference. Wilson believes that there are several key reasons to pursue industry partnerships, one of which is that it can “augment and enhance the educational experience of students” and help to “increase professional and pre-professional credentials for students (p.1).” She explains that when students are involved with industry, they have the opportunity to view industry from the inside. According to Wilson, students have the chance to interact with project managers, engineers, marketers and are also able to learn about consumer groups, suppliers, and other groups in the design landscape. Wilson (1997) adds that, in her experience, her students who have been involved in collaboration projects with industry have “gained knowledge, insight, confidence and presentation skills (p.6).” She
believes that her students have also “greater objectivity about their work and [can]...add the work to their portfolios, an added value for themselves as potential employees (p.6).” It is clear that Wilson is convinced of the value that collaboration between university and industry has to offer.

There are also other related areas of literature that provide insight for investigating collaboration. Hersey and Blanchard’s (1988) and Cartwright and Zander’s (1953) research sheds light on the functioning of groups and the powers and influence in groups. The works of Johnston (1997), Rath (1978), Taylor (1997) and Powers and Powers (1988) also added to my understanding of the challenges that can occur in collaboration. For example, in Johnston’s (1997) study, she described collaboration as an untidy business. Like Rath (1978), Johnston also echoes similar concerns over the sense of confusion about how collaboration should work, what roles participants’ are to play, how to construct relationships and to how dispell any distrust of the motives of the participants. Johnston’s further reports that in the beginning, participants did not know how to behave and conduct themselves. She states that they felt unsure about their role in the collaborative effort and also about the collaboration in general. It was reported, in the participants’ journals that they felt confused because there were no clear goals, and they did not have a clear vision. These factors, which should be taken as cautions when constructing collaborative ventures, occur in the initial stages of planning, a crucial time for collaborative projects.

Partnership does not mean each party has equal power, but rather a negotiated agreement about roles and responsibilities and a clear understanding about where power is located (Taylor, 1997). Hudson, as
cited by Taylor, identifies two main difficulties that collaboration raises. First, the participants lose some of their freedom to act independently when they might prefer to maintain control. Second, the participants must invest scarce resources and energy in developing and maintaining relationships with another organization when the potential returns on their investments are often unclear and intangible.

According to Taylor (1997), collaboration results in a different kind of working relationship. It involves power sharing and negotiating issues connected with different perceptions, values, and interests so as "to promote the collective ability to work together, (p.179)." Taylor also suggests that regarding experience as knowledge in itself, rather than something to derive knowledge from, allows the voice of the user to become available. In the end, the experience of the user is constructed and reconstructed. For instance, the professional educator temporarily relinquishes power and control, and adopts a facilitator role.

Why Involve University Students in Collaborative Projects?

In my proposal, I have stated that the literature about collaboration between industry and university suggests that such collaboration can be mutually beneficial to both industry and university. The literature advises also that one of the primary advantages of collaboration between industry and university is providing professional development for students. It has been suggested that involving students in real-world tasks affords students advantages (MacDonald & O'Neil, 1997; Rath, 1978; Taylor, 1997; Tinzmann et al, 1990). That is, through dialogue, interaction, and collaboration, students have the opportunity to examine different perspectives; become more knowledgeable; and become more successful learners.
Visser and Gattis (1997) share Wilson's conviction that collaborative programs with industry are valuable for students because students gain knowledge and experience that is based on the practical real world "...learn by doing, making mistakes, and learning from yourself and others (p.10)."

Conflicts of Goals and Purpose
Aside from the challenges stated earlier in the chapter by Johnston (1997), Rath (1978) also suggests that on the part of industry, there can also be confusion about the "mission of...education, school organization, and how to work effectively with school people (p.27)." It is also suggested that in collaboration, industry may be unwilling to make long-range commitments and this can lead to creating a sense of "...self-seeking motivations on the part of industry (p.27)." Rath points out that in collaboration, industry may show disillusionment when school or university officials are cautious about industry initiated programs. She states that on the part of industry, there can be a lack of planned organization, staff assignment, and funds to effectively implement the collaborative program with schools and universities. Rath states that these problem areas suggest that both educators and industry have problems in understanding collaboration.

Power Relationships
An area of conflict in collaboration that is highlighted in the literature is the issue of distribution of power or power relationships. Hersey (1988) writes about group dynamics and how problem-solving groups accomplish their goals. He states that groups develop personalities and that an effective group is a group that can respond to different situations and problems. Hersey adds that group members need to be able to adapt their roles to the
needs of the group. The author elaborates that there are two categories for roles, helping and hindering roles. Helping roles are, for example, those which clarify purposes, define goals, encourage and guide responses, promote commitment and facilitate problem-solving. Hindering roles are exemplified by attacking other personalities, dominating the group, name calling, or expressing futility, resignation, or helplessness. Cartwright and Zander (1953) also discuss the functioning of groups and the power and influence in groups. They state that an individual has power over another individual if one can do something that results in a change in the other. An individual with power can influence another through many forms, from persuasion to threats.

Johnston (1997) also states that one of collaboration’s characteristics is that of sharing and a shared goal. There was an understanding between participants that collaboration has “commonality of purpose and equality of power... (p.7)” but they did not know how to actualize this. The issue of power came into play during the decision-making sessions. In the beginning, it was difficult. Teachers would not assert themselves and preferred to rely on traditional hierarchical power. As an example, some teachers were afraid to speak up while discussing issues for fear of being perceived as being aggressive or uncooperative. These teachers did not feel safe disagreeing. Dissension was not valued. During such instances, Johnston reports that the traditional authority person was called upon. Johnston states that it was ironical that while the group members were arguing for shared power, whenever the group was not functioning and there was a clear split, the members would resort to someone in a hierarchical role to mediate the situation.
Rath (1978) discusses the power relationship in collaboration between schools and industry. There is agreement that in a collaborative effort, teachers need to redefine their roles as authority figures. It is also agreed that the exercise of power in collaborative groups can cause group pressures. There may be an in-group which may silence other group members and this in turn leads to the silenced members being ignored. This can cause conflicts for the overall collaborative effort.

In Cross's (1994) study of collaborative writing in a business setting, he reported that hierarchical power (the president of the company) shaped and dominated all debates. Therefore, hierarchical power preempted conflict by imposing the views of the most powerful group members. Cross's (1994) research suggest that subordinates have a tendency to agree with their superiors, thus there should be ways to reduce destructive consequences of hierarchical power and to have checks and balances in the hierarchical system to allow for open and honest communication.

The Role of Compromise

In collaboration, the concept of give and take is an important one. Rath (1978) states that participants of collaboration need to be prepared to offer alternatives and to compromise. She states that the process of collaboration should not depend entirely on one idea, therefore, collaborators should be prepared to offer alternatives. It is also suggested that in order to counter any potential area of conflict, collaborators should also know in advance when and where they are prepared to compromise. They need to analyze issues to determine which are negotiable and which are not. Rath (1978) points out that it is important that all persons involved in
collaboration learn how to compromise in order to reach a mutually acceptable agreement.

Rath (1978) believes that the process of compromise is critical to the success and the survival of collaboration. She states that it is not enough to put people together from different organizations, this does not guarantee collaboration. She emphasizes that there needs to be an agreement on a broad issue and there must be an on-going process of negotiation. The need for compromise and negotiation is also echoed by Tinzmann et al, (1990) who writes that without these skills, it would be difficult for collaboration to be successful. Johnston (1997) also agrees that compromise is essential for collaboration to work. She states that the group has to have shared norms in areas such as decision making. In Johnston’s (1997) study that involved teachers in schools collaborating on a school project, she reports that compromise can be difficult to achieve, for example, some group members were process oriented whereas other group members were product oriented. The process people found it hard to understand why everything had to be done so quickly and the product people insisted on deadlines. This resulted in a split within the group that greatly hurt the collaborative effort. Johnston, (1997) strongly advocates avoiding splits within groups. She encourages working towards a “…win/win situation...(p.156)” where group members commit to compromise and communication which in turn leads to shared decision making, a sense of ownership and trust. However, Johnston states that compromise and collaboration cannot be learned by reading a book. She states that it requires “on the job training (p.156).”
The Challenge of Time

The issue of compromise leads to another feature, it is that collaboration takes time. Researchers, such as Johnston (1997), Rath (1978), Taylor (1997), agree that collaboration is a time consuming effort. A common complaint from participants of collaboration is that there never seems to be enough time. In Johnston's study, participants reported that talking about things made the project longer than necessary and that at times it felt pointless going over and over again but there were also times when it was productive. Participants also reported feeling that it took too much time to come to a final decision, that is, it was a struggle to decide when a decision was final. However, Johnston adds that as participants became used to collaborating, it became easier to deal with the issues. Rath reports that "there is never enough time...(p.28);" Taylor agrees and reports in a study between industry and professional students, that students who were involved in collaborative programs felt that there was not enough time. She states that the main criticism was that the pace of learning was too fast and there was not enough time to address the problem in depth. The students in her study identified specific gaps in their knowledge. The newly qualified workers whom she interviewed could not see a solution to the problem of lack of time, other than extending the duration of the course.

Conflict Over Priorities

Another area that can pose a challenge for collaboration is in the area of the discovery of knowledge. As Powers & Powers et al (1988) explain, traditionally higher education seeks knowledge as an end in itself, knowledge for knowledge sake; whereas industry does so for profit. As Rath (1978) states, there may be a gap between the requirements of industry and the
goals of universities. Clearly, there can be a difference of interests, goals and purposes when industry and university collaborate. Powers and Powers et al state that a primary reason why universities want to collaborate with industry is “to improve their financial situations, corporations may provide entrepreneurial skills and capital and the university may provide research expertise...(p.20-21).” Powers and Powers et al also state that the primary reason why industry collaborates with universities is “to meet corporate product, service, or management needs (p.23).” Universities can help industries to make new products, improve current products, optimize management, and make technological advances in production techniques; all of which profits industry. Through collaboration with universities, industry is able to gain access to specialists who otherwise might not be accessible. Powers and Powers et al also add that students who collaborate with industry “frequently become permanent employees of the corporations involved (p.24).” It is also noted that industry collaborates with universities because it can be cost effective. Hiring research staff, buying equipment can be expensive. Universities have buildings with equipment subsidized by government grants and quality manpower. Therefore, it would appear to be in industry’s interest to collaborate with universities.

According to Powers and Powers et al (1988), industries choose to interact with universities in order to “(1) to obtain access to manpower, (2) to obtain a window on science and technology, (3) to provide general support of technical excellence, (4) to gain access to university facilities, (5) to obtain prestige or enhance the company’s image (p.25).” On the other hand, Power and Power (1988) view the reasons that universities chose to collaborate with industry as the following:
(1) to obtain access to industry as a new source of money and to help diversify the university’s funding base, (2) to provide student exposure to real-world research problems, (3) to provide better training for the increasing number of graduates going into industry, (4) to work on an intellectually challenging research program that may be of immediate importance to society, (5) to avoid some of the red tape and time-consuming reporting requirements that obtaining government money involves (p.25-26).

While it may seem, on the surface, that the interest of industry and university differ, Powers and Powers et al (1988) cite Krumbhaar (1985) who states that the needs of both parties can be satisfied through collaboration. The authors also suggest that there is a commonality of interest because many of the benefits that industry desires are the same benefits that a university may want to offer. It appears that while collaboration needs to satisfy the interests of both parties, how explicitly these interests are stated and made known is crucial to the success of the collaborative process.

**Vested Interests**

One conflict that may occur in collaboration, as pointed out by Powers and Powers et al (1988), is if industry is only interested in supporting knowledge bases which are already conceptualized; whereas, universities are about exploration in order to provide the technical base of the future. Another area of conflict is the academic necessity to publish and industry’s need for secrecy. The authors cite Tatel and Guthrie (1983) as expressing concern that industry imposes limits on information exchange. They state, “if students work on projects that cannot be freely discussed, their education is
of value only to the sponsor (p.182).” However, the authors suggest that this can be easily remedied by institutional policies that allow for a delay of publication. This also leads to another potential area of conflict for collaboration between industry and university, that is, the issue of patents and licenses. It is in the interest of both parties to have a clear understanding and agreement over this issue. Powers and Powers et al (1988) stress that neither party would want complicated court battles over patent rights.

Collaboration and the Adult Learner

The literature of adult education also highlights areas of concern for collaboration between university and industry. Since collaboration between industries and universities involves students who are adult learners, it is important that there is an understanding of the nature of adult learners. According to Westmeyer (1988), adult learners want to be self-directed, therefore, one of the tasks of adult education is to help the learner be more self-sufficient. Adult learners are also thought of as being “life-centered, task-centered, or problem-centered (Westmeyer, 1988, p.34).” The author contends that the adult learner will usually take a class if he or she perceives some usefulness from the class. He adds that the acquisition of knowledge and skills should be perceived as being worthwhile for students. Adult learners should learn in a setting that includes mutual respect, trust, supportiveness, openness, and collaboration (p.36). Westmeyer points out that there must be respect for students, which involves listening to them, inviting them to participate, and recognizing what they have to say. It is also equally important to allow adult learners to question the instructor. Clearly, this may have potential for conflict if teachers of adult learners are unwilling to give up the idea that they are superior to their students. Westmeyer
recognizes that although teachers do have power over students in many ways, one of which is evaluation, but teachers can be fair in their treatment of students. Teachers need to be “unprejudiced and be willing to hear arguments and then make decisions in an unbiased manner (p.37).” He adds that, to a certain extent, teachers do have power over students, but teachers can also take on a role that is more like a facilitator than a dictator.

According to Westmeyer (1988), adult learners want to be involved in planning their educational activities. This has implications for an earlier collaboration issue that participants may feel a lack of clear goals. Westmeyer suggests that learners have a list of goals and objectives to know in advance what is expected. This can assist in preventing learners from feeling confused about the collaborative effort.

For the collaborative effort to be optimal, it is also vital that learners have a safe climate for their discussions. Collaboration involves dialogue and Westmeyer (1988) states that it is important for teachers to have a plan that will allow for contingencies that may surface during discussion. Collaboration may be stunted if students feel that it is not safe to express themselves. Instructors can demonstrate that open-mindedness and willingness to accept different ideas. Clearly, this goes back to the issue of building mutual trust and respect. Adult learners may have fears that can hinder the collaboration process. These fears could range from being thought dumb by their peers, being unable to meet expectations to being incapable of acquiring certain skills. Such fears need to be assuaged, primarily by the instructor, in order for the collaborative process to be successful.

As stated earlier, collaboration is time-consuming and requires great effort. It is therefore important that participants of collaboration stay motivated. Westmeyer (1988) states that adult learners are basically well
motivated; however, in order to keep the adult learner motivated, it may be useful to look at extrinsic motivation, and intrinsic motivation, such as self-esteem and power.

Summary

In summary, while it may seem that collaboration seems to have many benefits for education, it is not without problems and challenges. Researchers, such as, Rath embrace it wholeheartedly, while other researchers such as Johnston are more cautious about it. Some of the benefits include bringing together people and resources to achieve new ideas and results, exposing students to real life situations that help them develop valuable skills, providing students the opportunity to interact with managers, engineers, and marketers, thereby gaining different perspectives, and allowing companies to explore concepts for future products, conduct product improvement and development.

While some of the challenges relate to conflicts over goals and purposes of the collaborative effort, the willingness of industry partners to commit, the distribution of power and confusion over roles and responsibilities, the collaborators' ability to compromise and negotiate, and the challenge of time.

Overall, it is of utmost importance to understand that collaboration is a complex process involving various partners with different perspectives, needs, interests which must be addressed through ongoing negotiations. Collaborative endeavours should be a continually evolving process as the project unfolds. All stages, beginning, middle, and end demand needed attention to collaboration as well as the project itself.
CHAPTER 2
DESIGN

Introduction

There are many descriptions and definitions of design. The word, design, comes from the Latin word designate which means to mark or point out, delineate, contrive, plan for action, make something, distinguish by a sign, give it significance, designate a relation to other things, owners, users, or goods (Krippendorff, 1995; Mitchum, 1995).

Design is everywhere. Design is basic to all human activity. Design is in a leopard’s spotted pelt. Design is in the hexagonal pattern of the honeycomb. Design is composing a poem, painting a masterpiece, writing a concerto (Papanek, 1984; Evans, 1973). The design process is the planning and patterning of any act toward a desired, foreseeable end. According to Evans, design is a process of structuring by using the basic elements, such as, line, form, space, light, color, and texture in order to compose a unified whole for a particular purpose. Evans explains that designing is a conscious and knowledgeable manipulation of the art elements to produce an expressive statement and that designing is a purposeful activity where emotion, knowledge, imagination, and intellect are at play.
Design Issues

Language of Design

There are certain fundamental concepts that make up the language of design. These are known as the art elements and principles. These elements are visual components used to create an object or composition; and the principles are the basic guide to organize or combine the elements. According to Barrett (1994), all artwork has form and the “formal elements of a work of art may include dot, line, shape, light and value, color, texture, mass, space, and volume (p.25).” Principles of design refer to how the formal elements are used and these include “scale, proportion, unity within variety, repetition and rhythm, balance, directional force, emphasis, and subordination (p.25).” These elements and principles of design also hold true in industrial design. As Evans (1973) stated, the successful designer makes design decisions based on the design principles involved for visual effectiveness and purpose.

Industrial design is specifically the broad term that encompasses a multitude of the products of industry. These products range from consumer goods (toys, furniture, sports equipment), commercial goods (gasoline pumps, cash registers) to durable goods (machinery, tools, transportation equipment). Industrial design involves a process of “analyzing, creating, planning, and developing articles for mass manufacture (Lindbeck, 1963, p.89).”

One of the major influences in industrial design has been the Bauhaus movement founded in Weimar, Germany in 1919. It introduced a simplified style for the twentieth century. Bauhaus design, according to Papanek (1984) and Evans (1973) was characterized by functionalism, simplicity,
elimination of superfluous and ostentatious ornament, and clarity of uninterrupted planes. The Bauhaus were concerned with the “creation of products which were primarily functional, yet visually correct (Lindbeck, 1963, p.86).”

Clearly, the Bauhaus school of thought has had a strong influence in art and design education. According to Papanek (1984), almost every design school in the United States has used and still uses the basic foundation design course developed by the Bauhaus. The Bauhaus philosophy strongly suggested that there was and is an international style and that this style was derived from an understanding of the function of the object together with an understanding of the aesthetic of the material and the production process. This philosophy has been the primary force in design education and design practice. In many ways, the Bauhaus has become the mark or signature of what has become accepted as good design in the global arena.

According to Lucassen (1995), the emergence of industrial design is a result of the increase in the production of goods. This relates directly to the mass production of goods and the economy. Lucassen (1995) also adds that design answers the industrial demand for distinction and provides an added value for products. Lucassen (1995) states that the discipline of industrial design “was born from the idea of brightening up everyday life, conferring a sensory richness on the everyday environment in order to enrich human experience: aestheticization as an instrument of humanization, (p.35).” Thus, on one hand there is mass production and an economic motive; and on the other hand, there is a humanistic perspective.
Design Today

In the past, the discussion of design centered around the object. The object or artifact was an instrument for improving social life and bringing order, reason, and expressive vitality to everyday experience (Buchanan and Margolin, 1995). In later years, the design debate of ‘good design’ centered around issues of how the forms of objects could enhance the quality of life, during this time the emphasis was on the objects themselves. According to Margolin and Buchanan (1995) the object still remains important but the design discussion is now focused on “the psychological, social, and cultural contexts that give meaning and value to products and to the discipline of design practice (p.xi).” In other words, the discussion is now focused on complex thought processes that led to the object or the situations in which the objects are used and given meaning. This discussion, according to Lucassen (1995) is no longer exclusively about products, but is about the humanist aspect of living with products. What has led the discussion to focus on these issues? Neither Buchanan and Margolin or Lucassen elaborate on the reasons which have led to a focus on design thought processes and a humanist emphasis, but merely maintain that these factors characterize design culture today.

Design: Product and Culture

Traditionally, industrial design has been concerned with the creation of the desirable object that will be mass produced, sold, used, and discarded. According to Zaccai (1995), global corporations would like to keep on producing such global objects given the production and worldwide marketing of the exact same product result in great profits. Zaccai (1995) states that
these global objects are absorbed into other cultures and become status quo objects of desire. The rich and developed nations cash in on this while the developing nations, in their eagerness to attain similar success, emulate the developed nation and erase their own culture from products.

Therefore, according to Zaccai (1995), the unique values of smaller, developing, typically non-western countries are usually surpressed and subordinated in favor of the global product that is mass produced and mass consumed. According to Zaccai, (1995), designers today want to address this dilemma and many designers feel that the ideal and ultimate goal for designers today is to strive to create products which are a reflection of a culture and heritage; thus countries need to be able to create unique products which fulfill the needs of their culture while at the same time appealing to worldwide markets.

I agree with Zaccai's ideas, but he has not articulated how designers can achieve this ideal situation. Perhaps, designers need to ask if this is a realistic goal, and can it actually be done? According to Zaccai, (1995), designers are trying to design products that are long-lived and meet individual needs while at the same time being sensitive to cultural, social and environmental issues. This is indeed a challenging task for designers, evident through the lack of an abundance of such products. Once again, the question 'Is this possible?' comes to mind.

Industrial designers such as Zaccai agree that it is critical for designers to understand the role of culture because any design that does not take into account culture will not be successful in terms of acceptance by the users. He states that learning about culture helps a designer to see things from another person's point of view. However, people do not always see the
other view and often times may find it difficult to understand another
culture.

According to Zaccai, (1995), today’s designers sell their ideas and
products to a diverse global market. This diverse global market includes
many culturally diverse groups with different needs, tastes, perceptions and
ways of relating to one another and to the products they use. Most
designers would probably agree that if culture is taken into account and
considered in the design process, products will have a better chance of
succeeding in the marketplace. However, there are groups who are so
concerned with emulating the Western culture that they simply do not see
the wonders of their own culture. Thus, while the industrial designer from
the West, may want to preserve an indigenous culture, the culture itself may
not share this wish.

For Zaccai, the question remains centered around the discussion of the
local versus the global and involves designers in discussions about the
importance of culture, striving to address local problems in a dignified,
relevant manner and resisting the standardization which has been accepted
by many as the simple, economic, and efficient answer. Is this possible? Is it
simply a matter of black or white? Does it have to be a case of either/ or?
Are Zaccai’s ideas overgeneralized? Do we need to consider each situation
as unique? Zaccai has introduced an issue that has captured the attention
and interest of designers, however, the discussion cannot stop in simply
recognizing the issue, the door has been opened for further questions and
more discussion.
Design Culture

Another issue in design refers to the culture of design itself. Buchanan (1995) defines culture in this sense as “the activity of ordering, dis-ordering, and re-ordering in the search for understanding and for values which guide action, (p. 10).” Buchanan views culture as a search for principles. The culture of design, according to Buchanan (1995) concerns the ideas and “disciplines of thinking and working that distinguish the field of design from other fields (p.79).”

According to Buchanan (1998) the ultimate purpose of design in society is to conceive products that reflect human values about what is good, useful, just, and pleasurable. Buchanan adds that these terms are not fixed, but instead are subject to designers’ thinking. The meanings of the terms ‘good’, ‘useful’, ‘just’, and ‘pleasurable’ are flexible according to the designer’s deliberations and thoughts. Buchanan (1998) stresses that this deliberation is important because with responsible discussion and collaborative decision-making on critical issues of action, designers may realize that there is the possibility of some truth in the perceptions of others and this in turn may lead to new ways of thinking and acting for the designer.

According to Buchanan (1998), the task of the individual designer is to find his/her design philosophy, learning to perceive what is true and valuable. Buchanan states that this involves better understanding of the disciplines of design thinking. Buchanan would like to see an improvement in the quality of discussions on design. Buchanan feels that in today’s design culture, designers do not spend time reexamining and reflecting on their ideas. He sees the need for designers to think about the role of design in the
modern world and its potential for contributing to human experience. Buchanan sees the need for design thinking and he hopes that this will lead to increased knowledge and improved design practice.

Therefore, designers should question why they design the products they design. They need to look at why new products are needed in a world where there already exists a saturation of products. What can be thought of as ‘good and valuable’? How can design be both for pleasure and responsibility? Who is the designer answerable to? In the end, who really makes the decisions, top management, the financiers, or the designer? These are difficult questions and prove to be a serious challenge for designers today.

Product and Soul

The issue of product and soul has become a growing concern for designers today. Designers argue for a deeper understanding of design that calls for design that includes the satisfaction of the intellect, the soul and all the senses. The product should have a quality which consumers feel comfortable with and perceive as being valuable and meaningful. The literature indicates that the Western consumer is looking for more than high quality products and services. According to Sallochi (1995), Western consumers are looking for corporations to demonstrate higher values, likened to an evolution of society, where the basic needs of food and shelter are answered and society now seeks spiritual well-being as well.

Tharp (1997) suggests that if we want to have products that have a long-term life span and are meaningful and valuable, products should have ‘soul.’ The term ‘soul’ as defined by Tharp, “concerns itself with the depths
of humanness... a quality or a dimension of experiencing life and ourselves (p.3).” Tharp explains that the idea of a product with ‘soul’ is related to the issues of depth, value, relatedness, heart and personal substance. He states that soul represents the core of humanity and to serve humanity is what a profession is about. He emphasizes that service to society is to serve the soul and this should be the true and final objective of designers.

Tharp (1997) further elaborates that in order to serve the soul at the deepest level, it is essential to understand the human condition and the essence of the human experience. He questions whether in a vacuous environment, empty of all other life forms, is it possible for an individual to have a human experience? He remarks, “…the person is a human being, but is their being, truly human? (1997, p.4).” The author argues that what makes a human being human is the addition of other things to relate to or connect with. According to him, it is a meaningful connection with people, things, and ideas that create the essence of life, i.e. soul, “…when relationships are meaningful, they are the stuff of the soul, (p.4).”

According to Tharp (1997), there are several ways human beings form relationships, for example, God, family, mate, groups and communities, and self (the subconscious and conscious mind). Tharp states that humans form these relationships through two connecting methods; internal connecting methods such as memories, dreams, emotions, prayers, and physical exercise; and external connecting methods such as work, reading, writing, conversation, artistic expression and religion. Therefore, if the true and final objective of the designer is to serve humanity, the destination of the designer is to enrich the relationships and connections of the human being. Tharp has an interesting perspective, but one has to wonder how many
designers feel as he does. Can industrial designers serve humanity? Or do they only pay lip service to it?

Tharp (1997) stresses that designers should ask such questions as “Do many of the marketed products today affect deeply or add meaning and import to life? What is the cost of their presence to individuals, society, and the environment? How does this effect the soul? (p.4).” Tharp sees a movement back to humanistic values and hopes to find products that are designed to touch society in profound ways.

Tharp (1997) provides examples of corporate firms that are “inviting soulfulness (p.5),” in order to create close relationships and greater meaning in the workplace. Corporate firms such as Boeing have hired a poet. Executives listen to poetry, exchange stories, thoughts, and personal experiences as part of an executive training program for raising spiritual awareness. At Lotus development, a soul committee was formed to reexamine the actualization of its company values as well as build a strong culture and community. Tharp states that even the world of sports has invited spirituality, for example, the Chicago Bulls basketball team used Zen Buddhist training. Once again, one has to ask if these companies are doing this as a public relations campaign to win the approval of the public. Is this something that sounds good but does not really work to promote ‘soulfulness’? Is this merely superficial on the part of corporations? Can these companies keep a promise for higher values? Can they truly live by a set of higher ideals or will profits win in the end?

Tharp (1997) states that respected voices in the design field are in agreement that there should be a substitution of human values for economic values similar to Zaccai’s views, this is an ideal and 'should' is the key word.
Can the designers go against the giant, all-powerful profit-making machinery that has been the driving force of industry for so long? Tharp calls for designers to incorporate wisdom with knowledge, “we must teach and create with conscience and the truest service to humanity (p.10).” Thus, the question revolves around how can the designer serve humanity. Does the product add or enhance meaning to life?

**Ethics in Design**

The previous issues point to issues of ethics and social responsibility that face designers today. This ranges from the choices regarding the re-examination of the actual necessity of a product, material options, environmental issues, appropriate use of production processes and substitution of non-renewable resources. It requires great awareness and self-reflection. Manu (1995) states that designers need to ask the questions: “What are we doing when we make a toy / tool? What is the impact of this on the environment and the people using it? (p.20).”

An excellent example of this is Victor Papanek’s (1984) Lolita dolls. Papanek had written a satire about a proposal to design, manufacture, and market plastic, inflatable dolls. His intention was to comment on the idea of irresponsible design. He was reflecting on a ‘society that largely views women as sex objects (p.104).” He stated that much to his surprise he received many offers to produce these dolls. He did not accept any of these offers, however, these dolls are readily available today. What does this say about ethics or, rather, the lack of? Buchanan (1998) states that designers should think about refusing clients that have unethical or irresponsible design
proposals. Buchanan makes a good point, however, how many designers have the moral courage to do this?

Designers, such as Fiksel (1996), write of the hopeful combination of environmental quality and industrial development. He states that "corporations can redesign their industrial systems to achieve both environmental quality and economic efficiency (p.2)." The term which Fiksel uses is "design for environment" (p.21). This means that there can be both design performance and respect for the environment. He makes a good point, but such cases are rare. In the literature there are only a few cases, however, such cases serve to exemplify that it is possible.

The time has come for designers to look at responsible and sustainable design (Salocchi, 1995). Salocchi states that designers should look at the life of products, their reuse, and the amounts of materials and energy needed for manufacturing. All this makes good sense in today's world of scarce natural resources, but designers do not really have the power to make it happen. The designer can propose and suggest ideas, but top management is where the power and decision making is located.

Salocchi adds that designers should look towards designs that have value and meaning, that have become a part of experience, of history. By this he means that products have been "able to arouse a strong sense of personal identity (p.87)." According to Salocchi (1955), products should appeal to dreams, emotions, and reasons to construct new ways of looking at the world.

According to designers such as Buchanan (1995), Papanek (1984), Tharp (1997), Zaccai (1995), and Fiskel (1996), ethics should determine the attitude of designers to their profession. They believe that designers have
increased ethical responsibilities in today’s world of scarce natural resources, raw materials, and energy. They think that designers have to ask what are the ecological disadvantages of each new product. Will the product be a blessing or a catastrophe? They also believe that designers have a social and moral responsibility. Will the product enhance humanity and society or will it have negative consequences? They suggest that designers ask the questions: Is there a real need for the product? Will society be better served because of the product?

It seems evident that despite the multiple perspectives on design and product, the crux of the matter is that ethics are the underlying factor that can pave the way to responsible, meaningful design. In other words, if designers wish to have products that have ‘soul’ as discussed by Tharp (1997), or products that consider culture; environmentally safe products; or products that use technology responsibly, then it is a question of ethics. When ethics informs the decision-making process, there should be an impact on the design process, the product, and the situation or environment. Thus, the product becomes a reflection of the designer’s social and moral conscience. However, it may not be as simple as it sounds. It is more complex. Even if the designer is an ethically and responsible designer, there are also other bigger forces involved, such as marketing, engineering, and finance. There is frequently a conflict between designing a responsible product and an economical product. How can the business side and the design side interface without sacrificing ethical standards?

Summary

The literature contends that many designers today believe that the current mode of consumption and possession of disposable products needs
to be reevaluated. Designers, such as Zaccai (1995), Neumeister (1995), and Tharp (1997), argue that the consumption frenzy needs reassessing. There is a trend in today's design to serve the global market and mass consumption, but there is also a keen awareness emerging among designers that there needs to be a shifting of gears. Designers are confronted with the requirement to go beyond merely serving the hungry appetites of major corporations and the global marketplace. To strive for more than the standardization of many products and move toward more meaningful, culturally-based, responsible design practices.

In the end, I think that what makes for good design is design that is appropriate for a particular situation and context of a culture. Good design can be local, global, responsible, ethical, and it can have soul and meaning. This is not to suggest that good design does not take into account the formal elements and principles of design; these should also play a part in good design but design should be about humanity.

This is certainly one of the biggest challenges that designers today have to face. Design is changing, industrial designers need to reexamine their roles and redefine what design means in today's world. There is a change of attitude from material thinking to spiritual values, from quantitative to qualitative thinking. Lucassen (1995) makes a valid point when he states that this change offers new opportunities for the designer and requires new thinking, a more philosophical style of thought. Designers such as Buchanan (1998) make a strong argument for the rethinking of design and design practice. However, what needs to occur is for designers to devise viable strategies, to realize a clearer plan for achieving these lofty ideals.
In terms of this present study, What are the impact of these issues are on design education programs? Are design education programs concerned about these issues? If so, how are they acknowledging them?

Based upon my reading of these issues, I would like to determine if these issues are significant in the collaborative project between OSU Industrial Design Department and Dynacraft and for the design education program at OSU. Do these issues have an impact? Are industrial design students taught to design responsibly? Are they discussing, thinking about ‘soul’ when they design? Do they consider culture? In the collaborative project, is there a conflict between design for humanity and design for economics/profit? How can working collaboratively with industry contribute to more responsible and meaningful design?
CHAPTER 3
METHODOLOGY

As stated in the introduction, three research questions were posed for this study. They are:

1) How does the collaborative project contribute towards an enriched educational experience for industrial design students?
2) How are the design issues addressed in the collaborative project conducted between The Ohio State University Industrial Design Department and Dynacraft Golf Products Inc.?
3) What are the problems and conflicts which emerge when university industrial design departments collaborate with industry?

To examine these questions, my research design was guided by qualitative methodology as explained by Glesne & Peshkin (1992); Marshall and Rossman (1994) and Miles and Huberman (1994). This method was considered appropriate because the data could be collected in a natural setting without manipulating it. The study was conducted in an industrial design studio class that lasted for one quarter (ten weeks). The focus of the industrial design course was a collaborative project between The Ohio State University Industrial Design Department and Dynacraft Golf Products Inc. The case study approach was the method used to collect qualitative data. Data was collected through the use of observation, structured and unstructured interviews, and written documents. This triangulation of data
strengthened the study. These three techniques, observation, interview, and written documents, allowed for an understanding of the way the participants thought, felt, and performed activities in the industrial design course (Glesne and Peshkin, 1992). This chapter contains an explanation of gaining access to the site and participants, the design of study, and the data collection and data analysis.

**Method**

The case study approach was used to collect data from the collaborative project conducted by the OSU Industrial Design Department and Dynacraft Golf Products Inc. This approach was selected because the case study as defined by Stake (1994), “is expected to advance our understanding (p.237).” The primary interest of the case study is to understand the case, to extend an experience and not to generalize in the traditional sense or form universal laws (Donmoyer, 1990; Schofield, 1990).

**Initial Stages**

I first became aware of the collaborative project between the Ohio State University Industrial Design Department and Dynacraft on February 27, 1998 while interviewing Susan Roth, who at that time, was the Associate Dean of the College of Arts at OSU. I had decided to meet with Dean Roth because I knew that she had been involved in several collaborative projects between the OSU Industrial design Department and industry. During the interview, she informed me that during the following quarter, Spring 1998, one of the design studio classes would be involved in a collaborative project with industry under the supervision of Professor George Hall (pseudonym), an Assistant Professor at the Industrial Design Department. She suggested
that I contact Professor Hall to talk to him about the possibility of using the class as a case study.

After the interview, I made an appointment with George. I explained my proposal to him and we talked about his experiences with conducting collaborative projects with industry. He agreed to let me observe and use his class as my case study. At this time, George informed me of the specifics of the collaborative project between the students and the client, Dynacraft Golf Products Inc. He said that the project was scheduled to begin in the Spring quarter, 1998 and would last for ten weeks. The client and the department had agreed to work with the industrial design students to develop a new golf club head that would feature playing advantages, that is, students would design a golf club that would hit the ball longer and/or more accurately than any other club in the market.

Once my advisor approved of my proposal for using this project as my case study and I had obtained permission from Lorraine Justice, the Acting Head of the Industrial Design Department, I began planning for the collection of data. I decided to observe the class beginning the first week of spring quarter until the final presentation of the students during the last week of the quarter.

Site and Participants

OSU Department of Industrial Design

It should be noted that through discussions with various faculty members and from the description of the Industrial Design Department in the College of the Arts handbook, I learned that the department has a history of conducting collaborative projects with industry in areas such as transportation and consumer products. The department has conducted
several collaborative projects with corporations such as Apple Computer, Ameritech, RCA, Texas Instrument, NCR, IBM, Dell Computer, Borden Coated Products Division, and Rubbermaid Special Division. The handbook stated that the department is listed as one of the top five graduate design programs in America by the Design Management Institute. The department is also accredited by National Association of Schools of Art and Design (NASAD), Industrial Designers Society of America (IDSA). The handbook states:

In undergraduate and graduate programs, a process-oriented approach to learning is encouraged, which provides students a stream of learning experiences similar to those encountered in professional practice. A strong research mission is the foundation of the department’s goal to give depth to students’ knowledge and skills. Its research mission follows logically from process to purpose, including research into the process of design and the conditions of design. The process is purposeful – its purpose is to give form to products to satisfy functional, psychological, and aesthetic needs. It is systematic because it involves the definition and analysis of problems in our environment, transforms information into theory and concept, and finally into appropriate creative solutions. The process is creative – designers must possess knowledge and skills to evaluate necessary factors from the humanities, science, and technology but also must have the expertise to appropriate design forms, spaces, and information systems for human needs and desires.

The Industrial Design Department is primarily located in Hopkins Hall on the main Ohio State campus, Columbus, Ohio. There are three floors of
studio space, laboratories, offices and model shops. There are also some studio spaces and offices in nearby Hayes Hall. The department has facilities such as a computer lab that houses PC-compatible work stations, used for computer-aided design drafting, three-dimensional modeling and animation. There are also Macintosh workstations, used for graphic layout, typographic and image manipulation, and the production of interactive communications for multimedia applications and the worldwide web. There are facilities specifically designated for graduate and faculty with both PC and Macintosh workstations. In addition there are resources such as the Advanced Computing Center for the Arts and Design (ACCAD), and the Emerging Technologies Studio (ETS), which provide sophisticated resources to further study computer graphics, animation, and virtual product and spatial simulations. Additionally, the department houses the Thomas and Kathleen Huff Lighting Laboratory, where students can explore the physical and psychological effects of light and color on indoor environments.

The Industrial Design Department encourages undergraduate students to participate in internship opportunities during their course of study. Students are eligible to engage in fieldwork once during selected quarters of the third and fourth years. There are also several international exchange opportunities for third and fourth year students in England, Switzerland, Germany, Finland, and the Netherlands.

The Instructor

The instructor, George Hall's, participation was voluntary. He was in his third year of teaching at the Ohio State University when the study was conducted. He received his masters in industrial design from the University
of the Arts in Pennsylvania and has been involved in a variety of collaborative projects with industry since teaching at OSU. The projects range from medical products for the OSU Medical Center to technology products with Apple Computers and Texas Instruments to consumer products with Rubbermaid Specialty Products and Whirlpool.

George’s teaching philosophy reflects a life philosophy, he said, “I guess my teaching philosophy is more like a life philosophy, I think that a lot of things taught in design, people would call it the quality of life, the quality of things...I guess quality comes from people who care about what they do...(in design) it would mean that you care about what you are doing, observing, making (personal communication 1/29/98).”

George thinks that collaborative projects with industry can make a difference in students’ educational experience, they can be situations where valuable experience and knowledge is gained. He commented that the collaborative project brings the students “closer to the real world experience” and that the collaborative project allows for students to work on “educational skills and issues” such as manual manipulation, problem solving and teamwork. The collaborative project allows students to experience the real problems of a professional setting.

George considers himself as a teacher/facilitator who encourages his students to be creative problem solvers and independent learners. The students’ comments about George suggested that they thought he was knowledgeable and capable.

In addition to George, there was a visiting professor, Paul, who joined the class for the project. He did not do any teaching except for one short, ten minutes presentation on sketching techniques. He brought samples of
sketch work to class. Occasionally, he would comment or offer suggestions during student critiques.

The Client

This project came about quite by chance, as related by Jerry Jones, the CEO of Dynacraft Golf Products Inc. As it happened, one of the Dynacraft staff members, taking classes at OSU, began talking to an industrial design student about the idea of working collaboratively. Subsequently, Dynacraft expressed interest in working together with OSU Industrial Design Department on a collaborative project. As a result, Dynacraft and the Industrial Design Department Chairperson met and drew up a proposal outlining the project’s goals, criteria, and requirements.

Dynacraft Golf Products Inc., a leader in the component golf industry, has been in the business for twenty years. Founded by Joseph Altomonte, Sr., in 1979, Dynacraft is the only major component company that does not assemble its components. It sells components to be custom assembled by individuals/shops. Dynacraft also has a clubmaking school and it provides technical help/services to customers when they need help assembling clubs. According to Dynacraft’s press release statement, the goal of the collaborative project was to partner with the Ohio State University in designing and developing a new wood driver model that will hit the ball longer and with more control than any currently available clubs of similar type (April 13, 1998). Jerry Jones stated that the goal was to develop a technologically superior golf club that could potentially revolutionize the golf industry.
The Design Studio Classroom

The class involved in the collaborative project, ID 462.04, was a Junior level design studio course. A five credit hour course, the students met three times a week in room HC 269, Hopkins Hall on the main campus of from 2.30 pm - 5.30 pm. The class was under the supervision of Professor George Hall. A representative from Dynacraft was present at almost all the class meetings, either Jerry Jones and/or John Smith, the technical advisor. There was a total of eighteen students enrolled in the course, all male except one female student. The students were informed that the goal of the collaborative project was to work with Dynacraft to re-design the wood/drivers 1, 3, 4, and 5. In the design brief, students were told that “the purpose of the collaboration project is to provide Dynacraft with a competitive edge in an already mature industry.” George informed students that the competitive edge could either be visual and/or performance attributes. Styling cues, proportions, graphics, and other form-related issues was critical in this project. George briefed the students and informed them that the project scope was entirely open. There were no restrictions other than the United Stated Golf Associations (USGA) rules of golf and golf equipment. These design criteria and limitations, rules for the game of golf and golf equipment have to be followed and cannot be altered. The students were expected to improve and develop their design skills and methodologies. It should be noted that the client did not have a specified number of designs for the students to produce. At the end of the quarter when the project was over, after discussions with the Dynacraft team Jerry decided which design ideas were marketable.

It was agreed upon by the OSU Industrial Design Department and Dynacraft that course deliverables would include:
Design Research and Documentation, Appearance Models, Virtual Models (if necessary), and Concept drawings and Models leading to final designs. A final research report that explains the design process and the decision making steps, 2D sketches, 3D mockups, 2D and 3D final designs, computer generated stills or animations, slides of final model and iterations. The students were evaluated according to these course deliverables.

Below is the breakdown used to determine the final grade:

Written documents/reports ............... 25%
Concept Models/sketches ................ 25%
Final Models/Drawings .................... 25%
Presentation ................................. 25%

The class had the opportunity to visit the Dynacraft office and workshop. They visited the premises twice, during the second and the third week of class. During these visits, the Dynacraft representatives provided the background of the company and also all the technical information related to the game of golf and golf club equipment.

The Dynacraft representatives, through oral presentation, slide show, and discussion, provided technical details and displayed samples of the company's club heads. During these visits, they explained the necessity of conducting patent searches with the students. Students and the Dynacraft representatives talked about which components on the golf club were patented and which were not. The Dynacraft representatives stressed the extreme importance of conducting patent searches on club component. According to them, a violation of a patent would cost approximately $100,000.
The students went to the workshop on the Dynacraft premises at Newark the third week of class and the production process was explained to them. The students had numerous questions during these two visits. This was an information gathering phase in the design process of the club both for the students and the faculty. The majority of the questions centered on technical aspects of the game of golf or on golf club requirements, for example, face angle, shaft, loft, hosel, how to calculate the center of gravity of the club head, weight of club head, types of materials etc.

At OSU, each student had a workstation. There was also a couch and some desks and chairs. The class was conducted in a very informal style. George did not stand and lecture the students, but instead sat with them and talked to them as if they were having a conversation. At the beginning of each class meeting, George and the students would form an informal circle, facing one another. With some students sitting in chairs, on the couch, and some standing. I positioned myself as unobtrusively as possible but close enough to record what was being said. Due to the fact that the students were quite spread out, it was difficult to tape-record everyone’s voice thus I chose to focus on recording George and the students closest to him. I also took handwritten notes of students’ comments or questions.

George began each class meeting by briefing the students on what was planned for that day, and discussing issues related to design. He would remind the students to think about design details such as color, graphics, product target markets, sometimes supplementing his talks with reading material from journals and magazines or samples of design work that illustrated a particular design point. At the end of each briefing, he made time for questions or comments from students. Sometimes these questions or comments were directed to Jerry, the representative from Dynacraft.
Usually, these questions were more technical and specific to golf club requirements and/or production requirements or limitations. After the questions, George would suggest that the students break up and do individual work. George and Jerry moved around the classroom, discussing and working with the students individually, usually beginning at the back of the class and working their way toward the front. The students were free to come and go between the studio room, the workshop, and the computer lab. The workshop and the computer lab were located on the level below. Since most of the teaching and students work occurred in the studio, I spent most of my observation time in the studio. I also decided to remain in the studio because this was the place that Jerry interacted with the students.

During the first few observations, I followed George and Jerry while they were working with the students in the studio, audio-taping the dialogue between them. After the first few observations, I noticed that George and Jerry split up and talked to the students separately, I decided to audio-tape the dialogue between the student and Jerry since I wanted data that would provide information about the student working with the client. I also observed that George would come and check with Jerry mid-way through the class meetings. After listening to the tapes of the first few observations, I then decided that I would spend some time interviewing the students. I chose to talk with the students when they finished speaking with Jerry or George, because I was interested in gaining their thoughts about what had transpired between them and Jerry or George. I also waited to talk with them because I did not want to disturb their state of mind when they were preparing to discuss their design with Jerry or George. I felt that they would be more relaxed and would have more time for me if I talked with them after
they were finished talking to Jerry or George. This allowed me to get immediate opinions and thoughts on the feedback the students had received.

**The Students**

There were eighteen students in the class, one female student and the other seventeen male. Three were international students and one was an African-American student. One of the international students, an exchange student, was actually at the graduate level, but had joined this class for the quarter. Although he had trouble communicating because of his proficiency with English, he demonstrated a highly skilled level of model making, especially mold making techniques using plaster. Many of the students went to him for advice about this technique. He was very helpful and often shared with the other students his knowledge about model making. I tried to have conversations with this student, Hartmut, but it was difficult to understand him. My own non-native proficiency with English did not make it easier. The students, in general were friendly and receptive towards my presence. As George and Jerry, the students were informants for the study, providing more information than I could have obtained solely from observation.

**Design of the study**

This study, from April 1 to June 8 1998 was divided into two stages. The first phase involved the preliminary observations during fieldtrips to Dynacraft office and workshop and interviews with the faculty. During the first class meeting, George introduced me to the class and explained my purpose. I spent a few minutes introducing myself and describing my plan. During this phase, I handed out consent forms to students, faculty, and the client seeking permission from them to be participants in my case study (see
appendix A). With the form, I also attached a cover letter where I briefly explained the case study proposal (Glesne & Peshkin, 1992). All the participants signed the consent forms agreeing to participate in the study. During this phase, I became acquainted with the students, teacher, client, and classroom dynamics. I observed as closely as I could and wrote field notes. I also took this time to have casual conversations with the students and faculty in order to establish familiarity and myself as a “trusted person” (Glesne & Peshkin, 1992). The faculty also gave me some documents, such as the course syllabus, design brief and a report on collaborative projects that the faculty had been involved in. This helped me refine my questions for the study. During this stage I also went with the class on their field trips to the Dynacraft premises and to Fitch, an international design consultant firm located in Columbus, Ohio.

The second phase was the primary data collection phase. This involved observation, structured and unstructured interviews, and document collection. I observed the teaching activities and the interactions between student, client, and faculty. The students, faculty, and client were interviewed in order to better understand their thoughts and opinions about the collaborative project experience (Glesne & Peshkin, 1992).

Researcher’s Role

In my study, I played the role as participant observer in the design studio classroom. This allowed me to observe the natural situation of the class. According to Glesne and Peshkin (1992), participant observation operates across a continuum from “mostly observation” to “mostly participant.” The authors explain that there are two levels of participant observation, “observer as participant” and “participant as observer.” In this
study, I was mostly an observer as participant, but I did have some interactions with the participants.

Data Collection
This case study was descriptive in nature using observation, interview, and document analysis as techniques for gathering data (Glesne & Peshkin, 1992). The use of these techniques provided the opportunity for triangulation (Stake, 1994; Glesne & Peshkin, 1992). Triangulation, according to Glesne & Peshkin, (1992) is described as a process to build trustworthiness in qualitative study through cross-checking data from different sources.

Observation
In this study, the observation technique was used throughout. During the observations I took field notes, audio taped, and sometimes video recorded. The field notes were usually descriptions and impressions of what I saw, heard, and experienced in the design studio classroom. During the lectures and critiques I tried to sit as close as possible to George without being obstrusive, as I wanted to record his lectures which usually covered some design related issues. I located myself near the front where I could audiotape, and at the same time, still observe the students.

Taking field notes proved to be quite a challenge as I had difficulty catching all the actual words of the participants. This is largely due to the fact that English is not my native language and it was challenging to listen and write simultaneously. I was thankful that the tape recorder had been invented. I used a three ring binder filled with loose leaf paper to record my field notes, I divided each page into two sections, on one side I wrote the
observations and on the other side any comments I had, often times I also included drawings of golf club components and the layout of the class (Glesne & Peshkin, 1992). I also added other comments when I reread the notes at home. As mentioned earlier, I used audio taping extensively, it proved to be a very useful tool as it recorded almost all the dialogue during the interactions between student and client, interviews, lectures and field trip presentations. The transcript of the recordings provided permanent data. However, because the interactions were one-on-one discussions with particular students, I could not simultaneously record George and Jerry when they separated and talked to different students. Often times I chose to follow Jerry as I was more interested in capturing the experience the student had with the client. I only used the video recorder a few times during the field trips, I found that it was very distracting trying to videotape everyone while at the same time keeping track of all the participants who were free to move around.

Interview

Interviews were structured and unstructured interviews used to obtain information from the faculty, students, and client. The structured interviews were prearranged with prepared questions for the participants. The unstructured interviews emerged from casual conversations with the participants and observations of activities.

The interview questions were based upon issues that emerged from the review of literature and participant observation. Sample questions were developed before the interviews and were usually later modified to fit the context of the interview. The intent of the interview questions were to discover the participants’ perceptions about the collaborative project and the
related design issues. The students were interviewed at the beginning of the project, midway during the project (midterm presentations), and after the project was completed. The client was interviewed midway during the project and at the end of the project. Throughout the study, I kept in touch with the faculty with constant on-going discussions.

Transcribing proved to be a challenging, sometimes mind-boggling activity. I spent many long hours trying to decipher what was said on the audiotapes. Sometimes I could not hear clearly because of background noise and disruptions, other times I could not understand what was said, probably because I was not a native speaker of English. This illustrated perfectly Glesne & Peshkin’s, (1992) observation that transcribing the words of people who spoke languages or even dialects different from the researcher’s own native language would likely take longer than compared to working with text in the researcher’s own language. However, transcribing the data allowed me to re-live the classroom observation, my memory was refreshed and I more closely connected to the data. This further provided me with an opportunity to decide which data were useful and which were not.

**Document collection**

According to Glesne and Peshkin (1992) documents can corroborate observation and interviews. They state:

Documents provide historical and contextual dimensions to observation and interviews. They enrich what you see and hear by supporting, expanding, and challenging your portrayals and perceptions. Your understanding of phenomenon grows (p.54)
During the case study, I was fortunate that the instructor provided me with reports of previous collaborative projects which he and the department had been involved in, design briefs for the course, and other reading materials used during class lectures and discussions.

Data Analysis

Once the raw data was condensed into manageable coherent parts, the data was ready for further analysis and interpretation. The analysis occurred in several stages: generating coding categories based on the literature review, organizing the data, seeking emerging themes and patterns, interpreting the data, correlating the analysis of collaborative and design issues, drawing implications for industrial design education and writing the report.

Miles and Huberman (1994) emphasized that early analysis helps the researcher to think about existing data and generate strategies for collecting new/better data. Using the research questions and the identified issues from the literature review I created coding categories at the beginning of the data collection stage. To analyze the data, I first read the hard copies of transcripts and field notes. These were later analyzed into units and color-coded based on the categories. It could happen that a unit was classified under several categories. A unit could be a sentence, chunks of sentences or paragraphs in field notes. The coded data were then separated and set up by category. Once all the data had been sorted, analyzed, and interpreted, I began writing.
Trustworthiness

It is important in qualitative research to establish trustworthiness. It has been described as a “quality of an investigation and its findings that make it noteworthy” (Schwandt, 1994). In order to establish trustworthiness, I used four methods: 1) in-depth engagement, 2) persistent observation, 3) triangulation and 4) peer debriefing.

Time spent on site can help establish trustworthiness, although ten weeks is not really a long time, it, however, was the entire length of the project. I spend many hours with the students, not just during class meetings with faculty and client, but also I was with the students when they were working independently in the studio or in the computer lab. The time invested in the field with the participants made for prolonged engagement. To build rapport and gather further data, I followed students on their field trips. I discussed the students' designs and shared some of my own experiences with them. Observation can help trustworthiness for the case study as well. Lincoln and Guba (1985) stated that persistent observation can help “identify those characteristics and elements in the situation that are most relevant to the problem or issue “ (p.304).

Multiple data collection methods strengthened and minimized weaknesses in the data. I had the help of a fellow student who was in the same stage of her dissertation study, who became my peer debriefer. We shared experiences and often discussed our data collection and analysis methods, this helped me keep my data in check.

Summary

This chapter presented the methodology utilized in my case study and descriptions of gaining access, the site participants, design of study,
and trustworthiness of the study. Data was collected through observation, interview, and document collection. The data was analyzed based upon the research questions: How does collaboration contribute toward an enriched educational experience for industrial design students? How does the collaborative process with industry intersect with educational goals and objectives? How does the collaborative process with industry intersect with design issues and design cultures related to industrial design education? What are the problems and conflicts which emerge when university design education departments collaborate with industry? and issues that emerged from the literature review about collaboration and industrial design.
CHAPTER 4

ANALYSIS OF COLLABORATION

The Case Study

The case study as defined by Stake (1994) is an attempt at understanding or extending an experience, "it is expected to advance our understanding (p.237)." The purpose of my study is to develop an understanding of the collaborative experience and to develop this understanding, between The Ohio State University (OSU) Industrial Design Department and Dynacraft Golf Products Inc. I am interested in understanding how the students, faculty, and client perceive the project and the collaborative experience itself.

The participants in the study will be referred to in the analysis as follows:

The Client: Jerry Jones, CEO of Dynacraft Golf Products Inc.
Students: Jack, Andy, Elly, and Mike, Ernest, and Craig.
Persons who play golf and/or buy golf products: Players, Golfers, Consumers, Users / End Users.

For the analysis of the data, I used data from tapes four, five, six, and seven. These tapes have been selected for analysis because they contain
Data Analysis of Collaboration

In the data analysis of collaboration, I looked at data based on the overall research question: How does collaboration contribute toward an enriched educational experience for industrial design students? I created coding categories using this research question, and Mattessich and Monsey, (1992) and other literature on collaboration. From this literature, I identified 141 key words related to collaboration. I used these key words and Mattessich and Monsey's report (1992) to develop six main categories: 1. Purpose, 2. Process, 3. Resources, 4. Membership Characteristics, 5. Communication, and 6. Environment. The definition of each category is as follows:

Purpose: This term refers to the reasons for the collaborative effort, the results that the group seeks. Purpose is related to concrete goals and objectives of the group, shared visions articulated by the participants and a unique purpose, where the goals or approach of the group may differ in part.

Process: This term refers to the management, decision-making, and operational systems of the collaborative effort. Process is also related to the ideas that of (a) shared ownership in the procedures and outcomes, (b) flexibility, (c) multiple layers of decision-making, and the (d) development of clear roles and guidelines.

Resources: This term refers to financial and human input that are necessary to develop and sustain the collaborative effort. Resources can include a financial base to support the project and a skilled group leader.
Membership characteristics: This term consists of skills, attitudes, and opinions of the individuals in the collaborative group. Membership characteristics can involve mutual respect, understanding and trust; appropriate cross-sections of the members; abilities to compromise; and the belief that collaboration is a worthwhile endeavor for individual members.

Communication: This term refers to the channels used by collaborative partners to send and receive information, keep one another informed, and convey opinions that influence group actions. Issues related to communication are about openness, frequency of communication and informal and formal links.

Environment: This term refers to the geographic location and social context of the group. This involves the history of collaboration in the community, and the political and social climate.

Collaboration Issues

The previous definitions primarily reflect Mattessich and Monsey, (1992) and additional authors cited in the literature review on collaboration. Additionally, there are other significant issues raised in this literature which will figure in the analysis of the case study between OSU and Dynacraft. One such issue is that one of the primary advantages of collaboration between industry and university is providing professional development for students. It has been suggested that involving students in real-world tasks affords students educational advantages (MacDonald & O’Neil, 1997; Rath, 1978; Taylor, 1997; Tinzmann et al, 1990). It has also been suggested that through dialogue, interaction and collaboration, students have the opportunity to examine different perspectives, become more knowledgeable.
and more successful learners. Another issue for analysis, as highlighted in the collaboration literature, is power distribution and relationships.

Cartwright and Zander (1953) discuss the functioning of groups and the power and influence in groups. They state that an individual has power over another individual if one can do something that results in a change in the other. An individual with power can influence another through many forms, from persuasion to threats.

Using these six categories, the issues of professional development opportunities and the two research questions for the study, I analyzed the audio-tapes of my observations and interviews. The analysis is in narrative form and addresses those issues that are appropriate to each audio-tape. At times, some collaboration issues are not pertinent to the data and therefore are not addressed.

Summary of Tape Four

I begin my analysis with tape four because it represents the beginning of the class interactions between the students, client, and faculty. In the tape the students met with the client to discuss their initial design proposals. The students and the client had met on a prior occasion when they visited the Dynacraft office. The participants in the tape are George, the instructor, Paul, a visiting professor who joined the class, Jerry, the client from Dynacraft, Fitch representatives, and the students. (Fitch is a design firm in Columbus that the students visited on their fieldtrip)

This audio-tape covers over three class meetings. The first class meeting, begins with George giving a brief outline of the plans for the week. George talks about the upcoming fieldtrips to two design firms, Fitch and Priority. He reminds the students to keep their research materials organized
and to pick up art supplies and modeling materials from the supply shop. Jerry, the Dynacraft client, is also in the class and George suggests that the students talk to him about their design ideas to get his feedback. There is a brief discussion about the importance of looking up patents, the best places to search for them and the procedure. As mentioned in the methodology, the students and the client had previously discussed patents when they went to visit the Dynacraft premises during the second and third week of class. Jerry states that the patent search is something that the students must do. After the discussion, George asks the students to break up and do individual ideation sketching.

The next section of the audio-tape is from the following class meeting. The students, the visiting professor, Paul and George are on a fieldtrip, to Fitch, a design company in Columbus, Ohio. During the field trip, the students, are given a brief history of the company and the company’s founders. Paul, who used to work for Fitch, is an old friend of the Fitch representative. After the brief history of Fitch, the students visit some of the design offices. The Fitch representative, suggests that the students observe the different sketch techniques, and the items around the designers’ spaces that influence them, books/magazines, sketch techniques, computers and other assorted items.

A short slide presentation about Fitch follows. The representative explains the Fitch goals and philosophy, which focuses on multi-disciplinary teamwork. Fitch also has a strong commitment to research methodologies, from ergonomics, anthropology, psychology to traditional market and user research. Students are told about the various branches within and outside the United States. The representative explains the type of people who work for Fitch and what type of employees they seek. They find out about Fitch’s
design process emphasis and the different types of design work conducted at Fitch.

The final section of the audio-tape occurs in the studio at OSU when the class meets with George, Paul, and Jerry. At the beginning of the class, George hands out reading material, asks the students to read the material and to be prepared to discuss it for the next class meeting. George gives some highlights of the reading material, primarily, customers looking for the experience of the product, product branding, and product imagery. Paul gives a short talk about sketching and shows some samples. This is the only time that Paul teaches in the class. Paul’s presentation lasts for about ten minutes. Most of the class time is spent talking with students individually. George and Jerry, talk with the students about their design ideas. The students explain their design concepts and ideas and show their sketches and drawings. Jerry gives his feedback. He tells the students what is acceptable, which design or features or concepts he likes or finds interesting, what needs to be changed, what is not acceptable or possible, and gives the students reasons why they are not acceptable or possible. He also offers his suggestions and ideas. Jerry provides information and details about some of the finer points about golf club design and manufacturing and the limitations of the design to stay within the United States Golf Association (USGA) rules and the club head manufacturing requirements.

Analysis of Tape Four
Overall perceptions and trends which emerged from the data:

1. Students maintain that the collaborative project was valuable because it provided an experience of working with a real client and company.
They perceived that this made the class different and more meaningful (genuine) from other design classes.

2. Students conceive that working on the collaborative project is not exactly like working for a design company.

3. Students realize that they used the same design process as employed in non-collaborative projects.

4. Students, faculty and client exhibited open channels of communication with mutual respect and exchange of information.

5. Students learn that one goal of an industrial designer is to keep the client happy, and display the ability to compromise.

**Event: Student Interview**

In tape four, only one student was interviewed during the class observation. The interview was an unstructured interview and was more like a casual conversation. Jack had previously met with Jerry five times and had just finished talking with him. I asked Jack how he felt about the project; and working with a client. Jack remarked:

Actually, I like it. I'd rather have a project where there is a client and the client really cuts us down instead of letting us do whatever because that can be confusing. This is the first project with so many limitations which is what I assume what we're going to see when we get out of school because we can't do this, we can't do that. It's probably similar to the real thing, this project, it is. It is different, in comparison, to all our other projects. I like that.

Jack’s response can be categorized under the purposes of collaboration. His perception is that working with a client is different from the other design classes because it is more like the real world. This response
relates to goals and objectives, of the collaborative project in terms of the course, the project provides the opportunity for students to gain experience from working with a client.

Jack's response can also be categorized under process. He perceives his role and responsibility as a designer as keeping the client happy, as suggested by George, the instructor. Jack's goal is to propose a design that would satisfy the client. He prefers the client be critical and to voice his opinion. Jack's statements also touch on other ideas that are related to process, primarily, decision-making. The student wants the client's opinion. His statement, "I rather have a project where the client really cuts us down instead of letting us do whatever," exemplifies this attitude.

Jack's statement also seems to indicate that there are open channels of communication. Jack had previously spoken with Jerry several times, therefore there was frequent communication and the fact that Jack likes it "when the client cuts us down" implies that criticism is welcome.

Jack's statement also exemplifies membership characteristics. Jack likes being involved in the project because he perceives it to be in his own self-interest and that it will benefit him. His willingness to compromise and work with the client's ideas relate to membership characteristics.

Several categories of collaboration interact with each other in tape four: Purpose, Process, Communication and Membership Characteristics. Jack's statements reflect collaboration issues in industrial design reports by authors such as MacDonald and O'Neil, (1997): Visser and Gattis, (1997); and Wilson, (1997). These authors report that collaboration between industrial design students and industry can provide professional development.
for students. Students gain knowledge and experience that is based on the practical real world.

The data also shows that there can be different goals and purposes in collaboration (Johnston, 1997; Rath, 1978). For example, while the industrial design department's goal and purpose may be to provide an educational experience. This is exemplified by George's statement that he wanted students to learn to define problems and polish design and problem-solving skills. The goals of the department were different from Dynacraft, which was to produce a golf club.

Jack's statements reflect issues of decision-making, roles and responsibilities, flexibility and compromise. They are also related to issues of power and group dynamics (Hersey, 1988; Cartwright and Zander, 1953; Taylor, 1997; Rath, 1978; and Johnston, 1997) where a member in a group can do something that results in a change in the other. When Jerry decides on the design, he exercises power and control, but this is not viewed negatively by the student; instead, Jack prefers it because he finds it helpful. Jack designs according to Jerry's wishes, thereby exhibiting the ability to compromise. The data from the student interview in tape four seem also to reflect Taylor's (1997) statement that partnership does not necessarily mean equal power among all members in the group, but that there is agreement about roles and responsibility and an understanding on the allocation of power. From the data, it appears that the client sees his role as being the person in charge, he decides the design direction of the product to be produced, while the student perceives his responsibility is to satisfy the client's needs and compromises accordingly. This perception on the part of Jack is also shared by other students in the class. For example, Mike, Andy,
and Elly express similar perceptions. (These students' ideas and perceptions are explored later in the analysis.)

Through my experience as a designer, I think that this is typical of the client and designer experience in a design firm setting. It is expected that a designer will cater to the needs of a client. It is the responsibility of the designer to meet the client's needs and the client usually will tell the designer exactly what is expected, therefore, the power, in terms of who controls the direction of the product is usually in the client's hands. The designer can propose ideas, but it is the client that makes the final decision. This is the reality of the industrial designer's role. Having said this, I also think that designers are not totally powerless, they have a choice, they can either choose to follow the client's wishes or not. If a designer has strong ideas about a particular issue, contrary to the client's, he/she can make a choice to explain and convince the client. It depends upon the designer and the designer's perception of his role and responsibility. It is also important to explain that the students were free to design however he or she wanted, as long as his or her design did not break any rules of the United States Golf Association, (USGA). They could design for any market, utilize any material or color, and include any other features. However, they had to justify or explain their design choices to Jerry, just as a design professional would in the 'real' world.

Overall, several perceptions and trends emerged from the student interview data in tape four. First, the students believed that the project provided an opportunity to work with a real client, something not available in the other design classes. Second, the decision-making is in the hands of the client, which one student at least says he prefers. Third, there is a clear division of roles and responsibilities: the students create the designs, the
client comments, and the students make the necessary changes. Also, the
participants communicate with each other and they have a shared goal - to
produce a golf club head that “can offer verifiable playing advantages,”
(Dynacraft press release statement April 13, 1998). This tape, however, does
not include the role of the instructor in the decision-making process about
the golf club design. The full picture of how decision-making,
communication, and the power structure of the collaboration should include
this role also. Thus, it is an incomplete understanding at this point.

Summary of Tape Five
Tape five covers two class meetings. The first part of the tape is
composed of conversations between the instructors, George, Paul and the
students or Jerry and the students. At the beginning of the class, George
points out to the students that they should rely on Dynacraft for feedback,
technical information, and strive to make the client happy. George and Paul
also point out some of the design elements, such as, graphics, logos, and
concepts. The rest is discussions between George and Jerry separately
moving around talking to students about their designs. A total of seven
students are observed interacting with either George or Jerry. The content of
the discussions ranges from students asking specific questions about
technical details about the golf club head, the weight, center of gravity and
angles, Jerry’s feedback about the designs and concepts of the clubs,
suggestions about improving the design of the golf club head. It is important
to note that throughout the discussions with the students, Jerry tells the
student what golf experts and consumers’ expect from a golf club. He also
describes business and marketing issues that concern the golf industry. The
students, for the most part, sought feedback on their designs and continued
their work based on the feedback which they received. There are no student interviews on this tape.

The remainder of the tape is primarily George and the students getting ready for the midterm presentation. They are arranging furniture and setting up for Jerry to view their work.

**Analysis of Tape Five**

Overall perceptions and trends which emerged from the data:

1. The students, faculty, and client had open channels of communication with mutual respect and there was an exchange of information.

2. Decision-making in terms of the design of the golf club was primarily on the part of the client.

3. The students displayed the ability to compromise, appearing to desire to keep the client happy.

**Event: Lecture**

In tape five, there is a brief lecture at the beginning of the class. The faculty, mostly, George, talks about design elements. For example, he refers to the image that the golf club is associated with the colors, graphics, and overall concept of the golf club. George also talks a little about working in a design firm and how design firms operate and conduct business. It is important to note that George reminds the students to ensure that the client's needs are satisfied. Below is part of George's lecture:

Do certain businesses try to dictate certain methodology? I would say yes in golf and sporting games. They rely on experts a lot, their clients (golfers). So we need to rely on Dynacraft. Have you guys talk to
Jerry, make the client happy. I'd rely on the Dynacraft rep. as much as possible, Jerry will be here...

George's lecture can be categorized under process because he talks about the role and responsibility of the students to listen to the client and to make the client happy. George uses words and phrases such as "rely on experts," "need to rely," "I'd rely on the Dynacraft rep. as much as possible" that convey the importance of looking to the client for direction. George's statements appear to outline the role and responsibility of the students and the client. The students look to the client as a source of knowledge and information about golf club requirements and other technical information related to club making. On the other hand, the client's role is one of a leader and decision-maker, and, in general, an authority figure. This may be due to the fact that Jerry is the primary source of information pertaining to the science of golf club making; thus, decisions related to the technical aspects of golf fall primarily on Jerry's shoulder. George is primarily the source of information and ideas related to design. During his lectures and interactions with the students, he constantly points out design elements, ideas and issues which students should be aware of.

George's statements also can be categorized under membership characteristics. The statements suggest that the students should view the client as experts with respect to the golf industry, indicating that the client's opinions and views are important and should be sought out by the students.

The lecture also can be categorized under communication. There is sharing of information and knowledge. The excerpt of George's lecture below is a good example of this:
Because golf is stuffy, look for what is traditional, what is high-tech, innovative, trying to put imagery to it, put themes to it. I think it is really useful to what we're trying to do now and depending on what category you pick, what your golf club is going to look like, the colors of your club, also the image of your club. Think about what position the clubs are at, position at play, when you're ready to tee up, standing behind you, what view are you looking at. What key positions are right for putting on graphics, think about not just the static position, it's going to be in several positions, at rest, at play, in swing.

There are discussions about a variety of topics pertaining to design and communication is open and free, that is, students are able to participate as well as the instructor.

Reviewing the lecture data found in tape five, several categories of collaboration are evident. These categories are Process, Membership Characteristics and Communication. The ideas that were related to the process and membership characteristics reflect issues pertaining to roles and responsibilities, decision-making and power, and flexibility and compromise. These ideas are related to issues of how a group functions and the dynamics of a group (Johnston, 1997; Taylor, 1997, Hersey, 1988; and Rath, 1978) where members of a group can influence other members of that group. In this case, the data shows that the client and the faculty can influence the students resulting in a change in the students (Hersey, 1988; Cartwright and Zander, 1953). The data shows that George tells the students that the client has primary control, in terms of the technical aspects of the design of the golf club head. Therefore, it appears that the power is given to the client
and the student's role, as the designer, is to follow and adapt according to the client's wishes. As elaborated by Taylor (1997), partnership does not necessarily mean equal power among all participants in a group, however, partnership can mean that there is agreement about the roles and responsibilities of the participants in the group. The data here clearly illustrates this point, it appears that allowing the client to be in control is understood and is indeed acceptable and preferable. This may be because this is usually the case in design firms. The designer's role is to work according to the client's needs and specifications. George is relaying this attitude to his students as he tells them that they need to work to keep the client happy.

Communication is also essential and vital in collaboration (Johnston, 1997; Rath, 1978). George talks to the students and discusses the design elements and techniques and guides them through the design process. This is in keeping with George's role and responsibility as the instructor. The ideas of role and responsibility are in turn related to process. Process is related to George's management of the class and George's role as the facilitator between the students and the client. The findings in this tape mirror the findings in the previous tape four except that the focus is on the instructor and the students' rather than the client, Jerry and the students.

**Event: Observation of classroom interaction**

In tape five, seven students are observed while they are interacting with the client and/or faculty. The students are presenting their design ideas to the client, Jerry, who moves from student to student giving feedback. He is direct in his approach and tells the students what he thinks will and will not work. He gives his reasons and explains why a design may or may not
work. This is usually based upon golf rules and requirements as set by USGA or production requirements and limitations of the technology available at Dynacraft. In the conversations and discussion, Jerry informs the students which designs he does like and does not. He spends time with students and working with their designs. Jerry is also concerned about the business of selling golf clubs, he wants to design a golf club that will have appeal and will be marketable. The students try to work within Jerry’s requirements and needs. The students usually have questions about technical requirements, for example, how to calculate the center of gravity for the golf club, which side of the club should be heavier, or how to account for wind resistance. They learn more about golf clubs and they change or adapt their design work to suit Jerry’s needs. The two examples below are typical of the interactions between the client and the student:

Excerpt one:
Jerry: What are we doing here? It’s going to be raised?
Andy: Coming down, I’m aiming for amateurs.
J: It’s going to escalate quite a bit, if you can shoulder it there somehow, then...
A: You mean, stand it like that...
J: Yeah, the air is back, you’re going to hit it, if you had a lot more weight concentrated there, it’s less likely to do that. People will look at that and they’ll laugh. I think it’s really neat but they’re going to say it’s way too much.
A: Can’t do that
J: It’s a complex design, meaning that it’s an unusual shape
A: So, what you’re saying is that most people when they go to the store, they won’t buy it because it’s too unusual a design
J: Exactly, it has to be traditional to some degree and it also has to have some feature that’ll get them to try it, that’s the difficult part, color scheme or something like that, that’s the way you can get something different without being too different.

Excerpt two:
Mike: Ok, I’ll work with the hosel a little bit to see if...
George: Yeah, so it’ll visually communicate sort of lighter
Jerry: If it didn’t have titanium that’ll be ok but now you have three pieces instead of two.
J: They’re going to perceive there’s nothing there to hit the ball with, if there’s nothing there you’ll basically have totally terrible results, even though they shouldn’t hit the ball there, as far as making cuts on the face, I’d take that and blend it back down. Put it down on the rear ends, if he thinks he can hit it better
G: This one, [this design] can it go all the way around?
J: I don’t know if you want to keep a certain thing just because, this one [Jerry is looking at another one of the student’s designs] he might look at it and think it’s more aerodynamic, it looks neat and that may be a selling point.
If the head’s too big, it’ll ring really loud. People are going to think there’s something wrong with it, it’s not necessarily good or bad, just what people think.
[Jerry is looking at the various design ideas that the student has laid out on the table]
J: This one’s more traditional, this one’s been done. This one I won’t accept at all. This one you might have to convince people, these too. Depending on the design, whether you have an unusual feature or
unique or high-tech, whatever you call it, you still can only sell so much of it, you'll still have to have something that's still traditional in here, like this design, I think that with the younger crowd it's good, I think you could sell that.

The data from the interactions can be categorized under several categories. Jerry has a specific purpose in mind. As the client, he has his own goal to produce a golf club. He seems to have a very clear idea of what he wants. However, he does not have any specific design or target market in mind, except that he is looking for any designs that have marketability and will sell. He works with the students in order to achieve his goal to produce a golf club that will sell. The students work with Jerry and together they have a shared vision. The student’s goal or purpose is to produce a design that will make Jerry happy. Together the members of the group work in order to realize their goal and objective. In both excerpts, the data shows that the students present their designs to Jerry and, usually, the more unusual and non-traditional designs are the ones that are unacceptable. As elaborated by Johnston, (1997) and Taylor, (1997) group members usually have a shared vision in terms of the purpose of the collaboration. In this case, both Jerry and the student are working towards producing a golf club that will offer verifiable playing advantages and is technologically superior (Dynacraft press release February 6, 1998).

The students may have a conflict because the student would probably have to shelve his personal favorite in favor of one that Jerry likes or change his or her design. The students do not defend or justify their unusual designs, they bend to Jerry’s advice. This could be because the purpose is to keep the client happy; therefore, a personal favorite would not be an issue.
Or it may be that the decision-making has been delegated to Jerry and he is the member of the group with the power. When I asked one of the students what he thought about the possibility of having to shelve his favorite design, he replied that it was not at all a problem because he was not designing the club head for himself, but for the client. Another issue, related to membership characteristics, is the ability to compromise, largely on the part of the students because the students listen to Jerry’s suggestions and work accordingly. It may be possible that communication is not open enough for the students to feel comfortable enough to talk about conflicts. Therefore, while there were frequent and established channels of communication between the students, Jerry, and George, the channels may not have been open enough.

The data reflects other ideas that are related to process, such as the clear division of roles and responsibilities when the participants work together and the students adapt and work to fulfill the client’s wishes. The students do not seem to mind that the client has the decision-making power, in fact as mentioned in the analysis of tape four, it would seem that the students not only find it acceptable but, to be expected.

Overall, several perceptions and trends emerged from the lecture and interaction observation data. First, much information is communicated to the students during the lecture. The instructor discusses and reminds students of important design element points and ideas and also tells the students to rely on the client. The instructor perceives his role as mainly responsible for guiding the students in terms of the design aspects and overall classroom management. George’s statement that Jerry is the expert demonstrates a delineation of roles. He relies on Jerry for the knowledge and technical information pertaining to the golf industry. According to George, as an
educator, he is primarily concerned about the educational aspect of the project. Earlier, he stated that his focus was on improving and honing the students' previous design skills and methodologies, research methods, conceptualization methods (rendering, sketching, model making etc), and presentation forms. He is fulfilling this objective in his role.

This leads to a second issue, the decision-making, in terms of the direction of the designs which seems to be in the hands of the client. Mentioned earlier, it is the client that controls the direction of the designs and this appears to be acceptable to all members of the group including the other authority figure in the collaborative project, George, who submits to Jerry's wishes and authority. A third perception is that all of the group members seem to have a shared goal of the project and work together to achieve that goal. Finally, it appears that because all members have a shared goal and a clear picture of their roles and responsibilities, they communicate well and are able to compromise and adapt accordingly in order to achieve their goal. However, it was previously suggested that the degree of openness in the communication is not clear and students may not feel comfortable in challenging Jerry or George.

Summary of Tape Six

This audio-tape is from the midterm presentations. During the presentations, Jerry considered each of the student's design as they explained them. Jerry told the student which designs he thought would and would not appeal to the golf community. In general, he seemed pleased with the designs that the students presented. He was pleased because there was a variety of designs and different user markets. He remarked that, usually, he was used to seeing the same types of designs, but there was more
experimentation in the class and he liked that. After the project was over, I learned that he probably would take some of the ideas and have his design team polish them. There was a sense of excitement in the air, other faculty members attended, a news crew, even family members of the students were present, it was more like a final presentation rather than a mid-term presentation.

Dynacraft and the Industrial Design Department agreed to invite the news media to the midterm presentations. Everyone was talking and there was a lot of noise. In general, the students seemed pleased with their progress. I took the opportunity to talk with eight of the students about the project. All of the students responded that this project was better than other studio projects. They liked working with an actual client despite the constraints and limitations that the client imposed upon them. Students said the limitations gave the project more focus and structured similar to their expectations for the work place. The students agreed that Jerry's opinion and ideas were invaluable. He provided them with much technical knowledge about golf club making. Additionally, the students felt that Jerry was supportive of them and their work. They seemed to have a common goal, to provide the client with his requests while at the same time trying to be as creative as possible. The students agreed that they had learned a great deal. It is important to note that almost all the students had to change their designs in some form or other. Some had to make more changes than others. It has been my experience that having to make changes in designs or modifications in design to suit the client's preferences are part of the nature of design work. Students only finalized their designs two weeks before the final presentation. Students, such as Jack, who had to change his design because initially it was too different for the golf market, just shrugged it off.
commenting that "It's ok, as long as the client's happy." However, there were others, such as Mike who had designed a golf club that the client liked, that expressed a desire for clients to understand that some designers liked to experiment and design wild things.

It is also interesting to note that the students who were golfers seemed more enthusiastic about the project, seeming more willing to accept the constraints and limitations. Others who either were not avid golfers or who were not familiar with the golf industry appeared to push the boundaries a little more and try to do more 'wild' designs. Overall, however, they seemed to understand that they had to work within certain constraints.

Analysis of Tape Six

Overall perceptions and trends which emerged from the data:

1. The student, faculty, and client demonstrated open channels of communication with mutual respect and there was an exchange of information.
2. Decision-making in terms of the design of the golf club was primarily on the part of the client.
3. Students displayed the ability to compromise, appearing to desire to keep the client happy.
4. Students' perceived that the project was better because there is a real client to provide focus and meaning.

Event: Student Interview

In tape six, several students were interviewed during the midterm presentations. The students each had a workstation where they set up their presentation boards that explained and illustrated their designs. I talked to
the students after Jerry had looked at the student's designs, asking them about the project. Below are some excerpts of the students' response to my question, “What do you think about the project?”

Excerpt #1
Student: At first I was a little drawn back, I felt like maybe there was too much limitation. Then I felt that well, try to turn the tables and make it work for me, see what they say, but maybe try to squeeze it past them but their opinion is really valuable. They know the real market. They're the business aspect of it, they sell the clubs, they manufacture the club, so whatever they tell me about these I definitely want to take their opinion, say if I need to make those changes, then you make the changes but I think they also need to loosen a bit. As designers you try to create wild and crazy stuff.

Excerpt #2
Student: I think it's been excellent, like with the designs and having to deal with the manufacturing process, I came up with a lot of ideas but it kept getting shot down because they didn't have the technology for it. I think it's excellent because it's actual real design, here you have to work within their constraints. Up until now you've been sitting in the studio and put this in and adding in. You're not designing for your own personal taste but for everyone. It's related to what works it's not imagined.

Excerpt #3
Student: I think it's a excellent idea because up until now our designs are really open-minded we can go anywhere we wanted, any direction
we want. But with this, you have to be creative but with tight limits. It's great, like today all of us are really excited we actually have a corporation logo on our presentation boards. We have TV cameras coming around, it gives us a more tangible view of what's it's going to be like after we graduate. I like it.

The students' responses can be categorized under the purpose of collaboration because their perception is that working with a client is different from the other design classes, an opportunity to work in the manner of the real world. The students believe that having an actual client gives the project a more realistic and focused perspective. The responses relate to the purpose of the collaborative project in terms of the course goals and objectives, providing the opportunity for students to gain experience from working with a client to design a product. According to George, in terms of education, the purpose is to teach the students problem solving and teamwork. He sees his role as the instructor and as the middle-man who interprets the client needs for the students. However, he also states that students are free to design whatever they want, but whether or not the client would select their design would be another matter. Grading for the class was not dependent upon client's approval or selection of designs.

The students' responses can also be categorized under process because the students' think of the client as the authority figure. This is related to ideas of roles and responsibilities, and decision-making. The students value the client as the expert from the golf industry and adapt their work to meet the client requirements. There is a clear and accepted agreement about the roles and responsibilities of the students and the client.
The students responses, changing their designs to follow the client’s suggestions, illustrates the students’ flexibility.

The students’ statement also seems to indicate that there are open channels of communication. The students and the client spend time talking to each other, trying to work out the designs. The students often bow to Jerry’s preferences as when one student remarks that he may “try to squeeze it past the client, but their opinion is really valuable... whatever they tell me about these I definitely want to take their opinion. If I need to make those changes, then I’ll make the changes.” The previous statements are good examples of the membership characteristics of collaboration. The students like being involved in the project because they perceive it to be in their self-interest.

From talking with the students during the midterm presentations, after five weeks of classes, I learned of how the students’ perceptions of the faculty roles in the project. In general, the students perceived that George handled the design aspects of the golf club, but did not have the technical knowledge about golf club production. Thus, the students would usually refer to Jerry for the technical information. The students also perceived that George took care of the management of the classroom and the discipline of the students. These student responses illustrate this:

Student: He keeps us on track with the design. But he doesn’t know about the science of club making. Making sure we don’t go off the handle. Making him like senior designers of a design team, keeps us on track of what the client wants. He helps us to keep us disciplined.

The data implies that George is as much of an authority figure as the client. He is perceived to be “like senior designers of a design team.” Below
is another student response when I asked whom the student listened to and what is George's role.

They [George and Jerry] are two facets. They are auxiliary. Jerry has a vested interest in the project, so they have an ultimate goal, it's not just to educate me it's to get a product.

It is interesting that the student perceives the ultimate goal as producing the golf club, and not the educational experience. Therefore, while there may be shared goals, there can also be different goals and purposes (Johnston, 1997 and Rath, 1978).

In tape six, several categories of collaboration surfaced and interacted with each other: purpose, process, communication and membership characteristics. The ideas of purpose revealed in participant statements reflect collaboration issues in industrial design reports by MacDonald and O'Neil, 1997: Visser and Gattis, 1997; and Wilson, 1997, who have reported that collaboration can provide professional development for students, where students gain knowledge and experience that is based on the practical real world. The data also shows that there can be shared goals and an agreement of roles and responsibility in collaboration (Johnston, 1997; Taylor, 1997; Rath, 1978). As in previous tapes, it is clear that the client, the instructor, and students know their roles and behave accordingly. In this collaborative project, months before the project began, meetings between the client and the OSU Department of Industrial Design, helped identify the roles and responsibilities of both parties. This initial planning and discussion helped both parties come to an understanding and a design brief was developed. In the design brief (which was also given to the students) goals and requirements are clearly spelled out. In this case study, it was agreed that George would be mainly responsible for the design aspect and
Jerry would provide the technical knowledge that related to the sport and business of golf.

Therefore, while power may not always be equal (Taylor, 1997) there is agreement on the distribution of it. In collaboration, it is important to have a shared goal and the shared goal here is to produce a golf club.

Summary of Tape Seven

This audio-tape can be divided into two sections. The first section is a continuation of tape six and it is comprised of interviews with two students during the midterm presentations. During the midterm presentations, as noted in the previous analysis, the students displayed their designs and work in progress. The client attended the presentation and examined the students work, often times offering comments or suggestions.

My interview questions were mostly centered on how the students felt about the collaborative project as compared to their other usual studio projects. For most of the students, this was their first time working on a collaborative project with a real client from industry. Many of the students felt positive about the project, most said that this was the closest they had come to the “real” thing and that this was more exciting and fun. Consistently, as found in previous tapes, the students said that the most important thing was to satisfy the client and their job was to make the client happy. The students felt that the client’s ideas, comments and suggestions were extremely helpful and very much needed. Most students said that it helped them in their decision-making and that it made them more focused when they knew exactly what they could or could not do. The students also said that the instructors were very capable and they appreciated the client’s sponsorship of materials which assisted them with financing the project.
There was a suggestion for improving the facilities in the design studio and the overall physical environment. There was also a suggestion that the class should be divided into design teams to work on the project. Lastly, there was a comment about the time factor, that students should use the time wisely, know how to budget their time, but that it was difficult to cover every single aspect in ten weeks.

The client gave a short speech during the midterm presentation. In his speech, he was very appreciative of the students' efforts and was pleased with the designs so far. He was especially pleased with the variety and quantity of designs produced by the students. He explained that usually in the golf industry, there was a tendency for saturation of designs, that is, for design ideas to have a tendency to be the same old routine ideas. Thus, he welcomed ideas that were not the usual or typical traditional design ideas, something new and different. He stated that he wanted "non-golf influences."

The second part of the audio tape records the class following the midterm presentations. The class begins with a brief talk by George about model making and the materials to be used to make the models of the golf clubs. During this class, George and Paul conduct a critique of the students' presentation boards. The students take turns explaining their boards with George and Paul offering ideas, comments, and suggestions about improving the boards. They tried to help the students make their boards look more professional. Overall, the students listen and agree to the changes suggested by their instructors. It is also important to note that George always asks the students what were the client's comments about the boards.
Analysis of Tape Seven

Overall perceptions and trends that emerged from the data:

1. The student, faculty, and client had open channels of communication with mutual respect and there was an exchange of information.

2. The students' perceptions were that the project was better because of working with a real client, making the project more focused and meaningful and providing a better understanding of the real world.

3. Decision-making in terms of the design of the golf club was primarily on the part of the client.

4. The students displayed the ability to compromise and keep the client happy.

Event: Student Interview

Tape seven is a continuation of student interviews during the midterm presentations. I talked to two more students in this tape and after five weeks of interacting and working with the client I asked the students their thoughts about the project and whether working on the project in this class would be similar to working in a design firm. As before, I approached the students after Jerry had spoken with them. Below are some examples from the student interviews:

Student: Designing for a professor and designing for a client are two different things. A professor doesn’t care about the final product, he doesn't care if you go for design A or B. But for this project, not only do you have to justify it, but the user has to like it and no matter what they said that is a factor.
Student: Ultimately for any design project you want to please the client. As long as you can present information to back your design. They may not necessarily like it but they may still go with it. The ultimate goal was to make the client happy. In this project, I’ve been focusing on Dynacraft and making sure that George understands that. It’s no problem, it’s helped me to make decisions, having a client, that can tell me what they like or don’t like.

Student: It is a little like real, I think they are pretty nice on us but actually, in the real world they’ll be pretty tough and say we want this, we want this, and these guys are more nice.

The students’ responses can be categorized under purpose of collaboration because the students’ perception is that working with a client is different from the other design classes because it is more like the real world. The students perceive that having an actual client gives the project a more realistic and focused perspective. The data demonstrates that the students perceive the purpose of the course is to produce a product that will make the client happy. The students perceive their roles and responsibilities as designers are to keep the client happy. These findings are similar to the findings from the previous tapes.

Other ideas in the process category concern decision-making, issues of power, and group dynamics (Hersey, 1988). It is clear that the client, the instructor, and students know their roles and behave accordingly in order to fulfill their perceived responsibilities. Therefore, while power may not be equal (Taylor, 1997) there is agreement on the distribution of it. In collaboration, it is important to have a shared goal and the shared goal for
the project is to produce a golf club. The problem is that this goal did not adequately address all the educational goals.

Communication is also essential and vital in collaboration (Johnston, 1997; Rath, 1978). The students and the client spend time talking to each other, trying to work out the designs. There is frequent communication and although the student may want to try more ‘wild designs’, Jerry explains what is and is not acceptable. The client communicates needs clearly to the students. The students may want to defend their designs but the client makes his views very clear. This again raises the question of whether or not the communication was as open as it could have been if students felt uncomfortable in defending their more innovative designs.

Tape seven also records Jerry’s feedback about the students’ work. This is the first time that Jerry speaks to the class as a whole and shares his views about the students’ work. After reviewing all the students work during the midterm presentation, Jerry was pleased with the designs and was, in general, happy with the work the students had done. His remark: “I want to say that you guys brought a lot more new ideas to the whole project than I ever thought possible” indicates that the purpose for the project may be expanding.

The data also can be categorized under membership characteristics related to the ability to compromise and share mutual respect and trust. “I was talking to George today and you should be a hundred percent proud of what you’ve done.” The client is happy and wants to work with the students to improve their designs and has admiration for their work. “Again, anyway we can help, any questions you have... by mail or phone.” As advocated by Johnston (1997) and Taylor (1997) members in a group need to want to work together in order to achieve their goals.
Upon studying the student interview data in tape seven, several categories of collaboration appear: purpose, process, communication and membership characteristics. The findings are very similar to the findings from the previous tapes. There is a consistency in the roles and attitudes of the client, instructor, and students in all of the data. It is actually difficult to find differences of perceptions and opinions about the project. This sameness may reflect a smoothly run project, or it may be that there were hidden issues that did not surface in the data.

Summary of the Analysis

_How does collaboration with industry contribute toward an enriched educational experience for industrial design students?_ In order to address this research question, it was important that I investigated a concrete experience to gain an understanding of the collaborative process. After analyzing the data from the OSU-Dynacraft collaboration, several perceptions emerged.

**Purpose**

The data suggests that there were clearly stated goals and objectives for the project from the client’s perspective. One, to design a technologically superior golf club head and two, to develop the cosmetics or aesthetics of the golf club head. According to the press release statement from the client (April 13, 1998), the goal of the project was to design and develop a new club head design that would offer more verifiable design advantages than any currently available clubs of similar type. However, the data indicates that the students’ design ideas were primarily focused on the aesthetic and cosmetic aspects of the golf club head design. Thus, it appears that the goals of the client were not achieved in regard to developing a technically
superior golf club head. According to the client, the club head which he selected does not hit any longer or more accurately than other available club heads. The club head design selected offered a new look for the client’s product line. The client did not state any specific market or category, he informed students that all categories were open and they could design the club head for any market.

While, the client had a more physical goal, the instructor was interested in developing and improving students’ design skills. He perceived that collaboration with industry represented a promising opportunity for students to hone their previous design skills as well as possibly developing new skills. For George, the instructor, his purpose was to provide an experience that could help students’ improve design skills such as problem-solving. He stated that the collaborative project had a real purpose and contained elements similar to that of a professional setting. These were: a clear problem, a real client, a real user group, and deadlines. According to George, having to work within tight constraints and, at the same time, having to produce new ideas is a common situation for industrial designers. These goals were clear to the instructor, but it is not certain that these goals were articulated and discussed with the client and students.

Overall, the students’ perception was that the educational experience was a positive one, working collaboratively with an actual industry client made the project a “real” one. The data strongly indicates that students valued the project because, as opposed to other design studio projects, there was an actual client. One noteworthy finding from the data was the students’ response to the many restrictions, requirements and limitations of the project. The rules of the USGA, golf equipment, and client’s preferences imposed considerable limitations for an acceptable design. The students
knew that they had to work within these constraints, but they said having the constraints challenged them to be more creative, and to produce innovative solutions which could both be exciting and meet the requirements. There was some conflict with the students’ desire to be creative, since the client verbally welcomed innovation, but at the same time, only accepted traditional solutions to the design problem. The students’ stated reasons for finding the project to be a positive educational experience included remarks that the project was “more meaningful,” “focused,” and “real.” The experience of working with a client was a valuable experience because each student worked with the client on a one-to-one basis. At the end of the project, Dynacraft had eighteen design concepts, instead of one design from eighteen students working as a team to produce a single design. According to the instructor, the students were not placed into design teams because the project was “not that complex and did not have any interface, to produce depth and complexities to the product.” He explained that if the scale of the product was bigger, such as, designing a computer or car, they would have put the students in teams.

The students found that the collaborative project with an industry client afforded them the possibility of having their designs manufactured and marketed, the prospect of which was exciting. It should be noted that the client made arrangements for the student whose design was selected for production to receive royalty payments. However, this aspect of the project was not viewed by the instructor or the students as a primary purpose for the project. As stated, the students’ evaluation for the course was not tied to pleasing the client or having their design selected for manufacturing.
Conflict and Problems

In terms of the purpose of the collaborative project, several conflicts and problems emerged in the case study. These are as follows:

- Educational goals were not clearly articulated and discussed with client at the planning stage and during the project. Therefore, the commercial goal seemed to overshadow educational goals.
- The limitations and constraints of the project, while reflective of actual design practices did not allow students to explore and experiment.
- The client verbally welcomed innovative designs from the students but at the same time only accepted traditional designs. This resulted in a contradictory message to the students.
- The nature of the project was not complex enough and may not have allowed for the implementation of the educational goals.

Process

There appeared to be a clear framework for the project. In the interviews with the client and instructor, it was explained that the management and planning of the projects were planned prior to the actual scheduled beginning of the project. The chairperson of the OSU Industrial Design Department planned for the project through meetings and discussions with the instructor and client. They agreed upon the scope of the project and the project deliverables, such as design research, documentation, and appearance models. The instructor addressed matters that dealt with class management, for example, benchmarks and deadlines. Due to the fact that OSU has a short ten-week quarter system, it appeared that the instructor was always conscious of the time factor and constantly reminded students of the deadlines and benchmarks. According to him, management, planning,
and the overall framework of the project had to be clearly outlined before the actual beginning of the class. While the project goals were clearly outlined, the data indicates that there was insufficient detailed discussion about the educational goals and potential conflicts and problems in the planning stage and throughout the project.

The instructor's responsibility was that of a facilitator, a primary contributor of vital design information in the classroom, and an encourager for the students to use and build upon their previous knowledge and skills. George presented information, (lectures, design briefs, reading materials) feedback, and relevant design strategies.

The client was also clear about his responsibilities, attending class meetings regularly and interacting with students. Each participant demonstrated a clear understanding of his/her role and responsibility. The students' central perception of their role and responsibility as a designer was to ensure that the client's needs were met. The students' valued the client's opinion viewing him as the expert about the golf industry. His feedback was critical and sought after.

It was also evident that there was a process for decision-making. The data reveals that decision-making in terms of the direction of the design of the club head primarily rested with the client who decided what was and was not acceptable. When the client interacted with students he was the one in control, the one who had the power. However, this was not viewed negatively by students or the instructor. Indeed, students appeared to expect this and students, such as Jack, found it helpful. The client saw his role as being in control while the students perceived their roles to fulfill the client's needs.
From the student and faculty interview data, I learned that initially some of the students were unsure if the goal of the project, to produce a new golf club, was possible due to the fact that there were numerous constraints and requirements of the industry client. However, as the project progressed, the student interview data revealed that the students became more comfortable and confident working on the project. Client and faculty support was the primary factor for this change of heart. The faculty’s concern was to ensure that the class would be able to meet the client’s demands and at the same time improve design skills. It is important to note that the collaborative project involves students in their third year of study. These students have already had several other design classes and are familiar with the design process. The faculty’s challenge is to ensure that there is a fit between the class and the client. It is important that these fit because this can influence and dictate the quality, range and type of solutions that the students produce.

Conflicts and Problems

- Educational goals for the project that were not discussed, negotiated, or clearly stated in the planning stage. Therefore, the educational goals for the project were submerged or overshadowed later in the project.
- The process of decision-making was not balanced. The client was the primary decision-maker which resulted in an unbalanced distribution of power. There should have been detailed discussion about the allocation of responsibility, decision-making and power in the planning stage and throughout the project.
Resource

In terms of financial funding, it appears that in the collaborative project, the client’s sponsorship helped formed the financial base for the project. The sponsorship of the project typically goes towards money spent on materials and equipment necessary for the project.

In terms of human input, the data showed that both the faculty and the client were sources of information. This data is connected closely to the ideas of roles and responsibility in the process category. As stated in the analysis, the client was the primary source for golf industry knowledge and the faculty was a resource for design. Both faculty and client perceived that it was part of their roles and responsibility to be the knowledge and information resources.

The students were not the only ones to receive information and knowledge. The students were also a resource for design ideas and the client received eighteen possible designs. The data revealed that the client was impressed by the students’ capabilities to produce new and very unique designs. However, the data also showed that while the client stated that he wanted something new and different, he did not want the designs to be so different that they would not appeal to golf players and consumers. Thus, it appears that the client presented conflicting messages. On one hand, he stated that he wanted new and different ideas, but when discussing the ideas with students he was not very receptive to the ideas that were different from the traditional designs. The client was motivated by economics. Thus, the client’s advice to the students about their designs was more of a business decision. The client’s statements from my interviews and electronic mail reflect this “...we looked at what we thought would sell well. Golf is a traditional sport; junior players are not so traditional, they are more
accepting of new ideas and designs. While many of the other designs were
good, they were too non-traditional in our opinion.” It should be noted that
after the final presentations, the client chose to use one of the student’s
design ideas, targeted at junior golf players. At this time of writing, the
design for golf club head is available in the market.

Conflicts and Problems

• The problem and conflict that emerged in the resource category
  concerned the client and the students’ perception of what the term
  ‘different’ designs meant. The students’ perception of ‘different’ designs
  was more experimental and innovative, while the client’s perception of
  ‘different’ designs related more towards changes in color or graphics. The
  participants need to negotiate from the beginning and continue
  negotiating throughout the project in order to understand each other’s
  needs.

• The client contributed 18,000 dollars and did not feel that his company
  received adequate returns on their investment, at least immediately after
  the project. It is possible that the sales of the golf club improve in the
  future.

Membership Characteristics

The students and instructor demonstrated the ability to compromise
and there appeared to be mutual respect between the participants in the
project. In terms of group dynamics, the client was the one in control and
exercised the most power. When interacting with students, the client was
perceived as the expert. The students were flexible and compromised
according to the client’s feedback.
Conflicts and Problems

- The students were not taught to negotiate with the client but instead to comply to the client’s wishes. The students could have learned to negotiate more with the client and defend their more innovative designs. This would have been a better educational experience for the students, learning to argue and persuade from their own perspective.

- In general, the students could have had more voice. Power could have been more balanced among all the participants, students, faculty and client.

Communication

The data showed that communication lines between the participants seemed open. There were established lines of communication, aside from the phone, fax, e-mail, there was also the one-on-one interaction with the industry representative. In this case study, the industry client was regularly present in the class meetings and interacted with the students during the class meetings. All participants kept each other informed, as discussed in the resource category, there was large amount of information exchanged and updated. There were frequent communications between students and client, students and faculty, and also faculty and client. However, the data indicates that the client has the most power. This could have been an unacknowledged problem for open communication between the client, students, and instructor. The data shows that during the interactions, the client was more vocal compared to the instructor. George asked the students to rely on the client, as mentioned earlier, this may have been because the instructor felt that this was an opportunity for the students to have direct
contact with the industry person who would not be available to the students in their other design studio classes. The client may have been more vocal during interactions because the students and instructor were unfamiliar with golf club requirements and production limitations. Perhaps, there was a need for negotiation related to power distribution and the role of the client during the beginning stage of the project. All participant goals and objectives need to be addressed in the planning and ongoing stages of the collaboration.

Conflicts and Problems

- Sole dependence on the client posed some problems that affected the quality of the educational experience for students. In this case study, the students were fortunate that the client was a steady, consistent, informative presence throughout the class quarter.

- However, communication was unbalanced. The client was more vocal, had more power while the students listened more, adapted and compromised according to the client’s request. Once again, as stated previously in problems and conflicts of membership characteristics, there could have been greater negotiations between the students and the client, more opportunities for students to experiment and defend their more innovative designs.

- There was a lack of structure or strategies for ongoing communication about the process. The product was often discussed, but the process was fairly invisible. This left many collaboration issues unaddressed.

Environment

The data showed that the OSU Industrial Design Department has a history of collaborative projects with industry. The department has been
involved in collaborative projects with clients ranging from computers, household goods to medical equipment. Therefore, there were established guidelines for management and planning.

Conflicts and Problems

- Although the OSU Industrial Design Department has had a history of collaborative projects with industry and there are established guidelines for management and planning, the collaborative environment could be improved if the guidelines for management and planning were reviewed to ensure that educational goals and students' needs are prioritized accordingly. The department could conduct an evaluation at the end of such projects. This could help assess the success and deficiencies of the project. Such an evaluation could inform future projects.

Challenges and the collaborative process

The results of the case study suggest that collaborative projects between universities and industries can be a rewarding educational experience for the students. It appears to have the potential to be a win-win situation for all concerned as long as there is a balance between educational goals and industry goals. Statements by Justice and Bullock, at the 1999 IDSA Design Education conference in Chicago reinforce this notion. They agree:

For research universities there are opportunities to fulfill their research mission and to generate and apply new knowledge. Real world input from the professions vitally enriches and offers dynamic collaborative learning opportunities. Businesses are also enriched by fully participating
in collaborative learning. Employee careers can be rejuvenated and there are opportunities to give back to the education establishment in an altruistic sense. One of the most important benefits is the independent, external, multi-cultural and multi-discipline viewpoint universities can provide. They also have first crack at employing some of the best and brightest students in the world.

It is important not to let the industry’s goals take over educational goals. If industry’s goals are too dominant and overshadow educational goals, then it would appear that industry is dictating how and what students should learn.

In this collaborative project, the project was a vehicle for the students to improve and develop design skills; the educational goal mainly focused on honing the students’ design skills. George said that the limitations, USGA rules and golf equipment rules, are in themselves educational because students learn how the practice of design occurs in the real world. The limitations allow students to construct a more realistic picture compared to other design studio classes with only an imagined client. While this may be true and may reflect the real world situation of a professional setting, it is also necessary to prioritize learning objectives and goals, learning about the design process is an educational goal, then the question of whether there is room for students to explore and experiment should be raised. Limitations are acceptable and necessary, but they should not be too tight or too rigid. Finding the right balance between educational goals and industry goals is an essential key for providing an enriched educational experience for students.
Perhaps this project, designing a golf club was not complex enough. The nature of the design project and its impact on educational goals should be an important consideration.

The literature, the perceptions of industrial designers, and design educators are that collaboration with industry is a positive step in fulfilling the educational goal of preparing students to be able to perform in the professional world. This is what some design educators have called a 'no brainer' (Kaufmann, 1999, Wilson, 1997, MacDonald and O’Neil, 1997). While the merit of collaboration with industry may not be an issue; the quality of the design project in terms of learning experience and the management of such projects appears to be an area of concern.

Design educators, and I agree emphasize that good, effective, and thoughtful management and planning of collaborative / industry-sponsored projects is extremely important. Education should be the priority and not the production of a product, let it not be that industrial design departments push students to produce a product while neglecting to teach students design skills and processes as well as related issues about design ethics, environment and social concern. Collaborative projects should not be viewed as low cost alternatives to professional consultations. Faculty can ensure that the project is relevant to the educational goals of the department and should ideally increase and polish students understanding of application of design skills, research methodologies, and professional design problems.

In this case study, it appears that Jerry did not really focus upon George’s educational concerns. It remains unclear whether or not Jerry was aware of George’s or the department’s educational concerns. As advocated by Rath (1978) and Johnston (1997) collaboration should involve negotiation by all participants, in this case study, this would include students, instructor,
client, and department chair at the beginning of the project, in order to mutually come to an agreement about the goals of the project, the educational goals for the students, the allocation of responsibility, decision-making, and power. Further, students should be included in the discussions at the beginning stage, as elaborated by Westmeyer (1988), because adult learners want to be involved in planning their educational activities. With enough negotiation and discussion about the goals of the collaborative effort, there can be more awareness of the elements of collaboration and the collaborative process. Without sufficient negotiation and clarification of goals and responsibility conflicts and ineffective collaboration can result (Johnston, 1997).

Students can be included in the discussions at the beginning stage in order to help students have a clear picture of what they are expected to achieve. It can help reduce confusion about the collaborative effort. The discussion at the beginning stage provides a safe climate for students to voice their opinions, as explained by Westmeyer (1988), students may have fears that can hinder the collaboration process. Students may feel that it is not safe to express themselves, thus teachers need to assuage student fears in order for the collaborative effort to be successful (Westmeyer, 1988).

In this case study, there did not seem to be enough negotiating in the beginning stages or during the project. Had there been more negotiation and discussion, educational goals and issues may have been clearer, thus, the client may have been more flexible and open to the more innovative designs for the golf club head and less focused on producing a product that was based so completely upon marketability. Discussions involving students, at the beginning stage, could have helped students become more aware of the elements of the collaborative process instead of merely being thrust into it.
Westmeyer (1988) encourages listening to students, inviting them to participate and recognizing what they have to say when participating in collaborative efforts. It is equally important to allow adult learners to question the instructor and contribute their ideas and opinions. As such, the students in the collaborative project could have exercised more voice and power. Instead of being taught only to please the client, the students could have been taught how to negotiate with the client. If students had more voice, they could be more comfortable defending their work.

The collaborative process in this case study had elements similar to descriptions of collaboration in the literature, such as, purpose, process, resource, and communication. In the case study, there was a goal for the project and there were guidelines for management of the project. It was also revealed that there was financial support from the client and an exchange of information and knowledge between client, student and instructor, this is as found in Rath (1978) and Johnston (1997). The collaborative process could be further improved had there been more detailed discussions about educational goals and issues, and negotiation at the beginning stage of the collaborative project. All participants need to have a clear understanding of the goals of the collaborative effort and communication needs to be open and balanced in order for the collaborative effort to be successful.

Finally, I would like to note that another case study on collaboration or collaborative situation might have the same elements but may look very different, as stated by Stake (1994), each case study is unique.
CHAPTER 5
DATA ANALYSIS OF DESIGN

As mentioned at the beginning of this chapter, this study has three research questions; 1). How does the collaborative project contribute toward an enriched educational experience for industrial design students?; 2). How are the design issues addressed in the collaborative project conducted between the Ohio State University Industrial Design Department and Dynacraft?; and 3) What are the problems and conflicts which emerge when university design education departments collaborate with industry? Chapter four analyzed the data as it related to on collaboration, in this chapter, I analyze the same data as it relates to issues about design and design education. I also include an additional tape, nine, in this section as it contains data related specifically to design.

In analyzing this data, I created coding categories based on literature of industrial design. From this literature, I identified key words related to industrial design today: They are: Product and Culture, Product and Soul, Ethics in Design, Design Culture, and Language of Design. The definition of each of these categories is as follows:

Product: The term product, in general, refers to consumer, commercial and durable goods. A product has been defined as an article analyzed, created, planned and developed for mass manufacture by industrial designers (Lindbeck, 1963; Papanek, 1984). Traditionally, it is taught that designing a product involves an understanding of the function of the product, the
aesthetic of the material, and the production process. This has been the primary force in design education and design practice. The product is also viewed as an instrument for improving social life and bringing order, reason, and vitality to everyday experience (Buchanan and Margolin, 1995). These two views are held by the majority of designers today (Buchanan, 1998; Zaccai, 1995; Papanek, 1984). The latter view is more widely discussed today and often times is viewed as an extension of the first.

Product and Culture: This refers to the call for designers to think about the role of culture in design and the design of products that are culturally specific and unique. Culture is defined in this context as the knowledge, world view, and behavior tendencies that is shared by an entire nation of people or by an ethnic sub-group, such as, Italian Americans. At the same time, culture can also be the knowledge world view and behavior tendencies shared in a micro-culture, for example, teachers or designers or policemen. Culture can provide rules for appropriate behavior and the knowledge to make interpretations about what goes on around you (Arnold, 1996).

Product and culture is related to the idea of designing products that are a reflection of a given culture and a heritage. This would include considering new and different groups, both globally and within a specific culture, that have different needs, tastes, perceptions and ways of relating to one another and the products they utilize (Zaccai, 1995; Papanek, 1984).

Product and Soul: This refers to design that addresses the satisfaction of the intellect, the ‘soul’, and all the senses (Tharp, 1997). As noted earlier in the chapter on design issues, the idea of ‘soul’ is related to the idea of a interconnectedness between the user and the product. The opposite would be a product that is disposable or throwaway (Zaccai, 1995). Product and soul is related to the idea that products should have a quality that the user
feels comfortable with and perceives as valuable and meaningful. It is also related to product designs that are a part of experiences, emotions, and reasons which create new ways of looking at the world (Salocchi, 1995). It is a call for designers to design products that enrich the relationships and connections of the human being, and add to the enhancement of life, a call for human values not economic ones (Tharp, 1997; Salocchi, 1995).

Ethics in Design: This is related to the idea that as a problem solver, the designer, has a range of alternatives in order to arrive at a solution. This could range from the choices regarding the re-examination of the actual necessity of a product, material options, environmental issues, appropriate use of production processes and substitution of non-renewable resources. It involves self-awareness and asking the question, What is the impact of this product on the environment and the people?

Design culture: This involves the ways that designers think, deliberate, and work, in other words, the discipline of design practice. It also includes philosophies that relate to the ethics, purpose, and the language of product design. Design culture is knowledge that is shared by the micro-group of designers. It reflects the way designers behave and think when designing, how they view themselves and their practices. It involves thinking about product design and how it reflects human values about what is good, useful, just and pleasurable (Buchanan, 1992; Buchanan, 1998). It is a call for responsible deliberation, thinking and decision-making, and action.

Language of design: This refers to the artistic elements and principles of design. It would include elements such as dots, lines, values, colors, textures, mass, space and volume. Principles of design would include elements such as scale, proportion, repetition and rhythm, balance,
directional force, emphasis, unity within variety and subordination (Barrett, 1994). Design decisions are based upon these elements and principles and involves organizing them for visual effectiveness.

Design Issues

The design literature suggests that in the past, it has been a trend for design to serve the global market which is accompanied by mass manufacturing. The literature also suggests that it has also been an era of frenzied consumption and possession of disposable products (Zaccai, 1995; Neumeister, 1995; Tharp, 1997). Designers argue that this trend needs reevaluation and there is a growing awareness emerging among designers, for a need to shift gears. Designers are confronted with the challenges of moving beyond service to the giant profit-making machines of corporations into more meaningful, responsible, and culturally sensitive design. The literature paints a picture of changes and challenges for industrial design, calling for designers to reexamine their roles and redefine what design means in today's world (Margolin and Buchanan, 1995; Tharp, 1997; Zaccai, 1995). Designers, such as Lucassen (1995), argue for a change of attitude from material thinking to spiritual values, from quantitative to qualitative thinking (Tharp, 1997, Salocchi, 1995). Designers, such as, Zaccai (1995) argue for multiple perspectives and designers such as Papanek (1984) and Fiskel (1996) urge designers to be ethical, and socially and morally responsible.

Thus, it would seem that industrial design has come to a crossroads and the time has come for reevaluation and reexamination. The impression emerging among designers is for a new understanding in a throwaway material world. We need to have more substance, greater meaning, and
refuse to allow economics, profit making, and the lure of greed and wealth overtake the moral and social ethics that are part of responsible product design. Thus, the call is for designers to reexamine, and reevaluate in order to design products that enrich and enhance society, to safeguard a loss of culture and/or heritage, and to assume social and moral responsibility. In addition to these considerations, the designers must also design a product that is aesthetically pleasing and functional.

Using the six main categories, defined in the previous section and the research questions: How does the collaborative project contribute toward an enriched educational experience for industrial design students? How are the design issues addressed in the collaborative project conducted between the OSU Industrial Design Department and Dynacraft Golf Products Inc? and What are the problems and conflicts which emerge when university design education departments collaborate with industry? I analyzed the data that I gathered from audio tapes of my class observations and also interview tapes of the students, faculty and client. The analysis is in narrative form and addresses those issues that are appropriate to the six design categories. The participants in the study are referred to as follows:

OSU faculty: Paul - The visiting professor. George - The primary instructor.

The Client: Jerry, CEO of Dynacraft Golf Products Inc.

Students: Jack, Andy, Elly, and Mike, Ernest, and Craig.

Persons who play golf and/or buy golf products: Players, Golfers, Consumers, Users / End Users.
Analysis of Tape Four

Event: Lecture

In tape four, there are three class meetings. Each class meeting begins with a brief lecture or discussion. The content of the lecture usually comprises design oriented material and classroom management concerns. In the first class meeting, the lecture centered on the importance of patents and patent finding. Both the faculty and the client informed the students about searching for patents and the resources they could utilize to check on patents for the golf clubs. The client, Jerry, emphasized the importance of students checking the patents in order to ensure that the students' design for the golf clubs are original. Below is an excerpt of the lecture:

IBM has a book on patents, you can look it up by GEO. You can also look it up by number. There's a patent search in the library, it may not be as updated. Use the web site, you have to do this, so you can search all the patents, so somebody out there doesn't sat that it is out there, so you've got to have that.

This lecture can be categorized under the design culture category as it relates to the thinking and working of designers. The students have to think about patents as they are working on their designs in order to ensure that their designs are original and do not infringe upon the patent rights of others. The data illustrates an attempt to teach the students about the responsibilities of industrial designers as it relates to the discipline of design practice.

The data can also be categorized under ethics in design, encouraging students to be honest and maintain integrity in their design work. The statement “you have to have this” illustrates the idea that students have a
moral and legal responsibility to observe the patent laws set by society. It also relates to the fact that a violation of patent right would cost the client a fine of one hundred thousand dollars, an occurrence which would not make sound business sense for the company.

As mentioned earlier in the data analysis of collaboration, students and the client had previously discussed the types of patents, patent searches, and which components were patented and which were not during their visit to Dynacraft Corporation. Thus, when Jerry said “you have to this,” it seemed to be more of a reminder from the earlier discussion at the Dynacraft office/workshop.

Event: Field trip

The second class meeting was a field trip to visit the Fitch design firm. During the field trip, the students had an opportunity to have an inside look at a professional firm. The students also met with two industrial designers from the company who talked about the firm, the work of designers and the clients which they have designed products for. This was a prime opportunity for students to learn about design culture.

Below is an excerpt that illustrates ideas that were addressed in regard to design culture:

We try to maintain a company culture, an interdisciplinary team approach. I think that this is a great place for that because we have so many different disciplines and ways of thinking because we have so many people and disciplines within us.

This statement indicates that the Fitch industrial designer, Andrew, perceives one of the strengths of the company is taking an interdisciplinary approach which means that the design team has members from different
disciplines, for example, ergonomists, anthropologists, engineers, and marketing and product designers.

He also talks about other ideas related to design culture illustrated by the following remarks:

This is somewhat our process - 4Ds - discover, define, design, deliver. Discover is research, understanding what the problem is, defining the problem and once you’ve done that you have the criteria for the designers to conceptualize and develop the design side of it, deliver includes refinement, modeling, prototyping, engineering, resourcing, manufacturing.

Here the industrial designer informs the students about the approach and strategies that the Fitch designers use. Design culture reflects the way in which designers think and act and this in turn is related to how designers will approach a design problem.

The data from the fieldtrip also includes information related to product and soul. This is exemplified by statements from Andrew, such as:

We also use traditional market research, probably the most unique thing is our user research - gives us background in all things which enables us to develop new methodologies for getting at and trying to understand what users experiences are all about. Traditionally, it was about creating products that work well, now there's a real push that's really recognizing that a product is really a part of the larger experience the product itself isn't the center of attention... it's trying
to understand the emotional factors is what it's all about, the different type of research help to get at that.

These statements categorized under design culture, relates to the approaches and strategies designers utilize for thinking and working. Andrew’s understanding is that research helps designers to discover the perceptions of others which leads to new ways of thinking and acting for the designer. He values research and developing new methodologies as part of the design process.

The Fitch representative talks about how design today no longer focuses only on the product. He explains to the students that today’s design has changed and designers are now focusing on the emotional factors, the experience of the product. This idea reflects ideas that are similar to ideas about product and soul (Tharp, 1997; Salocchi, 1995).

There are other statements that reflect the product and soul category. Andrew remarks, “To attract and retain customers to companies overall image, they are very concerned with brand image, customers are reminded of the experience of that company.” These statements reflect the view that designers are now thinking beyond just the product but also the relationship that the user has with the product.

It should be noted that Andrew’s presentation was more like a lecture. He was standing facing the students and explaining the slides as they were shown. There was little discussion during his presentation.

Event: Students, client, and faculty in classroom

Tape four also contains data from observations of students interacting with the client and/or faculty in the classroom. The students are discussing
their designs with the client and/or faculty and are receiving feedback. During the interactions, design ideas are discussed and information is exchanged. The students were previously told that the only limitations were the rules and requirements of the game of golf and golf equipment. They were also informed by Jerry, the client, that it was important that the club head looked good. George’s design brief to the class also stated that students should use “visual and/or performance attributes, styling cues, proportions, graphics, semantics, and other visual and form related issues will be critical in this project” (Appendix A). These design ideas can be categorized under the categories of language of design and design culture. A good example of the language of design is when Jerry was giving a student feedback about their design. He commented that “It’s not so noticeable coming down this end like this. That would go a lot better, there’s more symmetry to that, more functionality.” This statement demonstrates that Jerry is concerned about the way the golf club looks and how it functions, in other words, the form and function of the product.

Another statement that also exemplifies the language of design occurs when Jerry tells the student that he does not think the student’s design will be accepted by the average golf player because it’s too different from what the traditional golf player is used to seeing. Here Jerry is concerned with the way the golf club looks because the design proposed by the student is less conservative, more experimental for the golf industry and perceived by Jerry as likely to be less popular among players.

I like the idea of the hosel like an insect a little bit, but usually, put it this way, that’s gonna cause some problems for some people a little
bit because they’re used to seeing it this way. But I don’t think it’s going to be all that great for the average player.

The statement illustrates how much emphasis Jerry puts on the appearance of the golf club. Although Jerry has told the students that he wants to try something more experimental, he is now saying that the average golf player will not like it. This conflicting message reoccurs throughout the project.

Jerry’s statements reflect the way he thinks as a designer and a producer of golf clubs. It appears that his choices are made from an economic standpoint. Jerry perceives that the average golf player will not buy a golf club that looks different from the traditional golf club; therefore an experimental design not be worthwhile for him to pursue.

On one hand, Jerry wants to try different designs, but on the other, he eliminates the designs that are more experimental and encourages students to lean towards more traditional, conservative designs. While Jerry is concerned about the way the golf club looks, he is also concerned about how well the golf club functions. Therefore, for Jerry, it is not merely about the look of the club, but also the playability (function) of the club. The conflict lies in what is considered a ’good’ look for the golf club. The students have more experimental tendencies whereas Jerry has a more conservative approach. This relates to designing products that are culturally specific. In this case, the culture is golf players who are traditionally more conservative.

Are Jerry’s choices purely market driven? Should he introduce products that are different and experimental? Can he be different without compromising his business? Jerry appears to want to push the limits but the
business of selling golf clubs negates his support for the experimental designs.

This is reflected in his conversation with George during this classroom observation. George had asked Jerry what he thought of the students' designs he had seen that day and Jerry replied that he was pleased with the students' work, especially because the students were ready to experiment with the designs, and that is something that the golf industry did not do. Jerry had remarked:

People like this, there's no perimeter. Some of the stuff is legitimate, some of it is not, but you know in the golf industry we're stuck with, [the perception] it has to be like this...there's not really a whole lot of experimentation because as soon as you start to experiment obviously you can't have that but you guys that's your strength, that's pretty good.

Jerry liked the idea of experimentation and that the students were producing different designs. However, he did not accept some of their designs for reasons ranging from patent rights, non-playability, difficulty in manufacturing to simply because the designs were too crazy or wild to be accepted by the average conservative, golf player. Therefore, while Jerry stated that he liked the experimentation, he also stated that one could not experiment, "obviously you can't have that" in the golf industry. He wants to be different because that would give his clubs something new to offer, but not too different in order to cater to the tastes and preferences of the people who purchase the golf clubs.
This relates to economics and business, there seems to be an underlying understanding on Jerry’s part that a successful design is one that will sell either because it looks good, plays well, or has a niche in the market. Dynacraft is a business operation and the driving factor is to encourage sales. While there were no specific lectures or group discussions about this element of design culture, during the one to one interactions with students Jerry remarked which designs would and would not potentially sell, thus implying to students that this was a central area of concern.

Analysis of Tape Five

Event: Students, client and faculty in the classroom

In tape five, the students are working on their designs and discussing their work with Jerry and George. The class began with a brief lecture by George encouraging the students to rely on the client and to keep the client happy. The students received feedback from Jerry with suggestions about how to improve their designs based on consumer preferences. Below is an example of Jerry’s feedback to one of the students:

People will look at that and they’ll laugh. I think it’s really neat but they’re going to say it’s way too much. They won’t buy it because it’s too unusual a design, it has to be traditional to some degree and it also has to have some like that. That’s the way you can get something different without being too different, feature that’ll get them to try it, that’s the difficult part, color scheme or something.

Jack, the student, is informed by Jerry that when he designs, he has to keep in mind how the consumers would think of the design. This relates to design
culture, the way designers think, work, and their methodology. Jack learns through Jerry’s feedback that the consumers’ opinions are important. This was reinforced by George’s statement, during his lecture, when he stated that some businesses, like the sports industry, dictate the methodology. Thus, students learn in the lecture and from Jerry’s feedback a principal of design culture which relates to the intersection of business and industrial design. Through my own experience working with clients, Jerry could be more open to design ideas, especially since these comments occurred at the first meeting with the students. It is premature for Jerry to dismiss student ideas without allowing them to explore or discuss the ideas further as long as the requirements of the rules of club-making are followed. Jerry assumes too quickly that the student’s ideas would not work. He could be more supportive of different ideas and give the students the opportunity to use their design skills to achieve new innovative designs. Jerry is overly focused on designing products that will sell and not design issues. As discussed in chapter four, more discussion and clarification in the beginning stage about educational objectives and roles of the client was probably needed.

In another student and client interaction observed in tape five, Jerry discusses design research approaches with a student. In this interaction, Andy was trying to think of various approaches and strategies to utilize to research the market and consumer taste.

Student: Besides magazines, how do we, can find out what people will buy?
Jerry: Probably just go up and ask him. Would you try or buy something like that? Show him some drawings. What’s wrong with this? Which one do you like?
Jerry suggested several approaches for Andy to try. Jerry's suggestions are related to the methodology employed by designers when surveying the consumer market.

The statements below represented Jerry's responses while discussing the design proposals from three of the students, Jack, Mike, and Andy.

Student 1, Jack
Jerry: These are too much. People are going to look at those and it's too weird. This one is more traditional; this one's been done; this one I won't accept at all, this one you might have to convince people. These two, depending upon the design whether you have an unusual feature or unique or high-tech, you can only sell so much of it, you'll still have to have something that's still traditional in here.

Student 2, Mike.
Jerry: This one he might look at it and think it's more aerodynamic, it looks neat, and that may be a selling point.

Student 3, Harry.
Jerry: If the head's too big, it'll ring really loud, people are going to think there's something wrong with it, it's not necessarily good or bad, just what people think, I don't know about that, if this is raised up it's going to be smooth on top, there's a company that did something like this, they had dimples on it, I don't know that that works. I don't think that's going to sell.
In all three interactions with the students, Jerry talked about selling, which design would sell, which design would not sell and about marketing the golf clubs. As found in the previous data, Jerry's decisions were based largely on what would appeal to the consumers. He eliminated designs that he thought that the consumers would not like usually the more zany designs and praised the designs that he thought had the potential to be popular. As the industry client, it is only natural that Jerry would be interested in the business of selling his golf clubs, and in these interactions, the students' would most likely infer that Jerry's priority is selling the golf clubs. This is one aspect of design culture. Designers are hired by clients and businesses to design products that will appeal to consumers. As part of design culture, designers learn that they have a responsibility to the client, it is part of the nature of the job. They also learn that, it adds tension and a need for compromise. On the other hand, as stated in the analysis of tape four, Jerry could have given the students more opportunities to explore new ideas. He could have allowed students more room to exercise their creativity, once again this is an area that could have been discussed in greater detail at the beginning stages of the collaborative project.

Jerry's responses to the students can also be categorized under the language of design. Jerry talked about the look of the club, he used words such as, 'aerodynamic', 'unusual features', 'high-tech', words or phrases that reflect ideas in the language of design.

**Analysis of Tape Six**

**Event: Observation of student, client and faculty in classroom**

In tape six, Jerry reviews the students' work. He moved around the room examining the designs and sharing his opinions. Most of the students
had previously talked to Jerry numerous times in their earlier class meetings, and since this was the midterm presentation his responses were mostly short and direct. The responses were mainly about the way the golf club looked. Below is a remark by Jerry about one of the students’ designs. It exemplifies many of the other remarks made by Jerry in this tape and also in the previous tape, four. Jerry said to a student about his design, “I like the way it looks, I don’t like the playability. I don’t know about the weight but it’s a nice design.” Other examples of Jerry’s remarks from the midterm presentation include: “Everybody’s got that.” “That’s not bad.” “These are too square, the other one’s low.” And “The lines need to be more round.”

These remarks can be categorized under the language of design. The main focus seems to be on the appearance of the golf club. Jerry’s remarks can also be categorized under design culture. Jerry dismisses designs that are already in the market “everybody’s got that” which would indicate that in design culture something different and new is highly important. As recognized in the previous tapes, although Jerry says that he would like to have different designs, he also does not want the designs to be overly different. He would like to have different designs from the ones already in the market, but the designs have to meet the requirements. Jerry’s statements that he wants something new is related to the fact that he thinks that the current golf designs are somewhat stale and he thinks that the students may be able to inject some fresh ideas.

**Event: Student Interview**

In tape six, I conducted several student interviews during the classroom observation. As previously mentioned in the collaboration analysis, the interviews were unstructured interviews and were more like casual
conversations. This was not my first time interacting with these students. On several occasions I had talked with them about their work, thoughts about their designs and the project. One of the first students I talked with was Elly, the only female student in the class. I asked what she thought about her design. Below is Elly’s response:

Elly: I think that if you look around there is some pretty outrageous stuff, they’re pretty traditional, we all know that, but they’re pretty open. I’m trying to appeal to the amateur golfer who wants to play well but can’t really yet. I try to use visual cues, what I’m trying to convey is a lower center of gravity, this one is basically a different type of shape, very organic, smooth, aerodynamic.

Elly’s responses can be categorized under the language of design. She is focused on the form of the product. She uses words like aerodynamic, shape and organic. Elly used visual cues to achieve visual effectiveness, a key feature of design language. Her responses can also be categorized under design culture. She was thinking about a design that would appeal to golfers, thinking and working like a designer, using design strategies and a specific methodology.

Aside from Elly, I also had the opportunity to talk to several other students about their designs. One of the students, Mike, shared his design ideas with me. His responses were somewhat similar to Elly’s responses. Mike talked about design in terms of maximizing visual effectiveness, form and function and material and manufacturing. Mike’s concern was about creating the best possible look for the golf club using his design knowledge to achieve it. Mike responses refer to design culture. He was thinking about
designing, interacting with the engineer, manufacturing and about what the client wanted. "I'd actually like to sit down face-to-face with like the manufacture, engineer, and say, these are my concepts, can you build these, can you manufacture it, can we make a mould for it?"

It is clear that Mike is well versed and familiar with the design process, it is part of his thinking and practice as a designer. Aside from having design knowledge, Mike also knows that he has to listen to Jerry, reflected in his statement, "Their (client) opinion is really valuable. They know the real market. They're the business aspect of it, they sell the clubs, they manufacture the club, so whatever they tell me about these, I definitely want to take their opinion..." Mike's responses can be categorized under design culture as his responses reflect ideas about the practice of design, and how designers work and think.

It was interesting to observe that Mike and some of the other students, such as Andy and Jack, tried to push the limits, proposing designs that had features that were less traditional and wilder than the typical golf club. They were fully aware that they were pushing the limits in their designs, but they wanted to see if Jerry would approve. They perceived that Jerry was more traditional, but as Mike remarked "as designers you try to create wild and crazy stuff." "You try to squeeze it pass them but their opinion is really valuable, but I think they also need to loosen a bit."

In my own experience of working directly with clients as an industrial designer, I think that this is close to what actually happens in the 'real world.' Some designers tow the line more than others, while some push the limits. At the same time it also has to do with how much and effectively a designer persuades the client that his or her design will work or deem it
easier to just give into the client's wishes. The students were bold enough to create more innovative designs but less aggressive in verbally defending them.

Other students, Jack and Andy, had similar responses as Mike's, but felt that the client's opinion was important and that they had to work within the limitations. Their responses can be categorized under design culture and product and culture. It seems clear that the students understand some of what the practice of design entails. They know that the client's opinion and approval is important. They know that they have to listen to the client because they have a responsibility to the client. This is part of design culture.

Analysis of Tape Nine

Event: Lecture

In this observation, the class is two and a half weeks away from the final presentation of the designs to the client. The class begins as it usually does with a brief lecture by George, the instructor, followed by interactions with the students and faculty and client. This is the last class meeting and the students and the client decided on their final designs. Jerry and George discussed each student's design proposal, individually.

After this class meeting, the students spent the following two weeks making their models and preparing for their presentation. In tape nine, George addresses several design issues in a lecture format. Jerry also discussed some of these issues with the class. Below is an excerpt from George's lecture:
Fashion-conscious people look for colors and graphics by what they already own or know...the graphics should enhance not detract from the product, use graphics to highlight as a complement. There are three things you work with graphics and colors, image, words and colors. The most powerful here is color...people see (it) first and make decisions based on cultural or societal beliefs or experiences.

George’s lecture was primarily about the language of design. In his lecture, he addressed the concepts of colors and graphics, and how to use them effectively in order to attract consumers to a product. He also talked about the form of the product, “You need to respect and complement the three-dimensional form, this is the most important in our discipline.” This is one of the first things that industrial design students learn and is reinforced throughout their academic life. This is a statement that is reflective of how designers think and can be part of their design philosophy.

In addition, George also talked about how color can affect decision-making when consumers purchase a product. He added that cultural beliefs about color be a determinant, reflective of ideas about product and culture, where designers have to be aware and sensitive to the users' culture.

George’s lecture also addressed other design issues about product and culture such as, “Going back to tightly defined markets, doing design for generic markets, you need to know your audience, that means all the background stuff (income, lifestyle, proficiency). Also targeting actual marketing.” He explained to the students what they need to think about as they are designing a product, not only about aesthetics, but also about what the consumers want.
George elaborated further about other design issues, such as allowing time for reflection and thinking both about the product and the user. He said, "Experience, understand through experience. This will allow reflection on an action, the user, that's pretty much a given."

It is interesting to note that George said "that's pretty much a given" which would indicate that he assumed that it was common knowledge and it was something that the students would already know. This would be an instance of a common understanding among members of the design culture.

He further remarked to the students, "It's good to be aware of what we're talking about, critically look at what people are wearing, what people use and play with."

Lastly, George addressed the issues of product imagery or branding, an area that he discussed earlier in tape four. "Good brand identity, consistency within a company, it's about quality, environment, about experience." George reminded the students that it was important to remember quality in design and to design products that will give consumers quality, and a gratifying experience of that product. As mentioned in the analysis of tape four, this relates to product and soul, where designers are encouraged to design products that are valuable and meaningful (Tharp, 1997).

At the end of the lecture, George asked if Jerry had any thoughts about the students' designs. Jerry emphasized the point that George had made earlier about graphics. He suggested:

One of the hardest things you guys are doing is that the designs are high-tech and if you do graphics high-tech you're going to turn the traditional player off. But if you do the graphics too traditional that'll
detract from the high-tech of the equipment, you’re going to find that what appeals to the younger crowd will turn-off the older crowd and vice-versa, the younger crowd can’t afford it, the older guy wouldn’t buy it.

Jerry responses can be categorized under language of design and also design culture. He drew the students’ attention to the idea that the graphics, can affect the visual effectiveness of the product, the golf club. He added that the choice of graphics also affected purchase decisions. This involves the students in thinking about the features in their design and who are the potential consumers.

Summary of the Analysis

In the literature review of design, five design issues were highlighted: product and culture, design culture, product and soul, ethics in design, and language of design. The intent of the analysis was to identify the design issues that were addressed during the collaborative project between OSU Industrial Design Department and Dynacraft. The data revealed several design issues that were addressed during the collaborative project. Language of design occurred most frequently. This can be considered natural and inevitable since the class was a design studio course. The faculty, client, and students had many interactions related to the language of design. George, the instructor, also spent time discussing design elements and concepts during his lectures.

The data also demonstrated that the students appeared to be very familiar with ideas that were related to the language of design. One of the students mentioned that this was his fifth studio class. They also seemed to
understand the importance of the elements of design as one of the steps in producing a well-designed product. They had an added advantage when Jerry talked to them about their designs because they had a professional from industry, an expert so to speak. He also reinforced the significance of the design elements and gave the students a better understanding of how to use them to achieve the project goal. However, Jerry’s need to please the consumer placed limitations on the students’ use of the language of design in more experimental ways.

Another issue, largely addressed by George, was product and soul. George spent two class meetings talking about the ideas related to product and soul. He stated that “customers and users aren’t really looking for isolated benefits, they’re looking more for the experience and the value that the product gives them.” He added that it is about “how it feels, the experience from the product... it could be a desirable lifestyle or experience.” George introduced ideas related to product and soul via journal articles about product imagery and experience. The fact that the instructor spent two class meetings talking about this issue indicates that he thought that it was significant. He asked the students to read the related literature and attempted to discuss the issues in class, but unfortunately the students did not do their assigned reading and this undermined any meaningful discussion. In the classroom observation, my field notes show that a majority of the students acknowledged not reading the material. There were no significant contributions towards the discussion, perhaps because they had not read the material, perhaps because they had not spent enough time thinking about the issue or perhaps because they simply did not think that the issue was important or relevant.
In addition to George's lecture, the industrial designer at Fitch also introduced this issue. He informed the students that product and soul was something that was taking place in design today. Obviously, product and soul has importance for industrial designers, thus one should ask why the students failed to demonstrate greater interest in this topic. It could be because the students did not see this issue as significant to the design of the golf club. The data indicates that the collaborative project did not substantially foster students' interest in product and soul. Stronger connections between the issue of product and soul and the design of the golf club could have made a difference in the students' interest and understanding of this analysis.

The data revealed that the issue of design culture was often addressed. Jerry and Andrew, both professionals from industry, provided the students with an insider's look into the discipline of design as it is practiced in the real world. Jerry provided the technical support in terms of knowledge and information. For example, Jerry could tell students that if the club head was angled at x degrees it would hit the ball y distance. Jerry's contributions were not in lecture form, but were informal, spontaneous interactions. Jerry's messages to the students about the nature of design culture were implicit rather than overt. Implicitly he conveyed the notion that designers need to satisfy consumer tastes, and design products that sell.

As stated in the analysis of tape four, Jerry could have been more supportive of the students' experimental ideas. Through my experience as an industrial designer and educator, design culture can be receptive toward new ideas. They have the potential to be successful provided there is confidence in them, and there is appropriate and sufficient time to develop them. Fitch illustrates this in the time, energy, and money they invest in market research.
If one truly wants something different, then it is necessary that one actually attempts something different.

With Andrew, the Fitch representative, the ideas of design culture were presented more formally through a presentation about the company and its philosophy. Students, such as Mike, enjoyed these presentations because he gained different perspectives about how people work.

The data indicates that Jerry and George represent different aspects of design culture. Jerry emphasized ideas related to designs that cater to consumers' taste, and designing products that would sell, while George was more accepting of designs that were good, regardless of the economic factor. George conveyed his ideas primarily in his lectures, whereas Jerry's ideas were primarily conveyed during his interactions with students.

The issue of product and culture was also addressed in relation to the game of golf and the people who play golf. The students were consistently reminded to think of the users of the golf clubs.

One issue that was not addressed in the collaborative project was the ethics of design. There were no discussions about environmental concerns, social responsibilities, or moral responsibilities. If the students had any thoughts about this issue, the data did not reveal them. When I inquired about this issue with the students, most did not have any comments.

The students saw and heard from Jerry that the one important priority was gaining consumer confidence and buying power. Perhaps, this could have been balanced and tempered with some discussion of the moral and social responsibilities of designers. In one of the class meetings, the instructor did attempt to initiate a discussion about product and soul, however, this discussion did not quite get off the ground. The lack of emphasis on the ethics of design may be a consequence of the design
culture that informs George and Jerry’s practice, Perhaps in this culture, ethical issues do not weigh as heavily as the language of design, consumer needs, and the business of selling products.

George stated that this project was one of the most labor intensive projects that the department had undertaken. It was very action-oriented and the students were busy with a variety of activities, from research, ideation, sketching, to model making and presentation. Other studio classes are also action-oriented, but because there was an actual client, there was added pressure. Some educators may say that this is an unneeded pressure, while others may argue that it is precisely this pressure that makes for part of the ‘real world’ experience.

In conclusion, the more prominent design issues that arose during the project, were the language of design and design culture, while issues about product and soul and product and culture were mentioned, but not considered in depth and the ethics of design was rarely discussed, except to remind students to conduct patent searches.

It is a challenge to be able to address all these design issues in design education courses. One cannot expect one class or a single project to handle or teach issues in depth. Some product designs lend themselves more easily to particular issues. For example, if students were asked to design a hand gun for housewives or teenagers, ethical issues would or should be at the forefront. Students may also take other design classes with more opportunities to reflect upon and discuss current design issues. For example, the OSU industrial design curriculum includes a design class that covers ethics and professional practice.

The OSU faculty view collaborative projects as a means to improve and develop previously learned design skills and methodologies, and the
Dynacraft collaborative project, provided a chance for the students to apply these skills in an actual situation. The emphasis in the project was building and improving design skills. George stated that it is not all about delivering a final product, but rather “teaching problem solving, teaching students how to think for themselves.” In this collaborative project, students did have to evolve their own designs, but one needs to question the lack of design issues that informed the project. If a primary purpose of a collaborative project is to produce a real world experience and these design issues are merely peripheral to the project, it can send students the message that these issues are unimportant. Design education should not be dictated by industry. According to IDSA (Industrial Designers Society of America) guidelines, an industry-sponsored project’s main objective should be education. The guidelines explain, “the ideal project will add to a student’s understanding of professional design problems and increase his or her awareness of research techniques, technology, marketing and consumer needs, (IDSA guidelines, 1999).”

The Relationship between Collaboration and Design Education

The objective of the collaborative project was clearly stated, to help develop ideas for a new golf club head. The educational goal of teaching design skills meshed nicely with this objective. Another educational goal was to engage the students in real world design practice. Although the collaborative project engaged some real world elements, such as a client, user market, deadline, and use of materials, it did not exactly replicate actual design practice.
Based on my own experience as a designer working with clients, the collaborative project was not a totally real world experience for several reasons:

- Even if a student had not produced a product, his or her livelihood would not have been affected; whereas, in the real world, no product produced translates into no income. Here, the students’ livelihood does not depend on producing a product, although their grade for the course was dependent on this factor.

- In the real world, more time would have been spent on the project, anywhere from three months up to a year. The ten-week quarter system allowed only a short time spent for the project.

- Time would have been spent only on one project. In this situation, the students were also occupied with other classes, and did not spend all their time on the project as if they were keeping office hours.

- In the real world, the designer is answerable to the design manager of the project team rather than directly to the client.

In this case study, it would appear that the collaborative project provided the students with an opportunity to learn, from the inside, and understand better the professional design world, the ‘real world’ of industrial designers. The students were provided with an opportunity to work with a client. This is what most of the students perceived as the valuable part of the class, an actual client, and a real project. Collaboration, in this project, was a means for students to use their design skills in developing a client’s needs. However, it appears that the collaborative process was not fully utilized to address design issues such as product and soul or ethics.
From this case study, one would conclude that while the literature indicates awareness of design issues that concern industrial designers today, these issues do not seem to have spilled over into design education or into professional practice. However, while it is not possible to generalize from a single study, it does point to an area to be aware of in planning collaborative projects and industrial design curriculum as well.

It has been my experience that there are times when industry does not really understand the multi-faceted aspects and challenges in design education or the process of design itself. It is not all aesthetics and cosmetics problems, but design also involves responsibility to the community and environment.

Collaborations involving industry, and design educators can educate industry. They can discuss problems, challenges, and, most importantly, what to design, why to design, and the consequences on society and the environment. All participants in the collaborative project can use the collaborative process to work as partners as part of an ongoing exploration, a discovery, a journey of new forms of practices that hopefully can help serve the needs of humankind. To achieve such objectives, it seems necessary to spend more time in the initial planning stages of a collaborative project, defining and prioritizing these issues. Otherwise, once a project begins, such issues have a difficult time asserting themselves.

If there is growing awareness that design today is concerned with the ethics of design, values and meaning, why is this concern less evident in design education? Should not design educators be concerned about these issues? Should not these issues be raised in design education courses? Should they not talk to students about these issues?
Finding corporations willing to work collaboratively is not always easy, often times industrial design department do not have the luxury of an overwhelming abundance and choice of collaborative projects, however, this does not necessarily mean that departments cannot find a way to work with industry to discuss these issues. Departments need to clearly state their educational goals and industry should be partners in achieving these goals. Again, each partners’ goals and philosophy should be clearly articulated and explored during the initial planning stage of the collaborative process.

Collaboration can have positive contributions but it is not easy and has its challenges, such as finding appropriate projects that fit the students’ educational needs, building communication lines, articulating meaningful goals and objectives, keeping the goal and objective in the forefront, and finding students at the appropriate level for the project. While the study seems to suggest that there may not be an argument about the merits of collaboration with industry in terms of providing students with the opportunity to work with professionals with real world elements, it is important there is balance between educational goals and industry goals. Management of such projects is important in order to safeguard the students’ interests and educational needs. The priority should be the educational experience of the students.
CHAPTER 6
MALAYSIA: THE SCHOOL OF ART AND DESIGN AT UiTM

Introduction
My purpose is to use the research to provide perspectives, and possibilities for the Industrial Design Department, at UiTM in Malaysia. The findings of the case study between OSU and Dynacraft can be used a starting point for this consideration. At this point in my study, it is not my intention to develop a new curriculum model or a collaborative program for the Industrial Design Department at UiTM. However, I would like to initiate a discussion with the faculty about collaboration with industry and bring what I have learned from my research at OSU into the discussion.

Background of Malaysia
Malaysia is located in South-East Asia. It is made up of two regions, the Peninsular Malaysia which lies between Thailand and Singapore, and East Malaysia which is situated across the South China Sea on the island of Borneo. Peninsular Malaysia consists of eleven states: Perlis, Kedah, Perak, Selangor, Negeri Sembilan, Johor, Pahang, Terengganu, Kelantan, Melaka, and Pulau Pinang while East Malaysia consists of two states: Sabah and Sarawak. The capital of Malaysia is Kuala Lumpur.

Malaysia’s population is approximately 19 million. The people of Malaysia come from various ethnic backgrounds, the Malays, Chinese, and the Indians are the major ethnic groups on the peninsula; and the Iban,
Kadazan, and Bidayuh are the main indigenous ethnic groups in East Malaysia. The Malays are Muslims, the Chinese are mostly Buddhists or Taoists, and the Indians are mainly Hindus. There is also a small percentage of Indians and Chinese who are either Christians or Muslims. The Malays have, historically, populated Peninsular Malaysia. Malays and the indigenous groups are called, bumiputra, which loosely translated means ‘son of the soil.’ The Chinese and Indian immigrants were brought in during the British colonial rule for economic purposes. The British brought in Chinese workers in the 1850s to work in the tin mines and the Indians were brought in the 1870s to work in the rubber plantation. This marked the beginning of economic migrations by the Chinese and Indians that helped form Malaysia’s multi-ethnic and multi-religious population (Gullick, 1981, Hashim, 1996).

Islam is the official religion of Malaysia. However, the constitution guarantees religious freedom for people of different faiths. The official national language is Bahasa Melayu which translated means Malay language; however, the English language is also widely used, especially for business purpose.

Manufacturing is now the Malaysian economy’s largest sector. Major products include electronic components, electrical goods, air-conditioners, and textiles and apparel. Agriculture is the economy’s second largest. Agricultural products include natural rubber and palm oil. Malaysia produces 60% of the world’s palm oil and production is expected to continue to increase.

**Malaysia’s Vision 2020**

Vision 2020 is a concept presented by the Prime Minister of Malaysia, Dr. Mahatir Mohamad, February 28, 1991, at the inaugural meeting of the
Malaysian Business Council in Kuala Lumpur. In his speech he stated that "the main goal for the country's development is to become an industrialized nation and the total transformation of this achievement is by the year 2020." The multiple aspects of this development are economical, political, social, spiritual, and cultural. It covers the internal and external development of the country. According to the Dr. Mahatir, there are nine central strategic challenges that the nation has to confront. These nine challenges are:

The first of these is the challenges of establishing a united Malaysian nation with a sense of common and shared destiny. This must be a nation at peace with itself, territorially and ethnically integrated, living in harmony and full and fair partnership, made up of one 'Bangsa Malaysia' with political loyalty and dedication to the nation.

The second is the challenge of creating a psychologically liberated, secure, and developed Malaysian Society with faith and confidence in itself, justifiably proud of what it is, of what it has accomplished, robust enough to face all manner of adversity. This Malaysian Society must be distinguished by the pursuit of excellence, fully aware of all its potentials, psychologically subservient to none, and respected by the peoples of other nations.

The third challenge we have always faced is that of fostering and developing a mature democratic society, practicing a form of mature consensual, community-oriented Malaysian democracy that can be a model for many developing countries.

The fourth is the challenge of establishing a fully moral and ethical society, whose citizens are strong in religious and spiritual values and imbued with the highest of ethical standards.
The fifth challenge that we have always faced is the challenge of establishing a matured, liberal and tolerant society in which Malaysians of all colors and creeds are free to practice and profess their customs, cultures and religious beliefs and yet feeling that they belong to one nation.

The sixth is the challenge of establishing a scientific and progressive society, a society that is innovative and forward-looking, one that is not only a consumer of technology but also a contributor to the scientific and technological civilization of the future.

The seventh challenge is the challenge of establishing a fully caring society and a caring culture, a social system in which society will come before self, in which the welfare of the people will revolve not around the state or the individual but around a strong and resilient family system.

The eighth is the challenge of ensuring an economically just society. This is a society in which there is a fair and equitable distribution of the wealth of the nation, in which there is full partnership in economic progress. Such a society cannot be in place so long as there is the identification of race with economic function, and the identification of economic backwardness with race.

The ninth challenge is the challenge of establishing a prosperous society, with an economy that is fully competitive, dynamic, robust and resilient (Mahatir, 1991).

The call is for Malaysia to focus towards industrialization and post-industrialization as a means to become a fully developed nation. According to Dr. Mahatir, Malaysia needs to set new standards, achieve new results for
the journey towards industrialization. It is important to note that the prime minister also stressed that Malaysia can be as developed as other developed nations, such as U.S.A., U.K., Canada, Sweden, Finland, without being a duplicate of any of the developed nations. He states that Malaysia should be developed in her own mould (Mahatir, 1991).

As a result of this call for industrialization, a plan was made for achieving it. It was called the second industrial master plan and spans from 1996-2005. The second industrial master plan is a blueprint for industrial development. The emphasis of this plan is to move beyond manufacturing operations to “include strengthening industrial linkages and enhancing value-added through integration of activities along the value chain (Ong-Geiger, 1997, p.190).” This includes areas such as research and development, design capabilities, development of integrated supporting industries, packaging, distribution, and marketing activities. In order to manage the drive towards industrialization, Malaysia has to develop her human resources. Dr. Mahatir believes that the people are the most important, he said:

It is blindingly clear that the most important resource of any nation must be the talents, skills, creativity and will of its people. Our people are our ultimate resource. Without a doubt, in the 1990s and beyond, Malaysia must give the fullest emphasis possible to the development of this ultimate resource (Mahatir, 1991, p.5).

He added that there must be “the correct mix with regard to professionals, sub-professionals, craftsmen and artisans, and the correct balance with regard to those with competence in science and technology, the arts and social sciences (Mahatir, 1991, p.5).”
The government has made an on-going effort to ensure the attainment of a developed country status. An example of the government's efforts is through training and upgrading the skills of the people. Ong-Geiger (1997) reports that the government has allocated RM 90 million for the setting up of training institutions and programs. It is clear that the country is committed to higher education as an important part of the process of industrialization. Universities and other institutions of higher learning continue to grow and expand.

In summary, Vision 2020 is basically a blueprint of how Malaysia is going to transform herself into a fully developed nation. The goal is for the eventual creation of a resilient and competitive economy and the development of "viable and robust" commercial and industrial community (Khoo, 1995, p.334). At the same time, Malaysia should be developed not only in the economic sense but also socially, spiritually, psychologically, culturally, and politically. The prime minister sets his sights on Malaysia as a united nation:

With a confident Malaysian society, infused by strong moral and ethical values, living in a society that is democratic, liberal and tolerant, caring, economically just and equitable, progressive and prosperous, and in full possession of an economy that is competitive, dynamic, robust and resilient (Mahatir, 1991, p.1)

**Higher education in Malaysia**

The education system in Malaysia is a reflection of the multi-faceted role it undertakes to create a united, democratic, just, liberal and progressive society. The national objectives of education are national unity and human resource development. The foundation of a united and harmonious nation
was laid through the creation and development of a unified national education system. Education is also viewed as a vehicle for the country's manpower needs. Educational policies are aimed at providing greater opportunities for those in the lower income groups and those from the under-developed parts of the country.

In Malaysia, higher education aims to produce professionals to meet the nation's demand for human resources and provides facilities for research and consultancy services. Universities, colleges, polytechnics, and other institutions of higher education provide education and training at this level. In keeping with Vision 2020, there are plans for the expansion of post-graduate programs in the fields of science, technology and the applied arts. At the same time, the government in order to ensure development, areas such as industrial manufacturing, electronic biotechnology, and information technology have been designated as high priority research areas.

The School of Art and Design at UiTM

The School of Art and Design at UiTM has grown to become the foremost Art and Design institution of higher learning in Malaysia. It is the pioneer art and design school in Malaysia. It is also the only government-sponsored school of Art and Design. The school produces nearly 80% of the country's industrial designers. The diplomas offered by the institute are recognized as equivalent to a first university degree. Graduates from the Institute are deemed academically equipped to pursue post-graduate courses at foreign universities.

The School of Art and Design was founded in 1967. The program was structured based upon the first report by William Coldstream of the National Advisory Council on Art Education. Students are required to take a year of
courses in foundation studies before branching into their own area of specialization: fine arts, industrial design, graphic design, textile design, fashion, fine metal, to photography.

In the beginning, the curriculum was strongly influenced by the British system of education. The majority of art educators were British trained. By the 1980’s, however, a change occurred as art educators began to come from a variety of educational backgrounds. Local and cultural issues also began to gain importance and were informally introduced into the curriculum. In 1984, the School of Art and Design decided that it was time to restructure and revise the curriculum. The decision to revise was prompted by the idea of preparing students for the professional world, as stated in the goals and objectives of the school and the nation’s move towards industrialization. The goal was to provide students with educational experiences that would enrich their acquisition of knowledge and skills and to prepare them for the job market in the industrial and manufacturing sectors. It was believed that the students would benefit and be better prepared for the professional world if they were to take some courses out of their areas of specialization, for example, business management courses. It was argued that a course such as business management could provide a basic introductory background and knowledge about the business world which would be an advantage for the students when they entered the professional world. At that time, the curriculum did not allow for an integration of the different departments. There was no interdisciplinary concept between departments. Students were not allowed to enroll in classes outside their area of specialization with the exception of liberal art studies. It was decided that all eleven departments should require students to take a business management course.
Aside from interdisciplinary study, it was also believed that students' educational experience would be enhanced if the time spent on practical training was lengthened from three months to six months. Practical training is a requirement for students to graduate from the School of Art and Design. This idea was based on the belief that the more time students spent working in a professional environment, the better prepared they would be when they entered the professional world after graduation. Yet another idea that arose from the curriculum restructuring discussion was the idea of working with industry. While there have been a few random collaborative projects with industry, these projects have not been formally part of the curriculum.

In order to further improve and strengthen the curriculum, the school organized a conference in 1994 to discuss strategies that could answer future challenges of art and design education. There are four main areas that were discussed for further development: 1) strengthening the academic sector, 2) strengthening the management sector, 3) strengthening the link with industries, and 4) strengthening student development programs to produce quality graduates.

Today eleven departments that help make up the School of Art and Design. At present, the departments offer courses culminating in a diploma degree in the following fields: Diploma in Art and Design, Diploma in Art and Design (Graphic Design), Diploma in Art and Design (Textile Design), Diploma in Art and Design (Fine Metal), Diploma in Art and Design (Industrial Design), Diploma in Art and Design (Pottery and Ceramics), Diploma in Art and Design (Fashion Design), Diploma in Photography, Diploma in art and Design (Fine Arts), Diploma in Music, Diploma in Art and Design (Art Teachers' Diploma). There are approximately one thousand three hundred students enrolled in the School of Art and Design.
Department of Industrial Design, UiTM

The industrial design program is a four-year undergraduate program leading to professional employment or graduate study. The objective and goal of the department is to produce competent professional industrial designers who are equipped with design skills, design management, and basic entrepreneurial skills for the professional world. In their first year, students in the program take foundation studies in art and design conducted by the Department of Foundation Studies. The following three years are mostly studio-based classes and liberal art studies, including classes in art history, humanities, art and design theories and other interdisciplinary classes. Areas of specialization in the Department of Industrial Design are product design, furniture design, and transportation design.

Even though the objectives are to produce competent professional industrial designers who are equipped with design skills, design management, and basic entrepreneurial skills for the professional world, the strategies and solutions to fully achieve the goal of the department are still vague and underdeveloped. Reevaluation of the strategies should focus on the real need of the industrial design students, which, according to the goals and objectives of the curriculum, is to step closer to the professional world.

The School of Art and Design Working with Industry

There are several ways in which the School of Art and Design, UiTM works with industry or corporate firms. The first is through a service department, Pusat Daya Cipta, translated it means design center. The design center provides consultancy services. A complete explanation of the design center will follow. Another way in which the School of Art and
Design works with industry is when individual departments engage in projects with industry on their own initiative or through contacts with industry.

Pusat Daya Cipta (The Design Center)

Pusat Daya Cipta (PDC) is a service department registered under the trust fund of UiTM. This center is operated by the faculty and staff of the School of Art and Design and provides design consultancy services. Projects range from product design, interior design, corporate image, graphic design, photography, clothing and textile, souvenirs involving fine metal and ceramics. Corporate firms and industries seek out services that faculty, staff, and students may be able to provide. Firms and industry directly contact PDC. PDC then channels the projects according to the appropriate department. All eleven departments in the School of Art and Design work with PDC. Faculty, staff, and students work for the client under the direction of PDC and usually it is financially rewarded. The income that PDC makes is divided three ways; UiTM, PDC, and the faculty or team each receives a percentage. PDC has its own account and trust funds.

The consultancy projects from PDC are not formally part of the curriculum, due to the time and the nature of the projects. Most of the PDC projects are either long term projects, a year or more, more time than a typical design class or very short term projects, one or two weeks. The time constraint makes it hard for students to be involved in such projects. Many PDC projects are typically consultancy based with clients coming to the center seeking design services. Education and teaching are usually not part of the picture. The client hires PDC for design services and typically does not become involved with projects except during presentations. However, some
faculty members chose to involve selected students to work on the projects with them. It is not unusual for students and faculty members to work together on consultancy projects. In some cases, faculty members and students work on these projects on their own time, outside of class. In other instances, faculty members bring these projects into the classroom and incorporate them into the class. What usually happens is that PDC receives a request for a product design and assigns a faculty member to the project. The faculty member chooses his/her team, usually consisting of technical and support staff members, and may want to include his/her students. In general, the faculty member goes about this either by selecting students to work on the project outside of class time or by involving an entire class and working together during class time.

Departments working with industry corporate firms

In addition to working with industry through PDC, it is also common for departments to work with corporate firms based upon personal contacts and their own initiatives. Firms or industries directly contact the Head of Department or a faculty member of a particular department and they work together on a project. These projects are usually either sponsored projects, competitions or research and development. As mentioned earlier, departments such as the Industrial Design Department have had many projects with industry in some form or other.

Summary of UiTM Situation

In order to have a clearer and updated picture of the current situation in the Industrial Design Department, I e-mailed and called five of the faculty members. One faculty member, the Head of the Department, Mazlan Majid,
was a classmate when I was a student at MARA from 1978 till 1982. Two of the faculty members are senior members who have been with the department for over twenty years; They were my lecturers when I was a student and have since become my colleagues and friends. I have, in the past, worked closely with them in departmental matters. One of the senior faculty members was the previous Dean of the School of Art and Design and is an active speaker and presenter at design seminars and conferences. The remaining two faculty members are junior faculty members who have been with the department for about four years. They were previously my students and I helped recruit them as faculty members for the school.

I asked them faculty members a range of questions, concerning their educational goals for the department, teaching philosophy, design issues, future plans for the department and their opinions about collaboration with industry. I asked these questions as a comparison to the educational goals, teaching philosophies, and design issues in the OSU Industrial Design Department. I also inquired whether or not in the past three years that I have been abroad, there had been any projects involving collaboration with industry.

It is important to point out that the following discussion of the faculty responses to my inquires should not be considered an in-depth analysis of the department or faculty, but is an attempt to obtain a general notion of the current educational program and situation at the Industrial Design Department and to gauge the viewpoints and perspectives about collaboration with industry.

One of the more obvious developments in the departments has been a change in name and status of the institute. The institute was previously known as MARA Institute of Technology, and has since been upgraded to a
university. It is now known as University Technology MARA (UiTM). The change of status seems to indicate that the institute is growing and developing. I have learned that there are plans for the development of graduate and postgraduate programs in the university. Aside from the Diploma certificate, the University now offers Bachelors of Arts degrees for some programs. Since I have been away for almost four years now, it is difficult for me to offer a complete and accurate picture, I would like to study this further when I return to Malaysia. There is still much that I have not explored and examined with regards to the upgrading of the institute to a university and what it means to the School of Art and Design and specifically to the Industrial Design Department. This may be part of a further area of study for me when I return to UiTM.

**Educational Goals of Industrial Design Department**

From the conversations and the responses through email with faculty members, it appears that most have an idea as to the department’s educational goals. One exception to this was one of the junior faculty members who did not know what were the educational goals of the department. The faculty members interviewed stated that the primary educational goal of the department is to provide skills for students to become professional industrial designers. The Head of the Department stated that the educational goal of the Industrial Design Department is to provide quality education to equip students with the skills to meet the job market needs.
How does the department determine and define job market needs?

In the past, as a lecturer and as Head of the Department, several factors have helped determine what were job market needs, such as, feedback from external examiners and curriculum advisory council members from industry, discussions with invited speakers from industry and interactions with part-time lecturers who are full-time designers. In the Industrial Design Department there is a curriculum advisory council made up of industrial design faculty members and several industrial designers from industry. These industrial designers, recommended by faculty members and industry peers, are usually established, practicing, managerial level industrial designers. The council members meet once a year to discuss curriculum concerns and issues such as the duration of practical training for senior level students. The discussions and feedback from the council members help provide an idea of job market needs. Additionally, the department has external examiners who evaluate students’ final year design projects. The external examiners are from corporate firms and have to be industrial design degree holders. They work with the department evaluating students’ design projects. At the end of each evaluation the external examiners are required to give an oral and written report to the School of Art and Design academic council about the quality of the students’ work. Their reports include strengths and weaknesses of the students’ work, areas for improvement, and issues which students need to address, such as the use of materials, processes, and presentation techniques. The feedback from these external examiners are a source of information that help form a picture of the concerns of professional industrial designers and the practice of industrial design. This information in turn helps the department to determine job market needs.
A third area that helps determine job market needs are lectures from invited speakers. Industrial designers and entrepreneurs are invited to speak to the students and faculty about the work they do, their experiences and challenges they have faced. These talks help to keep students and faculty informed about industrial design practice and the demands of the ‘real world.’

Finally, job market needs can also be determined through interactions and discussions with part-time lecturers that service the department. The Industrial Design Department recruits part-time lecturers to teach Saturday and evening classes. These part-time lecturers from industry are practicing full-time professional designers. In the design classes, part-time lecturers provide support with regard to technical aspects and technical information or knowledge, such as, model making. The feedback from part-time lecturers covers areas such as students’ strengths and weaknesses, and areas for improvement. Once again, this feedback provides insight and information that help students and faculty gauge job market needs. There are also other secondary means that help provide information about job market needs, such as, design seminars and workshops, design conferences and journal literature.

The faculty members further identified developing research skills and the intellect as educational goals of the department. This would be in keeping with the stated objectives of the department as mentioned earlier in this chapter, “to produce competent professional industrial designers who are equipped with design skills, design management, basic entrepreneurial skills for the professional world. “

Overall, the faculty members hoped that students in their classes would learn new innovative ideas that would satisfy true needs of the
market. They also desired that students would learn about the real world of design practice and business and how to merge conceptual ideas into marketable production ideas. One faculty member stated that he wanted students to learn to make responsible design decisions, and to be able to consider the best possible design solutions.

Therefore, it appears that although all the faculty members have individual teaching strategies, they have a common goal that is to provide the students with skills and knowledge and to prepare them to enter the professional world. The connection of industrial design education with professional practice is a strong theme that dominated the faculties comments.

Collaborative Projects

According to the Head of the Department, Mazlan Majid, at this time collaborative projects between the department and industry are not required and are not part of the industrial design curriculum. However, the idea of collaborative projects between industry and students is not new to the industrial department or to the Art and Design School of UiTM. In the past three years, there has been one collaborative project conducted between the department and industry. According to Mazlan, the department and the industry representative signed an MOU (memorandum of understanding), but had almost no contact with the students directly. The collaborative project involved junior level students who were asked to develop designs for recreational vehicles (go-karts). The students produced scale models as part of the class requirements. There was a final presentation and, according to Mazlan, the client was impressed with the designs of the students. However, there appears to be no further follow-up on the part of industry. The industry
representatives did not attend the class meetings and had no interactions with the students. The students and the client did not discuss design ideas. The faculty members who were involved in the project took some students to the industry's showroom. However, this was on the initiative of the faculty members and was considered an informal visit. A chassis was provided for the students to view in order that they would be familiar with the structure of the vehicle, but the client did not supply any other materials or resources. A technical representative from the industry attended the final presentation and, as mentioned above, was impressed with the design proposals of the students.

In my conversations with the faculty members, I learned that all the faculty members felt positively about the idea of collaborative projects with industry. The faculty members shared the same viewpoints as Wilson (1997) and MacDonald and O'Neil (1997) who contend that collaborative projects have much to offer students in terms of providing students with an experience with actual projects and companies, thus helping students to polish or build better professional skills. The faculty members also elaborated that collaborative projects can help boost students' confidence and help students better understand the other aspects of design, such as marketing and manufacturing.

At this time, however, collaborative projects are not part of the curriculum but in the interviews, faculty members recommended that they become part of the curriculum. The faculty also pointed out that there are challenges that come with collaborative projects, such as management and planning and budgets and sponsorship related to the project.
Expansion of the School of Art and Design

It appears that the Industrial Design Department is expanding. From my conversations with the faculty, I learned that the department has been given more physical facilities and more studios and spaces for students. The enrollment in the industrial design department has also increased and the ratio of female students has risen.

The School of Art and Design is also expanding and now has a Bachelor program and they are currently working on a graduate level (Master’s) program that is scheduled to commence in March 2000. Thus, despite the economic slowdown that the country and the South East Asia region is experiencing, it appears that the plans for expansion and growth are still moving along. Vision 2020 continues as part of Malaysia’s vision for the future, perhaps the rate of growth may have slowed down and it may take a little longer to achieve the goals, but the nation and her people are still growing and developing. As mentioned earlier, it is difficult for me to offer a complete picture since I have been away for the past three years, however, I would like to study this further upon my return to Malaysia.

Implications of the OSU case study for UiTM

Similarities Between OSU and UiTM

1. Educational Goals

Both Industrial Design Departments appear to share similar educational goals, that is, to provide a “learning environment for students...preparing students for professional practice (Kaufman, OSU Industrial Design Department, 1998). This is similar to UiTM Industrial Design Department’s goal to “to produce competent professional industrial designers who are equipped with design skills, design management, basic entrepreneurial skills for the professional world.” Both departments emphasize preparing students
for professional practice. The OSU Industrial Design Department regards collaboration with industry as one way to help students prepare for the professional world, thus this may be a consideration also for the Industrial Design Department at UiTM.

2. Level of students

At OSU, the collaborative project usually involves students in their junior year, likewise, in the past at UiTM, collaborative projects have typically involved junior year students.

3. Curriculum Inclusion

Although collaborative projects with industry have become a common feature of the Industrial Design department at OSU, they are not a formal part of the curriculum; however, there has been a recent proposal from some faculty members to include collaborative projects as part of the curriculum (Kaufman, 1998). Similarly, the Industrial Design Department at UiTM does not include collaborative projects as part of their curriculum. The collaborative projects at UiTM operate on more of an ad hoc basis.

4. Coursework required

Both departments also offer similar types of courses covering various design skills, such as, drawing and rendering, model making, and presentation skills. However, OSU seems to have a stronger research background than UiTM Industrial Design Department.

**Differences Between OSU and UiTM**

1. Perceptions

While both departments have experiences in working with industry, the perceptions of collaborative projects with industry at the two institutions
are not the same. The OSU Industrial Design Department possesses a more comprehensive understanding of the problem.

2. Procedures

The OSU Industrial Design Department has a history of collaboration and there appears to be clear guidelines to help with the management and planning for such projects. This is an area that the Industrial Design Department at UiTM has yet to fully develop. At present, the department at UiTM has yet to clarify what collaboration entails. For example, there is a need for clearly defined roles and responsibilities, and specific goals and objectives. At present the planning and management for collaborative projects at UiTM is only vaguely articulated. The situation at UiTM is such that if chance opportunities present themselves for the department to work with industry, the Head of the Department decides how the project will be implemented. This is different from the situation at OSU where the chairperson usually plans and selects the projects before the quarter begins and discusses management details, such as project goals, level of students, sponsorship and other related matters with the faculty who will be involved.

3. Role of the client

In the case study between Dynacraft and OSU, the client was an active participant in the project. He attended the class on a regular basis, worked with the students on their designs, and contributed to the learning process by providing information and knowledge that the students needed for the project. The client also sponsored the project with a contribution of approximately 18,000 dollars. The client also arranged for the student whose design was selected for production to receive royalty payments from the sales of the club head.
This is different from the collaborative projects at UiTM which in my own experience, lacks participation from the client. Clients do not attend class or work with the students. There is no involvement on the part of the client apart from the first day when the client explains what the students are to design and on the final day when the students present their work. Additionally, there was usually no sponsorship on the part of the client. Projects take the form of competitions. Students are awarded prizes for first, second and third place and the other remaining students received consolation prizes.

Implications from the case study for UiTM

Based on the findings from the case study between OSU and Dynacraft Golf Products Inc., I have several recommendations for future collaborative projects at UiTM. One, I suggest that the industrial design department at UiTM and the potential industry partner discuss and clearly state the educational and commercial goals and objectives of the project. The case study findings demonstrate that this is a significant factor for ensuring that the project is successful, in terms of answering both educational needs and industry needs. It is crucial that discussions of this nature occur in the beginning stages of collaborative projects. However, before this type of discussion can take place in the UiTM context, there will need to be prior dialogues within the department in order for the faculty to reach clearly stated, shared agreements, and visions as to the purpose for collaborative efforts.

It is highly important for the faculty to be seriously committed to the rationale behind collaborative efforts, if they are to be effective and successful. Before a department can plan collaborative projects with
industry, they need to be a united team with a clear understanding of educational goals and objectives. Without such a consensus, differences among faculty members in terms of the educational goals and objectives can lead to ambiguous, confusing communications to industry. This in turn leads to less effective and successful collaborative efforts that potentially affect the educational experience of industrial design students.

Additionally, the department would need to consider the following questions: What will the collaborative effort require from the university and industry? What are the roles and responsibilities of each party? What will be the role of negotiation? How will power be distributed? How will the lines of communication function? and What resources will each partner contribute?

The Industrial Department at UiTM needs a shared vision of their own role and responsibility in collaborative projects. This can be achieved through active and serious discussions among faculty members, only then can meaningful discussions with industry take place. Power structures will need to be negotiated between faculty, industry, and students. I would like to believe that discussion and negotiation of this nature is possible given the fact that the faculty members are mature, educated professionals who are able and willing to engage in serious, constructive, and rational dialogue among faculty and also between faculty and industry.

If discussions, beginning with the grassroots of the department up to discussions with industry, help clarify, define, and deepen understanding of the educational goals and objectives, as well as roles and responsibilities, occur in the beginning stages of the project, there could be an increased sense of ownership that could improve the chances for shared and negotiated power between parties. This relates to Taylor’s (1997) idea that partnership does not necessarily mean equal power among all members, but
an agreement about roles, responsibilities and the allocation of power. In the case study, there was a power structure that was not necessarily equal but which allowed for the students, faculty and industry to listen and discuss each other’s ideas. However, it was not clear that this structure was explicitly negotiated, but rather developed in a less overt manner. The fact that the client appeared to exercise greater authority might have been more problematic than indicated by the faculty and student comments in the data. The negotiation of power can be a sensitive topic in any collaboration. At UiTM, the culture is more formal; more emphasis is placed on protocol and authority figures are seldom questioned. This difference will have an affect negotiation of power in collaborative projects.

The case study findings showed that client involvement is significant to the success of the project, making it necessary to convince industry as to why they should assume this responsibility. In the UiTM context, industries could be persuaded to be more actively involved in collaborative projects by emphasizing that design can provide a competitive edge in marketing strategies. The department can explain the fact that low labor costs and an abundance of raw materials no longer provide enough of a competitive edge and that more industries are gradually becoming aware of the potential benefits from research and development in design. At the same time, it should also be emphasized that the Malaysian government strongly supports research and development, illustrated by government incentives provided from five years tax exemptions if companies and institutions are involved in research and development ventures. This was explained by the Minister of Science, Technology, and the Environment, Law Hieng Ding, during The First International Industrial Design Conference and Exhibition held in Malaysia in 1991.
Additionally, Malaysian industries may want to become more actively involved in collaborative projects with the industrial design department at UiTM due to the government establishment of a fifty million Malaysian ringgit Industrial Technical Assistance Fund (ITAF). In this fund, twenty million dollars is allocated to promote product design and development in small and medium-scale industries, (Law, 1991). These government incentives are related to Vision 2020, the government plan for Malaysia to become an industrialized nation capable of producing her own products rather than a producer of pre-designed, made to order products, for local and export markets. There is a growing awareness that design born out of the indigenous culture can be a significant marketing strategy and this can help promote the idea for more collaboration between industries and industrial design departments (Law, 1991).

Industry will be persuaded to become more actively involved in collaborative projects if they perceive that it is in their self-interest. In the case study, the client realized such benefits as the development of a product, input into the training of future industrial designer employees and a positive public relations image in working with an educational institution. These same outcomes could apply to Malaysian industries and become persuasive factors to encourage participant collaboration.

The outcome of the case study also indicated that communication was a significant factor for the success of the project. Aside from daily communication, in terms of keeping one another informed and updated, the findings showed that a more informal approach was used by the faculty, industry, and students when interacting with one another. From my experience and observations of the American culture and specifically in the case study, I have noted that a more informal approach at OSU when
compared to UiTM. This may be largely due to cultural differences. The Malaysian culture is more formal with greater emphasis placed on protocol. The industrial design students, faculty, and industry in the case study at OSU placed less emphasis on formal protocols, and authority. This was demonstrated by the casual behavior and body language of the client. Although he was definitely in charge, the client projected himself as open and not as authoritarian. The students were comfortable enough to be on a first name basis with him. There was respect for his technical knowledge and contributions but the students were not unduly in awe of him. In my observations, the client was respectful toward students, although there was direct criticism of students’ designs, the tone of voice used by the client was not harsh and these were not personality attacks. This was also the case with the faculty and students who could communicate fairly openly. The students respected the faculty as a source of design knowledge, but were not afraid to approach him to discuss ideas and strategies. The faculty was approachable and treated students fairly and respectfully as an adult would wish to be treated. This is somewhat different from the situation at UiTM where, based upon my experience, students are more inhibited by authority figures. I project that it would be challenging for the faculty, industry and students in the Malaysian context to have a similar level of informality. This raises the question of whether it is desirable informal, why is it desirable, and if so, how can it be achieved? I think that a less formal approach, perhaps less emphasis on protocol matters, may help improve communication between all participants in a collaborative venture. At the same time, there needs to be respect for cultural traditions. Cultural traditions may be difficult to change and this may present itself to be an area for further consideration and examination.
The findings from the case study were that the experience built the students' design skills in terms of problem-solving, material usage, and working within particular limitations. Such would be advantageous for UiTM students. However, issues such as product and culture and ethics in design were not significantly addressed during the case study. The issue of product and culture may be more significant for the UiTM context as there is an awareness of the need for development of products that offer a local, indigenous identity as well as a culturally relevant indigenous Malaysian identity that has global appeal. This objective would need to become part of a shared vision between UiTM faculty and industry that is negotiated through the collaborative process.

Ideally, in the case study more ethical issues would have been introduced and integrated. Perhaps this could have been negotiated with industry if the department had emphasized the ethics and responsibilities of product design in regard to human values. Collaboration can provide the opportunity to educate both designers and industry about the issues that are important to designers and industry alike, such issues derived from educational and industrial goals. Collaboration has the potential to help group members become more aware of concerns and needs through discussions, negotiations, and compromise, all of which could improve design education in Malaysia and elsewhere.

A further question that arises from the case study relates to the selection of collaborative projects. The type of project selected for the case study was limited, as it did not maximize innovative thinking. Further, it was not a complex project, the collaborative environment in class could have been more evident if the students could have been placed in design teams. While there may not be an abundance of Malaysian industries currently
involved in collaboration projects this does not negate the need for careful selection of collaborative projects that can significantly contribute to design education experiences for students. This would include attending to the type of product to be designed, the complexity of the design project, and the willingness of the industry partners to consider educational goals and objectives and to become involved, committed partners.

Significance of the study for design education
There are several contributions from the case study involving collaboration between industrial design departments and industry to the field of design education. These are as listed below:

- Collaborative projects between university industrial design departments and industry can enhance the educational experience of industrial design students specifically in terms of improving design skills such as problem solving. However, this would be dependent on student skills and industry needs. It is important that there is a match between student skills and the needs or requirements of industry in order to ensure that students comprehend fully and are able to fulfill industry needs while at the same time there is the opportunity to develop and improve student skills.

- Collaborative projects offer the opportunity for industrial design students to gain an idea of the professional environment they may encounter upon joining the workforce. Students have the opportunity to work with industry, something not found in other design courses. Students are exposed to information and knowledge that otherwise may not be as readily accessible or available in other courses. However, the findings indicated that the professional environment encountered was only partially like the real world. Factors such as the time span of the project,
• the fact that the students did not work as design teams, the fact that the students livelihood were not dependent upon their designs, and that they did not have to answer to a design manager are factors that did not reflect the real world.

• Collaborative process characteristics such as discussion, negotiation, and compromise can increase awareness among participants of each other’s diverse needs and resources. This can improve understanding and allow for development of new perspectives and approaches. Discussion and negotiation should continue throughout the project. Steps should to be taken to ensure that discussion and negotiation remain an ongoing component of the project.

• Design education departments can utilize the collaborative process to educate industry about important issues in design such as social responsibility, ethics, and culture as such issues can inform and raise awareness. This allows both communities to address problems they encounter and to prepare for future challenges.

• It is necessary to state the goals at the beginning stage of the collaborative project. Detailed discourse about educational and commercial goals between design departments and industry, supported by an effective organizational structure can contribute toward the success of a collaborative project. It is important to remember that industry goals should not dominate educational goals.

• The allocation and distribution of power among all participants of the project need to be discussed and negotiated. Power relationships need to be negotiated at the planning stage and throughout the project.

• Gaining a more objective perspective can be problematic when the power structure in the university is promoting the project.
• Prior to collaboration, design departments need to examine, evaluate and prioritize their curriculum goals and objectives, particularly in light of the current situation of design practice.

• Communication channels need to be balanced. The client should not dominate and hold all the power. Greater negotiations between students and client allow students to have more voice. Negotiation related to power distribution and the role of client and students during the beginning stage of the project need to be addressed.

• In design education, the student is the product. Design education should strive to produce quality professionals, in character and design skills. Skilled designers who are socially and morally responsible can contribute toward more relevant and better products. It is easy for these goals to become overshadowed by the production of a product.

Significance of the study for UiTM

It appears that there is still much to discuss and think about in terms of the application of this study to the industrial design department at UiTM. It would be an oversimplification to simply recommend implementing collaborative projects as part of the industrial design curriculum. As suggested by the above questions, there are still many considerations to take into account, much for the faculty members to discuss and think about. More time and examination needs to occur before any steps are taken to revise and restructure the curriculum to include collaborative projects. One however, should expect that collaborative projects will be as diverse and unique as the partners that are encountered.
This case study is significant for UiTM because:

- It can act as a stimulus to returning to basics such as: What is design education about in Malaysia? What do we really want to teach and train designers to do? and What collaboration can contribute to the educational experience of the students at UiTM? There is a need for strategic, realistic, constructive discussions to develop an effective and organized management structure that supports clear educational goals.

- The decision-making to take on the collaborative project is complex. Power relationships and group dynamics will need to be carefully negotiated. Educational goals and objectives, faculty, industry, and students roles and responsibilities, resource input, and balanced communication between participants also need to be discussed and negotiated throughout the project, from the beginning to the completion of the project.

- Decision-making in a collaborative process must be flexible enough to accommodate different situations as warranted by different contexts and industry partners rather than rigidly following the established rules. In Malaysia, the mind-set is to not to question and to follow rules. Thus, faculty at UiTM may need to change their mind-set.

- Collaborative projects can also include students during discussions at the planning stage and continue to include student input throughout the project.

- Malaysia’s international industries may have undue influence on the nature and direction of collaborative projects. Collaborative projects for UiTM need to be carefully selected to meet the educational needs of the students and department.
In Malaysia, it is common for industry to have the upper hand, therefore the process by which power negotiation will be worked out will need to be raised by UiTM.

Collaboration has to address the local situation and context. In UiTM, as far as collaboration is concerned, it is likely that I will be perceived as an expert and the faculty may not question or be involved enough. Instead of perceiving me as an expert, the collaborative process requires that I am perceived more as a facilitator during discussions with faculty. As indicated in the findings, the expert model, where participants rely heavily on one person who is perceived as the expert does not work well, it is not collaboration.

Most of all, there should be a willingness among the faculty at UiTM to consider new or alternative options, and to change outmoded or ineffective strategies and practices, and false preconceptions.

Culture, according to McFee (1986), is something that is acquired, learned, transmitted, maintained and modified through language, behavior, ritual play and art. Culture is not static and evolves over time. It is not my intention to use the findings from my case study to impose upon the present culture at UiTM. Cultures, however, can learn from one another, while not necessarily imitating the other. Significant change in design education at UiTM cannot happen without the support and commitment of the faculty of the Industrial Design Department at UiTM.

Design today, as explained by Buchanan (1995) is caught in a triangle, being pulled in three directions; one, toward art and aesthetics, with concerns about form and appearance of products; two, toward engineering,
with concerns about making products that work; and three, toward human
science with concerns about communication and the relationship between
product and people. In addition, economic concerns represent another
dominating factor. There needs to be a balance, a center among
theses tensions. The collaborative process can be useful in this search for a
balance among these tensions by providing a place for dialogue and
discourse.

In conclusion, my hope is that the collaborative process may help improve
design education at UiTM not just in terms of building and improving design
skills, but with respect to a return to human values as explained by
Buchanan (1995) and Tharp (1997). I share the concerns of Buchanan
(1998) for design education and the role it plays in advancing design
thinking. I agree with him that basic skills need to be taught, but there are
other elements of learning which contribute to the development of an
educated, responsible professional. To succeed, the UiTM context needs
careful appraisal, all relevant elements need to be considered, and tough
questions need to be raised. With careful planning, and a willingness to
change, the collaborative process can make useful contributions toward
improving and strengthening design education at UiTM.

Educational institutions, such as UiTM and industry partners must
have clear goals and be aware of what collaboration entails. Collaboration is
more than a relationship. It is a shared investment by all partners and it is an
ongoing process, not a product. It keeps changing. The biggest challenge
may be an unwillingness to change and to hold on to the status quo, or to
misunderstand what collaboration is about or to jump on the bandwagon and
fail to see when collaboration is and is not beneficial for industrial design
education.
Collaboration allows both design education and industry to address long-range challenges, develop perspectives and increase understanding of each other’s culture. Both communities have much to learn from each other and increased understanding about another’s culture helps develop mutually beneficial collaboration. As design education and industry draw closer it is important to recognize the strategic role each plays toward contributing to ongoing permanent innovative collaboration.
LIST OF REFERENCES


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Interview Questions

A study of collaborative projects in the field of industrial design sponsored by corporate firms/industry with University Industrial Design Department.

Interview Questions for faculty members:
1. How many collaborative projects have you been involved in while at the OSU Industrial Design Department?
2. How were these collaborative projects started? Could you describe the types of projects and the companies that were involved in these projects?
3. How do you incorporate the collaborative project in relation to:
   - the Industrial Design Department program?
   - the selection of students?
   - the schedule?
4. What are the objectives or goals of the department in initiating this kind of program? Do different collaborative projects have different goals? How do these goals evolve?
5. In your experience, what are these projects like for students?
5a) Do you think your students get anything out of these projects?
6. What has it been like for you to be involved in collaborative projects?
7. What about the industries? What do you think they get out of the project? Anything?
8. In your point of view what is the primary motivating factor of a collaborative project?
9. Who sponsors the collaborative projects?
10. Are the participants being reimbursed for their time?
11. Where do these collaborative projects usually take place?
12. Are there any challenges during the collaborative project? If yes, please elaborate.
13. What are the skills that the participants bring into the project? What are the specific responsibilities of the students, of yourself, and the industry?
14. What kind of guidelines does the Industrial Design Department have for legal documents e.g. a contract?
15. Could you describe the relationship between the participants (student, faculty, industry), for e.g. the power relationship. Is power an issue? Does power have to be negotiated? How much do you negotiate the power?
15(a). Who are the key players in decision making? How are these decisions made?
16. Are there conflicting goals i.e. individual goals vs. goals of the collaborative projects? How are conflicts handled?
17. In your experience, are participants roughly equal in terms of their contribution (work)?
18. To whom does the end product belong to? Does each party have equal rights to the end product?
19. How are each participants right protected?

Interview Questions for students:
1. How many collaborative projects have you been involved in while at the OSU Industrial Design Department?
2. Could you describe the types of projects and the companies that were involved in these projects?
3. Do different projects have different goals? How do these goals evolve?
4. In your experience, what were these collaborative projects like for students?
4a) Do you think students get anything out of these collaborative projects?
5. What has it been like for you to be involved in collaborative projects?
6. What about the industries? What do you think they get out of the project? Anything?
7. In your point of view what is the primary motivating factor of a collaborative project?
8. Are the students reimbursed for their time?
9. Where do these projects usually take place?
10. Are there any challenges during the collaborative projects? If yes, please elaborate.
11. What are the skills that the participants bring into the project? What are the specific responsibilities of the teachers, of yourself, and the industry?
12. Could you describe the relationship between the participants (student, faculty, industry), for e.g. the power relationship. Is power an issue? Does power have to be negotiated?
12(a). Who are the key players in decision making? How are these decisions made?
13. Are there conflicting goals - individual goals vs. goals of the collaborative projects? How are conflicts handled?
14. In your experience are participants roughly equal in terms of their contribution (work)?
15. To whom does the end product belong to? Does each party have equal rights to the end product?
16. How are student rights protected?

Interview Questions for Dynacraft Inc. representatives:
1. How many collaborative projects with OSU's Industrial Design Department has your company been involved in? What about other Industrial Design departments?
2. How were these collaborative projects started? Could you describe the types of projects?
3. How do you incorporate the collaborative project in relation to:
   - the Industrial Design Department program?
   - the selection of students?
   - your company's schedule?
4. What are the objectives or goals of your company in initiating this type of program? Do different projects have different goals? How do these goal evolve?
5. In your experience, what were these projects like for students?
5a) Do you think students get anything out of these projects?
6. What has it been like for you to be involved in collaborative projects?
7. What about the industries? What do you think they get out of the project? Anything?
8. In your point of view what is the primary motivating factor of a collaborative project?
8(a). Why do you think industries get involved in the collaboration process?
9. Who sponsors the collaborative projects?
10. Are the participants reimbursed for their time?
11. Where do these collaborative projects usually take place?
12. Are there any challenges during the collaborative project? If yes, please elaborate.
13. What are the skills that the participants brought into the project? What are the specific responsibilities of yourself, of teachers and the students?
14. What kind of guidelines does the company have for legal documents, for e.g. a contract?
15. Could you describe the relationship between the participants (student, faculty, industry), for e.g. the power relationship. Is power an issue? Does power have to be negotiated?
16. Who are the key players in decision making? How are these decisions made?
17. Are there conflicting goals - individual goals vs. goals of the collaborative projects? How are conflicts handled?
18. In your experience are participants roughly equal in terms of their contribution (work)?
19. To whom does the end product belong to? Does each party have equal rights to the end product?
20. How are each participants rights protected?
Interview Transcript

Interviewee: George Hall
Asst. Professor
Industrial Design Department
School of Art and Design, OSU

Interviewer: Baharudin Ujang
Date: Thursday Jan. 29, 1998
Time in: 3.05pm
Time out: 3.55p
Building: Hopkins Hall

The session began with a brief summary of the topic of my study. Prior to this interview (last quarter: Fall 97), I had given George a copy of my proposal and the objectives of the study. I sent (e-mail) George a copy of the interview questions on Wed. Jan. 28 1998. He consented to allow me to audio-tape the interview.

Below is the transcription of the interview:

Baha: Before I start with the detail on the main topic of the question, can you just give an introduction of your background, maybe your teaching philosophy?

G: I guess my teaching philosophy is more like a life philosophy. I think a lot of things taught in design, a lot of people would call it the quality of life, the quality of things, mmm, I guess the quality comes out from people who care about what they do, so I guess if you care about what you’re doing, observation and making, what you’re working on, that characteristic is the quality...so that doesn’t mean you have to care about everything...just about what interest you, you need to find out what interest you, your time, your resources, your energy, and whatever and then from that, quality comes. Regardless of the whatever, the product or the process... I guess that’s the key.

Baha: How long have you been in the department?

G: This is my third year.

Baha: Oh, 3rd year. So, since you’ve been in the department, how was the philosophy work out? I mean do you feel good about, I mean, I think is this the place...

G: You mean...do I want to stay?

Baha: You want to stay like you know

Wayne: Ya, it’s been a good place for me personally. But it is difficult for the department in
general because it’s short on staff because people want to leave on sabbatical. There’s nothing you can do about it, so it comes down to the people who are left. But it’s good if you want to leave, there’s a lot of support, you just have to ask for it.

B: Ok. Let’s go to the main topic. I understand that you have been involved in several collaborative projects with industry and students in the industrial design program. I understand you have been working with the OSU medical center on the MRI project, Texas Instrument, Apple project, Rubbermaid. This was like last year, right?

W: Right 3

B: So, it’s just like in a short period of time you have covered 4 kinds of projects. How are these projects started? Is it your own initiative or...?

W: Usually, the easiest way to initiate projects is going to the people that are in the industry that have their plans, or alumni, or the department they usually contact the Chair of the department or the Chair goes out soliciting, ah, like to have a sponsored project or if this quarter is open that we don’t have anybody doing a project at this time. Actually the Chair probably thinks in advance what projects the students already have. The senior class already had type of project with technology so they wouldn’t want another technology project, they would probably go for a low-tech maybe sports project, so, ah if you have that latitude that’s what the Chair is thinking about. the whole curriculum, the point of the whole curriculum for one class, they are not just going for latitude but certain interest, their planning out a little in advance.

B: So are you saying that at the senior level, projects should, must be a sponsored project or a collaborative project.

W: No, no, not necessarily, but I think on average the class probably have minimum two sponsored projects, one maybe in the junior year, the other in the senior year and in the last quarter in the senior year they have their own personal thesis, usually it’s up to them to find a sponsor.

B: Ok that’s kind of like an individual project.

W: Right, right.

B: I see, so you’re saying it’s better to have a real project for their senior thesis or it could be...

W: It could be anything but it helps...by that time they should know how to connect with the client, write a proposal, do things like that.
B: Going back to the collaborative projects you’ve been doing for the past year, I mean like, how are these projects incorporated in the program, for e.g. like you’re saying that you have contact with friends, alumni, or maybe industrial contacts, and then how does this work, incorporated...of selection of student, scheduling...its a very big question..how do you manage..do you start early in the semester or how do you plan it?

W: Actual project?

B: For example, I don’t know.. how does the Texas Instrument started. Did you start early before the quarter?

W: Ya, exactly. Ah, I guess the planning, pre-planning is the sponsor, the client. The sponsor talks to the professor, I guess myself and I try to get an idea of their purposes in terms of the project, that usually happens the quarter before. There’s communication before planning, getting material ready for the lectures, planning for the presentation whether their here, on site, or they’re down at the actual site, the actual company. And also a lot of those projects wanted some sort of communication device from us. We set up a lot of, I guess prototypes of standard operating procedures. The student would want to ask questions to the industry with the client so they could go through me or just send to these people compensating. These little communication issues and a lot of those companies wanted also to have just not one person in the company involved in the project but several, so for those projects we had like a website, so students would put on images and pictures and more people, a lot of people in the company got involved and then there will be more communication. So these are the things that we plan on before the class, what are the standard operating procedures. What are you looking for, what are the loopholes by the end of the project, what are their expectations.

B: Most of the projects are at the senior level, right, junior and senior level, right.

W: Right.

B: Then do you have any problems in schedule, in terms of, if you are bringing in one project like you could finish it in a quarter or maybe an extension?

W: That’s already planned in.

B: I see.

W: The Apple and Rubbermaid were two quarters.

B: Oh, alright, ok.

W: The other one is one quarter, MRI is on-going. We just had a Whirlpool last quarter. The Whirlpool project was only for one quarter.
B: About the department of industrial design over here, is there any strong reason why you want to engage in this kind of collaborative project.

W: I guess the benefits are it is closer to some real world experiences for the student, for the company it is very cheap labor, usually they donate maybe 10,000, 20,000 depending on the types of projects, how long the project is... So from that point of view the student gets pretty much the cost of materials, maybe slides and then they get the experience working with a client. And of course, the company feels good about themselves helping the student and getting cheap work.

B: When we talk about these projects most of the financial will be sponsored by the industry. On the part of the department, do they sponsor too, sharing the financial or totally by the industry?

W: Ya, totally by the industry.

B: And then like in your experience how does student see this project benefit them.

W: A lot of them really see it as a benefit because they put it in their resume that they work for a company, that really looks good and almost like an internship but again it's more real world. It gives them an advantage to the corporate world, it is especially evident in the European students, we had some students from Britain come over and I don’t know the economy but it is very difficult for the industrial Design students to get certain jobs and for the school to have contact with industry it was a great experience for them, they could put that in their portfolio.

B: You're saying that on the industry side they benefit a cheap way of product development. What about your part, do you benefit too?

W: Ya, it's not really tangible, from the point of view of the teacher it is very difficult. I'm the middle man. I have to interpret what the client wants for the student but because the students are free people, people who think and do what they want to do, I can't really force them to design what the company wants, so they sort of... it's a strange relationship.

B: I see, Are you saying that the relationship is not tied, I mean like if you are working in a company.

W: You’re assuming you’re doing the work like an employee of a company, but as a student you don’t have the same responsibility. So it’s like I don’t know you can do as good or as bad as you want.

B: You’re position...hey, you guys I’m in the middle
W: Right, right. I'm in the middle, it is stressful... but it's good for like I guess the big things, one it brings money to the department, somebody has to do the work, somebody has to do the operations end and good for the promotion...

B: So, you're saying that the industry pay the department, right, do they pay the student, the faculty?

W: They don't get any money, there is no exchange of money form the department to any people, it is only reimbursement, for supplies or things they spend on. They do get money but usually they spend more than they get back.

B: In your experience of doing collaborative projects, which do you think is more important, is it the collaborative process or the end product.

W: I guess if I had to rank them, I think the process is more important, umm, there needs to be a balance, the things I talked about before, the planning, the company, the department, the agreement that will deliver these sort of products, these sort of tangible things, so they need to be balanced, I guess the danger is as an educational institution we're supposed to educate the student and a final product is not as important as teaching the problem solving, teaching them how to work together, teaching them how to think for themselves, things like that sort of binding them gives something to the company, but doesn't always happen, maybe insights that students found during their research.

B: When does it (the collaborative project) take place, from doing the ideation, presentation?

W: I guess again there's planning for this, for ideation, to give students enough background, we ask the company to give us background, information to the students as much as they can, meaning literature support from their own employees to come down and guest lecture and then myself I talk to my colleagues elsewhere and bring them in, so there's planning for the whole quarter, so the students can be rammed very quickly because ten weeks is not a lot of time for these projects, so they get all the information they can, so they don't have to recreate the view, and then they can do the project.

B: So representative from the industry do contribute in terms of teaching too.

W: Sure, sure,

B: Through the whole process?

W: It's variable. But the Whirlpool project, the last one, they had an engineer come in from Sweden, another from Hong Kong, and then from Michigan and there were like three other times when Whirlpool representatives came down.
B: This is a project you're doing now?
W: Last quarter
B: Last quarter, which project?
W: Whirlpool, we redesign...

B: This isn't on the website right?
W: No, they didn't want it, see certain companies don't want publicity.
B: Ok, Who are the key players? Does the industry have more say or how does it been negotiate?
W: I think that a lot of the industry understand that it's an academic environment, so they're pretty lenient on what ever the result are, they'll be satisfied because most of these are either explorative concepts design, they're not for...their ideas are not taken all the way to the production, maybe 2 out 10 will be taken to the production, or 5 out 10 good ideas but the power relationship...ahh..the client is usually pretty good, not being overbearing, so my point of view I try to communicate what the client wants from the students, that's about it.
B: How does communication work, is it through meetings, presentation, like decision making, in terms of selection, to decide which design would be selected...
W: For the most part, the company leaves it up to myself...and they give the design criteria, perimeters that they're looking for, there's not, I guess you could call it like a management maybe, they're not that. For the most part they're not into seeing what color it is... it's up to the student.
B: Most of these industries, they do have their design team
W: Yes, I think all of them do
B: I think this is part of the influence of the design team to have collaborative projects with institutions
W: Ya, I think it's more so definitely because they don't have the money and the workload, ya, it's all design team because those design teams probably are shielded, insulated, they don't have any new ideas
B: You're saying that their department come to a period of saturation
W: Ya, they're on the same people, same information, so they need new ideas, the offices they have don't do consultancy or else a school, 10,000 is nothing when you talk about consultancy, it's nothing
B: Let's talk about responsibility in terms of contribution of each participant, you did mention monetary, what about other things like facilities.

W: There was a project that Reinhart Butter did and he requested computer equipment and so they sent us computer equipment and we kept it and software, I think money to buy software, because that particular sponsor worked in a certain way, maybe using particular software, specific computer equipment, so to do the project here we didn't have so we requested from them, they sent it.

B: Like students they are responsible to come up with ideas through the final presentation.

W: Yeah.

B: On your part, do you contribute on ideas too, or do you just manage the whole...

W: Yeah, depends on...I try to get as many ideas to the students as I can.

B: Do you have like preliminary presentation before presenting to the client?

W: Usually the client comes in first, very early, first week of the quarter I usually tell the student that they are coming in, be prepared for this kind of presentation and they usually have questions for them, usually the second day of class the client will come in.

B: You were saying that early in the quarter you have planned how things could work, what about do you consider legal matters?

W: Usually there's a first right over refusal, all students have to sign a contract, what that means is that the company has the first right on the design, to make the design unit, production design for the whole one year and if they are going to make it production design they are going to pay the students for a certain amount of money to take that away from them, and then the student has no right over that. If the student finds another company that wants to take his design that he had done for X company but he wants to sell it to Y company, X company has the option to say no, we still want that design for one year, so they can refuse the student to go anywhere else for one year.

B: You mean the design?

W: The design...the right of information.

B: Is it the selected design or any of the design?

W: The selected design.

B: But the student work which are not selected?

W: It's up to the student to come back and tell the company.

B: Usually, the paperwork is it a standard kind of proposal?
W: It usually comes with the company, legal consultant, legal counsel
B: Does OSU have...
W: I don’t think so, they might have with a research company but we don’t it’s too much trouble
B: So the reason is that they want to protect the design
W: Yes, ah ha
B: Through doing several of these collaborative projects, do you remember any major problems you come across, how do you solve it
W: I think the anxiety is the students don’t understand what the client wants, sometimes the client doesn’t know what they want and sometimes the planning before the class starts is planned according to me or the department trying to develop the curriculum, develop the project, so sometimes the client doesn’t even know what they want. I think that’s where the problem starts like there’s not a clear goal then it’s hard for me to guide the students, the students feel very left out
B: In that case, are you saying that most of the projects being set up the brief is not very clear
W: Ya
B: And then like they’re not talking about the product they’re going to produce or are you saying that it’s more like experimental concept
W: Some of them are and some companies want really the research and insights more than the final product and sometimes it’s clear to the students, there’s always going to be a product, anybody can make a product but some of the companies start to realize the research, the methods that we use are extendable to the benefit of them. By doing these types of video ethnography or photo montage things like that, they gain from that route, you know, anybody can make a thing but it’s what’s behind it, why did you make that...
B: I still like to touch on the confidentiality of the projects. Most of them are really confidential
W: Some companies want to keep it confidential. Some don’t really care, they want the publicity.
B: How will it last? Till the product is on the market
W: Usually a year, but it’s not really a super secret thing because I write about it, the department writes about the project, we have used it to talk about...
B: Students may need to use it in their portfolio
W: Exactly, that’s in the agreement too, they can take it, put it in their portfolio.
B: Do you think the collaborative project is a worthwhile effort in the industrial design program? How do you rate it?
W: I think it’s important, the danger is you want a balance, you don’t want too many collaborative projects because then industry has determined what students are doing but I don’t think you want students working without any direction because the project real life situation, students start bring out working on teams. For the most part, all the collaborators are team players, that’s a big part of it, so too the management of time.
B: Do you have any feedback from students after the project?
W: Ya, I think a lot of students say they really like it. It’s a lot of work, a lot of hard work, a lot more stressful, a lot of anxiety than a project that didn’t have one, I think a lot of them liked it.
B: Do you feel that in this kind of project, that you are really assisting them to the real world?
W: Ya, I think there’s a lot more weight put on these projects, the problem the students have dealt, meaning the real professional from industry come into class and tell them the same thing that I have been telling them. Sometimes they believe it more believable because of where they’re working right on, it has a different weight, that’s some of the things that industry brings.
B: Are there like suggestions...
W: You mean the students?
Ya, alumni, ex-students
W: I think they like it, the other options are like internships, co-op.
B: Do you have like a continuous collaborative?
W: Usually, it’s like one or two quarter but actually the industries come back maybe four or five years after projects, again it’s the alumni, the network of..
B: In another way they’re saying that they’re satisfied and that we would like to work here
W: Again it’s the cycle thing, meaning the industry also gets the chance to look at the potential employees. When they come out here, they see the students, they’re also looking for good designers, so if they see the designers do a good job on the project, they’re going to bring them down to industry and do internships or co-op that maybe lead to full-time jobs and that person will be our alumni and as that guy gets older, he’ll come back to us.
B: That’s one thing good about the profession, there’s always support from the alumni
W: Ya, everybody’s happy.
B: Ok lastly is there anything I should know about collaborative I didn’t ask
W: Not, really, I think the industry they’re serious about their work but I think when it comes
to these collaborative projects, it’s a bum thing for them, the first couple of times I was
pretty serious, very business-like, always bring a sense of humor when dealing with clients
because you know when they visit here it’s fun for them to come back to school, back to an
academic setting, you know
B: Ya, because they’re sort of like..ah, I’m released..
W: Ya, breathe, ya that’s the only time as a student you’re only responsible primarily for
yourself but once you go to work you’re responsible for other people, the products that you
make...
B: Do you think that the industry people really want to be a part of these projects.
W: Ya, in the T.I. project the industry sponsor and I went to the golf course, golfing
B: Do you have any on-going projects
W: No.
B: I might like to interview students, is it possible?
W: There’s a senior class right now, probably a good time to ask
B: Where’s the seniors’ room?
W: Room 16 at Hayes Hall
B: At the basement right?
W: I know they have a critique tomorrow or maybe Monday
B: Is it with you?
W: No, They have Ana
B: Maybe I have to talk to Ana. These students what are the projects they are involved in
with you
W: They did the micro-wave and the Timex watch
B: Oh, ya, I’ve seen that, Reinhart did show it to me
W: You missed a good class, they were a really good class, a year before this one, they had
a collaborative project every quarter, they had Ziemien, GI, Samsonite, Conar, every quarter
except for their senior thesis
B: Projects done with Texas Instructment, are they still around?
W: Ya, these guys, the one with the Sharp monitor...he’s taking general education courses,
he’s done with the design work, he’s working in the shop
B: What’s his name again?
B: He’s a senior, right
W: Tall guy, kinda thin, hair kinda long
B: This is just for my own information, it is possible that you have any written reports on collaborative projects?
W: Ya, this is...the purpose is different the way I wrote it, the Apple project...
B: Can I make a copy of this?
W: Ya
B: Do you think that in the future if you’re working on a collaborative project I could observe?
W: Ya, sure. What’s your plan for your thesis?
B: This is my pilot study actually, this is where my proposal will come in, if everything is ok, the committee approve and I have a good site so by summer I’ll do my candidacy exam and most probably I’ll start my research next fall. I might come back to you, to do observation. This is only a beginning, to start off.
At the end of the session I thank Wayne for his time and input.
George: And tentatively probably comeback Monday and definitely next Wednesday, he's pretty flexible so bring in early research concept stage so that down the road it's not realistic, oh...after Fitch next Friday we're going to go to Priority design, they do a lot of sports stuff like golf equipment also, I'll get a map to you next week for that field trip, other minor things, there's a blue crate back there with some of the folders, I figured we keep our research somewhat consistent and organized so you guys want to use that as a filing system, that'll be useful, sharpies are also in the box, grab some, that big block, that Doug was talking about, the shop downstairs has a bunch of that, they know that we need it, so ask for it, what else, what else, oh, Loraine Justice is presenting her teaching lecture at 3:30 pm and I might pop in to hear research lecture it's upstairs, so I don't want to keep you guys from not seeing it, so you guys can go if you want, but since Jeff's here I would take advantage of that, um, anything else, question?

Student: Is there any other way to look at patents? Through the internet or whatever else.

Jerry: IBM has a book on patents, you can look it up by GEO you can look it up by numbers.

G: There's a patent search in the library, may not be as updated.

J: Use the website, you have to do this, so you can search all the patents, so somebody out there doesn't say that it is out there, so, you're got to have that, if you find it, let me know.

G: Anything else, why don't we get working on visual stuff sketching, and you want to get to models.

Paul: Also any literature we're gathered let's get it together so we can see what have we got, put it up here somewhere.

Student: Man class is over.
Man: Paul, you want to tell them how we got started? Laughter. Paul and I go way back, what we’re going to talk about how we get started here, we’re going to walk around and a brief slide presentation. And then we’ll walk around the place but I’d like to hear from you guys what we want to get out of this, ask any question, so...we got started 35 years ago, Doug you can help me out.

P: I think it started out in a chicken coop on Route 33 and.....

Man: then they transferred into a stable, they like animals, Dave and Dean were from Pratt Institute in New York, they became friends there and came back to this area, renovated an old chicken coop, then they got a little larger, came to this place which was owned by Dennison Hydraulics and I think when they first got here, Dennison was still operating so across where all the cars are parked used to be a stable so they setup shop in the stable, still had a horse in it. then the horse died about a week later, (laughter) so here we are, following that Dennison Hydraulics, originally this place was bought by a travelling Minstrel, This is what I heard, you heard this one?

Doug: No.

Man: This is what I heard from Dean, travelling minstrel, one of this guys wandering around shows and things like that, convinced the government to help finance uhh..the operation here for freeze drying for the war and if you walk up that way you would see a lake that was used as part of the process. Uhh...they never really started it though, so they got a free place, they started the hydraulics stuff, and then it translated to Dave and Dean and as we go through the office you’ll see that...the additional kinds of thing he added on, then, I guess around about 10 years ago, a company in London named Fitch which is primarily retail design acquired us so we became Fitch Richardson Smith and then became Fitch, so let’s see anything you want to add (to Doug)

p: How many offices do you have now?

Man: We’ll show some of that, I think the thing you want to keep an eye on when we’re going through here, all the different types of peoples, you’ll be seeing all the different types of sketch techniques, stuff you see around people’s space that influence them, uh, computers, everyone has computers, so let’s go, let’s take a walk to that room, you’re going to see a little bit of that and then let’s find out a little bit about what you guys want out of this, o.k?

Man 2: So, Fitch what is it? Um, Fitch is an international business and design consultancy we provide solutions for people and um, companies who use products help to sell products, all kinds of things, we have principal offices in Boston, Columbus, San Francisco, London, last year we acquired Titan, we opened an office in Osaka, in Japan.

Man1: He’s got 700,000 people flyer mile. He’s got 300 or so people.
p: How many are employed here?

Man 1: About 120 or so

Man 2: Boston we have about 40-50, San Francisco around 25, um Osaka office about 6, well depends, people tend to travel between there and Ann Arbor about...

Man 1: Uh, Ann Arbor about ...uh...

Man2: Just make it up.

Man 1: Uh about 16. They're growing.

Man2: This is over San Francisco (slide) office, that opened about 2 years ago, about 2 1/2 years ago and uh they're really pushing for space now.

Man 1: Remember we had shifted move from San Diego they're feeling the difference in location.

Man 2: A lot of people from that office started work here and moved around a lot, each location has different...

Man 1: The cultures are different, I think that's pretty interesting, we try to maintain a Fitch culture, interdisciplinary team approach but still different cultures in SF vs. here vs. Boston.

Man 2: This is the entrance to the building (slide) that houses our Boston office which is (newer part of town?) down by the docks, and this is an office where we get to meet a lot of people, a very much a multi-disciplinary, team-work and that is the location of the London (slide) office which is also going to be changing within the next few months they're growing and need more space.

Man1: That's Ann Arbor (slide)

Man 2: Ann Arbor is becoming the advertising,

Man 1: talk about a difference, their approach's a lot different than ours, real interesting, the dynamics of trying to converge on the freeway of opinion we learn something from them, they something from us.

Man 2: I think Fitch is a great place for that level of posturization, of different disciplines and ways of thinking because we have so many different people and disciplines within us.

We have 3 sections, Product development, communication and environment. Within product development we have Industrial Design we also have engineering, user interest, PSI, we design a product, engineer a product, we get PSI to help us manufacture that product. We also have communication which is graphics design and media as well, writer's people we use quite often for helping us with language, structures, bringing in new ideas, just helping us with the whole process, also compiling documents and catalogs environment-retail environment for like copy and buses, you'll see some as we go about all these rely heavily on...
Man 2: Research as well, which is the caravan outside we got different types of researchers from ergonomists to antropologist, psychologist very respected very respected within their fields, um.

Man 1: We also use traditional market researcher, probably the most unique thing is our user research- gives us all backgrounds in all things which enables us to develop new methodologies for setting at trying to understand what users experiences are all about. Traditionally, it was about creating (traditional) products that work well from the factors stand point now there’s real push from really recognizing that a product is really a part of the larger experience, the product itself isn’t the center of attention, the heart of that experience and trying to understand the emotional factors is what it’s all about, the different types of people, research helps to get at that.

Man 2: Communication (slide) rendering services products to the market, also involves Internet experiences. Environment is the design and planning of spaces, to attract and retain customers to companies overall image not only design environment but also very concerned with the brand image, at every point, the customers reminded of the image and the experience of that company.

Man 1: It’s interesting the types of designers that work in retail and the designers that work on product you can see sort of wild far out kind of design real exploratory that aren’t something you’re have to going to mass produced real interesting because the kind of personality that design product develop is not more conservative these things are kind of wild and crazy just different type of individual that fits into the kind of thing.

Man 2: I think a lot of it comes from the nature of the product, short term product that has to attract, it evolves very quickly, has to attract people and create a sort of wild factor to bring them in, so this is up in Minneapolis Mall of America (slide) for Chrysler, develop a new type of shopping experience or browsing experience, where people are shopping in garages, dealerships, there’s more shopping through the web, this was an effort to create an environment to attract people to come and see the cars and not necessarily buy them but get an idea of what Chrysler had to offer and what the experience was.

Man 1: Chrysler trying to shift their brand identity so they felt that it was important to move away from traditional methods of advertising to more grassroots methods, so that’s why they would have these browsing areas, customers just walk around, not necessarily hassled by a dealer, just get a sense of what Chrysler was all about in the 90s, and coming up to 2000.

Man 2: This is somewhat our process, 4Ds. Discover, define, design, deliver. Discover is research, understanding what the problem is, defining the problem and once you’ve done that you have the criteria for the designers to conceptualize and develop the
design side of it. Deliver includes refinement, modeling, prototyping, engineering, resourcing the manufacturing so that's what those are about.

Back at ID studio, the next class meeting, after the field trip to Fitch.

G: If you want to interview with him, he can accommodate you earlier before 2:30.

So rough count, how many people are thinking about showing their portfolio?

(G gives class directions to Priority design).

Monday and Wednesday P and I want to dedicate the time, both of us talking individually to all of you to see where you’re standing, what your thoughts are and what your directions are. Jerry here but he’s got to leave at 5, right? He’s got to get to somewhere else. Paul and I will take a tour, reading material, this article going around is called "Integrating Team, Reinventing Maxi-fly Golf" maxi-fly is the golf ball and it’s all about identity and how they changed their identity. The article talks about, you think about changing a golf club is hard, think about changing a golf ball. This is from the journal called Design Management and they publish a lot of case histories and studies on design and business related issues, so take a read at this, we can discuss it Monday. Some of the things you want to look through, some of the highlights, the author is talking about are that customers aren’t really looking for the isolated benefits. They’re looking more for the experience and the value that the product gives them, more of an overall picture and I think Jeff is talking about making titanium sound like a boy club. So that it’s not like this thing’s got a Kmart dimple on it, it talks about how it felt, the sound, the experience you get from the product, not just any driving club. It’s about features but I think a lot of the customers are looking for more, what they’re calling whether it’s just a lifestyle, and whether it represents desirable experience. Also their methodology, I know we can’t get into some of the research they’re talking about but they’re looking for the type of personality associated with particular brands or product, depending on where you’re picking your golf club that fits, you need to find the particular person that fits the category, that talks about imagery, what imagery that’s associated with those people, what do they buy and what do they actually live in, like some people like IKEA stuff (like me) and I can’t you know buy a whole set of wood that are Calaway you know, think of how these people live, they don’t drive the Porshes, they might want to, so maybe that can flow into consumable things that are less expensive, what are they acquainted with, what do they want, what they associate with, so this is some of what the article talks about, product case imagery and personal drive imagery and that gets into what they wish they were doing, other people doing that they’re not and that’s like sports utility vehicle syndrome of I’m having more fun than you, I could climb mountains but I really don’t. We’ll talk about this Monday. Questions? Any questions?

Looks like some good development with the models here. Paul's going to give a little demo and show some sketching.
P: Ah, I'm gonna show some sketches, just for the first sketches, underlays, just outline and do some quick concepts, you can knock out 15 sketches you know while watching tv. I brought my old friend's work, some of his sketches are better than his planned stuff. I think, if you look at some of his loose stuff, I like that a lot better than the final rendering. These are cars and fun stuff which you all can relate, feel free to look at that. If anyone's interested, I brought the mailing address for the publication.

This is a picture holder I made while I was at Fitch, you can take a look at it. This is a thumbnail that I put out, sort of a puzzle sketch, threw in a little color and put the logo on the side. This is a real simple sketch and it gave them (client) just what they needed to see what it would look like. So, it's not something that would a whole lot of rendering to show. I guess that's about it, show and tell, use some of this to show first sketch technique.

G: I think that the value that Paul's talking about with the quick sketches is that it captures more movement and it's really good for sports, motion, excitement, again it's drawing with efficiency. You don't have to put a lot of time into, use that to underlay and so another thing is if you go the other way and getting tight and trying to draw everything exactly perfect. You get to some trouble of people thinking that's rendering drawing and looking for mistakes and finding mistakes. Keep your sketching line loose, that allows them to see what they want to see and allows you to work off those sketch lines as underlays and make more different concepts, so a lot of good importance with just sketching and not being perfect. I think Jim Moore kind of teaches that too. Why don't we break up and we'll all work around and talk to everybody.

Students move and breakup to do individual work. George and Jerry (separately) go around and talk to students individually about their ideas and work in progress.

Jerry talks with students about their design ideas for the golf club.

Student #1

J: This drawing here, move it to a straight line and keep the angle right there, coming down this way and coming down this way (Jeff sketching while talking).

S: I curved this out a little bit

J: It has to be bigger here and curve it back

S: So, you're saying keeping it bigger, so the...

J: The perception is dropped, it's bigger on the bottom, like that, (draws), see most clubs have the bottom start down here somewhere, where the bottom parts smaller, this to me look like the top part is still up here, o.k. and this is definitely bigger than the bottom part

S: So, then the patent says that the top cannot be bigger than the bottom or vice versa

J: The top has to be bigger than the bottom, o.k?
Student #2

J: so, you see this line here, where you have the flared out there, it has to go, it has to be scraped, o.k.

S: o.k., so...

J: It can't curve this way, it has to curve this way...

S: So, like actually it'll probably be that way more, I think that was just my marker but umm

J: o.k. so, you can just come down here, you can just like curve like this

S: and then the patent

J: that's fine

S: o.k. Beautiful, I'm working on it now, so

Student #3

S: Actually, that's in a magazine, I've gotten into this illustrated thing now, I've put all my things in the back of my mind

J: that's fine, that's fine, yeah

S: Started out with the golf bag, I put that in there and that being the two shot and the grip, it was actually a little tiny picture in a magazine I was flipping through and the different things I could put in my background. I'm gonna put a golf putt, you know, I'm trying to find other stuff like maybe put a golf hat and you know, I don't know if I could get twenty by Friday, that would be it for like, you know, some of these models. I might make one or two, that I can take clay too, just so I can change the front that way too but I'll have a few models that I can take around. I found a golf place to go to (Deer Creek), a lady I babysat for there runs the place there, I've got Black Creek, and the other place is out at the airport.

J: O.K

S: I've got another golf pro. I've no idea where he's from, tomorrow night I'll see him. I'll grab a hold of him, I've got a few more people.

J: those ideas are good

S: is there anything in here, like any direction areas that you saw that you think I should definitely pursue

J: I definitely, anything I like now I like on the outset. I don't know that I'm really into the curving kinds of things

S: the cutouts
04091. J: it’s something to move your way around and just let people know without being super obvious about it. That’ll be a way to do that.

04092. S: like this, you mean the bottom half of it,

04093. J: yeah, I like that,

04094. S: I thought the chip one

04095. J: I don’t know about that one. I just..., that maybe

04096. S: I’d make a model of that too, so you can see how that ripple would flow into the whole

04097. J: of all of them, I’m less convinced that that one would do what you think it’s going to do, o.k. I like the idea that you’ve other parts matching the face. Somehow, see if you can carry it over, so the top of it looks like this and the bottom part also looks similar to that, that type of thing, see what that looks like

04098. S: o.k. no problem

04099. J: o.k. I’ll talk to you later. I’ll talk to some of the other guys.

04100. Student #4

04101. S: Is that a gimmick or I see a lower center of gravity

04102. J: it’s patented

04103. S: so, anything with that kind of shape is patented?

04104. J: yeah, the bottom of the club has to be smaller than the top

04105. S: o.k. alright

04106. J: yeah, the idea is a slower center of gravity

04107. S: I see, o.k.

04108. J: also, I’m trying to persuade people who have the back of this out like this, it’s better to come straight down or if you come down more like this, it’s not so noticeable coming down this end like this. That would go a lot better, there’s more symmetry to that, more functionality. Even this, this is bigger down here than it is up here. That’s going to put up a red flag. You can’t do that. Pasio has a club like that.

04109. S: yeah, ok, I just wondered.

04110. J: yeah, some of the strange things that you can get a patent on

04111. S: that dictates a lot on what it’s going to look like
J: oh yeah, it does, it sure does, yeah, nobody until now came out and patented that

S: alright, thank you

J: no problem

Student #5

S: Several I’d eliminate immediately

J: yeah, eliminate that

S: this sort of increases the illusion of less surface area

J: I’d eliminate that one, that’ll be the only one from the playability point of view, o.k.

S: o.k.

J: I think that from a visual point of view “e” is probably bad because this is so much more higher here, people are going to think there’s nothing back there. I think you could do that design but it would have to be more gentle, narrow it down there. I think that shape is ok but not the straight

S: umm, keep it down, more round, rather than

J: umm, I’d put it here and bring it down

S: so, just bring it down like here, ok

J: yeah, this is too harsh, as far as it’s too cut, I think. “J” is gonna create more wind resistance because it’s higher back here and people are gonna think if you swing it back the wind is gonna fly back, so I’d probably eliminate that

S: umm, on “J” how about we say eliminate that part where the wind would catch it, all that, would that work?

J: yeah, we’d fall back if the wind was high, either way it’s going to make the ball lower and the average guy hits it higher. So that’s you know, that one is viable. I’d eliminate that, any of the other ones are alright, ok?

S: yeah, yeah,

J: I like the idea of the hozzle like an insect a little bit, but usually, put it this way, that’s gonna cost some problems for some people a little bit because they’re used to seeing it this way. The big trend right now is off set where you put the hozzle out here, this way, ok, most players when they swing have their hands, when they have impact, they have their hands in this position. This is gonna make it more, whereas if you put the offset hozzle here your hands are ahead of it, there’s a chance to clear out, so this way is ok. But this
way I don't think it's gonna be all that great for the average player, alright?

The soles on all of these seem pretty flat, I think you need to do something with the sole radius, make it more raised, have something done to the bottom, do something to the bottom

S: some ideas for the bottom, something like that

J: oh, yeah, anything along these lines. I'd avoid making cutouts in front of the club. It's gonna give the perception that there is less surface area. I'd eliminate that, these are acceptable. These things, for a male, this is too radical, guys would say that's like craft, women on the other hand might not mind that, guys on the other hand are going to have a problem with that, so I'd stick to major lines like this. Anything you do make sure that it's towards the heel of the club because it's going to swing this way.

S: ok. Good or bad, putting the face in this direction?

J: Nah, can't do that, Adam's golf has a patent you can make it straight down like that.

S: ok

J: But Adam's patent has the design patent. You're going to have problems with that. Ok. So, you could make it come out straight down or go that way.

S: umm, ok

B: Do they patent the angle or they patent, like they're doing 50, you're doing 40

J: If you did it 90 that's ok, technically if you did it this way one degree that violates the patent because the bottom of the club is larger than the top of the club.

S: What if it's skewed?

J: That'd be ok, you're looking at it from this point of view. You could have it skewed but I don't know what advantage that would get you

S: yeah, I meant sort of like this except that in some kooky way, this was larger

J: If you made it noticeable like that it probably won't be worth pursuing it

Student #6

S: umm, density fifteen -five and seventeen which one is less dense

J: fifteen-five is less dense

S: o.k. you haven't worked out the density
J: I can e-mail Wayne tomorrow

S: could you please?

J: alright, yeah

S: alright, great

J: Write that down on a piece of paper for me would you?

W: How's it going?

J: There are some good ideas around here. The design aspect is so obvious to these guys, symmetry and all that kind of stuff, being around all day, it just opens up your eyes. There are no perimeters.

W: a huh

J: All the designs out in the industry are somewhat similar but people like this there's no perimeter whatsoever, some of the stuff is legitimate, some of it is not but you know in the golf industry we're seeing we're stuck with it has to be like this

W: saturated style

J: but there's not really a whole lot of experimentation because as soon as you start to experiment obviously you can't have that but you guys that's your strength that's pretty good. I'm going to talk to a couple other guys I haven't talked to, ok?

W: ok. Thanks Jeff.

Student #7

S: I agree that it'll give the illusion that we really don't have enough face even if the club were larger which it would have to be, I like the look of it

W: a-huh

S: He also brought my attention to, as you move this over, you're able to see the face less, he mentioned that

W: umm-hmm

S: But that I could come up with a concept

W: what he was talking about, a cool idea, sort of mesh face with this part of the hozzle, make this less prominent, sort of making it cut, actually come into the hozzle

S: yeah, and this separate from here to here but if I fill it up here and put a raised here and

W: yeah, a-huh, that's an interesting one, like a wall sort of like this,
S: yeah, I didn’t even think about that, you said marker, make sure it’s tight raised so that the sun can catch it when you’re out there on the field, less shine

W: also think about branding and stuff, I know you have been focusing on the top but look at the back part, the behind, that’s where you catch the identity of the club, the heel, a lot of them have colors but you can take them out, it’s going to catch somebody’s eye, I think

Student #8

S: I’ve been doing a lot of sketches from this. I’ve been reading a bunch of golf books, trying to get information

W: a-huh, it’s working pretty well for you too

B: This is your fifth time talking to Jeff, right?

S: Yeah, I expected to get more sketches done but I guess I didn’t really need them, it’s really important to talk to him because we’re like really illiterate you know, a lack of knowledge

B: How do you feel about the constraints, like golf club ‘rules’ on your design ideas?

S: you mean, how do I feel about getting my design shot down? (laughing)

B: (laughing) yeah,

S: actually I like, I rather have a project where the client really cuts us down instead of letting us do whatever because that can be confusing like do they like this, or this, or this

B: Is this the first project you’ve done with many constraints or limitations?

S: yeah, which is what I assume what we’re going to see when we get out of school, because we can’t do this, we can’t to that, it’s probably similar to the real thing, this project is

B: How has the project been for you?

S: It’s different in comparison to all our other projects, where most of it was defining user research, I like that
Dear Baha,

Good to hear from you. I hope all is well with you. I will be happy to answer your questions. I am not a great typist, so excuse any spelling errors; they are actually typing errors and I do not have email spell check. In response:

1. The selection process involved wanting non-golf influence on a golf design. In a golf company, we sometimes do not look enough to outside sources for fresh ideas. Thus OSU provided some of those ideas.

2. I assume you mean for the final head chosen...we looked at what we thought would sell well. Golf is a traditional sport; junior players are not so traditional. They are more accepting of new ideas and designs. While many of the other designs were good, they were too "non-traditional" in our opinion.

3. We have not used other designs and, in all honesty, probably will not at this point.

4. I wouldn't say the club is any longer, more accurate, etc. Matt's design was more in the cosmetics of the club than in specification selection. We did the specs here; Matt gave us the look. The club is oversize for accuracy and has generous loft to help the junior get the ball airborne. Matt's design adds a flair that attracts a junior's eye.

5. There were no changes from his model other that choosing the specifications.

6. At this point, we have no plans to do another project.

7. The biggest challenge was in trying to get non-golfers (the students) into a golfer frame of mind. Many of the ideas were superior ideas, but just would not be accepted by a wide enough range of golfers. From a technical aspect, there were no huge challenges. Determining the specs for the clubs was easy based on our experiences.

8. Wow...difficult question. While it was an enjoyable project...meeting the students...working with Wayne...etc., I am not sure we benefitted from a financial standpoint. I think that since golf was a "different" sort of sport for most of the class, that the students could not totally comprehend the types of designs needed. There simply was not enough time for us here at Dynacraft to make them aware of what club design is all about. I have only positive things to say about working with OSU, but would probably not do the project again.

Let me know if you have further questions. Best of success with the dissertation.

Regards,

Jeff

Baha Ujang wrote:
Hello Mr. Jackson,

This is Baha Ujang, the graduate student from OSU. I observed Wayne Chung's class for the club head collaborative project between your company and OSU. I hope you still remember me. I would like to first congratulate you on the success of the Dynacraft/OSU project. I recently learned through the Dynacraft website that Matt's junior club is currently available in the market. That's great! At the moment I'm trying to finish up my dissertation. I would like to ask you a few more questions, if that's ok? You can email the responses back to me. Below are the questions:

1. If you could, please explain the design selection process for the Dynacraft/OSU project?
2. What were the criteria/basis for design selection?
3. Asides from Matt's design, have any of the other students designs/ideas been selected? If yes, could you please elaborate further.
4. In what way does Matt's design (Junior club) meet the stated goal of the project, i.e., to produce a club head that is technologically superior and can hit the ball longer/further with greater accuracy?
5. Were there any further developments/modifications from Matt's original design? If yes, could you please elaborate further.
6. Are there plans for Dynacraft to collaborate again with the industrial design department in the future? If yes, what would the project involve?
7. What were the challenges (in general) and also for you as the client and technical advisor?
8. In retrospect, what would you have done different or more of or less of or not at all?

Thanks a lot. I really appreciate it.

Baha

p/s If you have any questions, you can email me at ujang.l@osu.edu or contact me at 614-688-9044.
Subject: Re: Question
Date: Wed, 12 Jan 2000 08:40:37 -0500
From: Jeff Jackson <dynacraft@nextek.net>
To: Baha Ujang <ujang.l@osu.edu>
References: 1

Dear Baha,

'No problem; 'glad to help. In response, I offer:

1. The sales of the junior club have thus far not justified the cost of production, coupled with the cost ($18,000.00) of the project to OSU.

2. What I meant was that not many of the students played golf; thus they were not as familiar with a golf club as they would be with say a baseball bat since most have played baseball. In all honesty, we really had no preconceived notions of what the students would come up with, so we didn't really "hope" for anything per se.

3. Given the time, which would have been literally weeks, we would have gotten into the physics of club head design and performance along with a history of equipment in order to help the students realize that unusual designs are not well accepted in the game.

Thanks again,

jeff

Baha Ujang wrote:

> Dear Jeff,
> > Wow! that was quick! Thanks for the quick response to my questions - I really appreciate you taking the time from your schedule to answer my questions. I just would like to ask if you could clarify a little more on what you meant by:
> > 1." I am not sure we benefitted from a financial standpoint." In what way did Dynacraft not benefit financially? In what way would you have liked Dynacraft to have benefitted financially?
> > 2."i think that since golf was a "different" sort of sport for most of the class, that the students could not totally comprehend the types of designs needed." In what way do you perceive golf to be a "different" sport for the students? Can you give me some examples of what students did/did not do to indicate that they did not totally understand the type of designs needed? What type of designs had you hoped students could come up with?
> > 3. If you had had the time, what would you have explained to students what club design is all about?
> > Thanks again.
> > Baha
Assalamualaikum Dr. Baha,

Terlebih dahulu ribuan maaf kerana terlambat sikit membalas e-mail. Was a little caught up with some family matters these past few weeks.

Anyway, the following are my response to your questionnaire/interview.

>1) How long have been teaching in IDE dept. (UTM)?


>2) What do you think are the educational goals of the IDE dept.?

The educational goals of the IDE Department is to produce design graduates competent both as thinker and doers, with some knowledge of entrepreneurship. At the degree level, they will be well versed to function as a designer within the Corporate Design Development Team.

>3) What are your classes you are teaching now (semester July 99) or before in IDE dept.?

Mainly involved in thesis supervisions and team teaching in the final year design studio project supervision.

>4) What is your teaching philosophy?

To inculcate and nurture into the students their critical creative thinking and problem solving skills in addressing any type of design problems.

>5) What do you hope students learn from your class?

Students should think independently and become self-critical and analytical in approaching and solving any design problems.

>6) What is your emphasis in your studio design classes (project) or design lecture class?

Main focus is on their ability in firstly fulfilling the project's functional and interfacing requirements whilst aesthetical considerations only complementing. Aesthetical issues should not go overboard from the functional and ergonomic issues. The students should be wise enough in their design judgements to know the limits.

>7) Are there any design issues (eg. environmental issue, cultural issue, etc) emphasis in your studio design class (project) or design lecture class? If yes please describe why it is emphasized?

Cultural issues is largely emphasised because design is meant to make consumer life more rich and fulfilling and not to slowly erode it with an alien value that may have stemmed from foreign cultures and values which are in conflict.
Question on Collaboration Industrial design project

1) What is your opinion about Collaborative design project with industry/firm?

The collaboration is essential as the students will be able to acquire life and hands-on knowledge of the actual design and development, production constraints, consumers preferences as well as production economics.

2) In the past 3 years has the IDE dept. (UTM) been involved in collaborative design projects with industry/firm?

The Department has already embarked on many such projects, but not on full scale programme. Many are brought in through the Pusat Daya Cipta Consultancy design projects or by the Department lecturers.

2a) If the answer is yes, what do you think of the projects in terms of benefits and challenges? Are collaboratives design projects part of the IDE dept. (UTM) curriculum program?

For the present Bachelor programme, a full scale participation is not quite practical mainly because of the big student numbers in a class as well as the tight students study schedule and timetable. Because most real life design project in industry are mostly of long termed in nature, it might be possible only for the final year students to get involved in such collaborative projects, commencing from their practical training collaboration with industry all the way to the final year project (a total of 3 semesters). However, it is critical that this must be very closely monitored by the department lecturers so that the pedagogy aspect of learning is not overshadowed by industry’s erratic work demands. After all, academic is meant to educate industry and must not allow it to be vice versa.

2b) If the answer is no, would you recommend the collaborative design project as part of the IDE dept. (UTM) curriculum program? Explain.

Bachelor is meant to train the ‘doer’ aspect of the students. I strongly felt that the incorporation of the Collaborative Design programme is more appropriately done during the Masters programme where the emphasis then would be on training them to be Design Managers/ Design Project leaders. Only then will design planning, work schedules, design management, design costing, design research, etc which makes up the real life Collaborative Design projects make sense to the students. Having the above curriculum incorporated too early into the Bachelor programme will only overburden the students as well as stifle their creativity with procedures too early in their academic life.

3) What are the future plans (eg. curriculum, programs… etc) of the IDE dept? Please describe.

At present the MA and PhD programme for the faculty is already under way for approval by the UiTM Senate, targeting it to be offered by mid 2000. However, because it will take some time for the infrastructure and manpower to be ready, both the programme will commence first with Research based Curriculum, while the Studio Based will follow suit at a much later date.
The above will fit well in the Studio-based programme of the Master's Degree of UiTM.

The above is my compressed answer to your questions. I know that it is too condensed an answer, but kalau you need more detailed explanation to the above answer, please feel free to call me for an elaborate explanation. Or I can further expand on any of the above issues later if you need. Feel free to send me an E-mail.

Wishing you all the best in your research programme, dan kami mendoakan semuga tuan berjaya. Mohair kirim salam.

Regards,

XMI

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Subject: answers from shahle
Date: Sat, 4 Dec 1999 05:28:43 -0800 (PST)
From: shahle mujir <solermujidesign@yahoo.com>
To: ujang.1@osu.edu

Assalamualaikum,

En. Baha, apa lama tak dengar khabar? harap sihat. Proff. Tamyez passed your question at my pigeon hole. happy to hear from you. Actually I did call and send email to you but no reply...Anyway, sure you're so busy with the writing. What ever it's I hope and pray you're doing fine and everything is undercontrol. So, don't you want to know my life? atleast from me... well, I'm happily married to Norashikin, a Sarawakian and now a father to a baby boy...Mohd Aiderus Naim. Alhamdulliah, everything is fine and thank Q so much for your kind advice. So, now dah tiga tahun kat itm... unbelievable I still here. Maybe I'm happy with the job ... busy with student and bonded with my design work - handling electric vehicle design project mou ITM/Tenaga Nasional Research. Actually, I supposed to do my MA last year with Kem. Sains & Teknologi Scholarship but gawat stop everything but ada rahmatnya... Now I'm starting again with the US univ. application which I have to be out of Malaysia by Mac 2000 or it'll be to late. I'm going to LA (15 - 26/12/99) to visit fausin and try to catch an appointment cum interview maybe at Art Center for my ma programme. Anyway, how graduate courses at osu? are you free for an advice?

The Q & A,
1) 3 years 5 months (full time)
2) IDE Dept. goals are great! The curriculum are set to provide and polish design skill together with
technical knowledge.
3) My classes at IDE dept. are;
   a) Since semester June 1998
      ..teaching Class Semester 03 and 05
   b) since semester July 1996 until June 1998
      .. teaching class Semester 06, 07 and 08
4) My teaching philosophy are;
   ... always think positive for any idea, more head
   is better than one head. It is good to work as a team
   so the issue could be easily solved. Every human
   being has their own strength...and capabilities. I
   believe...to a good ethics...where we can appreciate
   and respect each others, system, life, environments.
   Teach others not just design and flooded the market
   but to 'think' with good design planning - and reduce
   damaging our earth....
5) To gain knowledge and be themselves. They should
   understand what they're doing...according to design
   criteria and requirement, needs to design, really
   clear with the proposal and the best solution.It's
   important for the student to be independent, to have
   their own decision and matured.
6) The studio project design classes is very important
   to 'set' the student where they are a "future
   designer"
   where they will 'pick-up' god or bad during this
   period. A properly project brief and "theme" will be
   perfect where several issues related ( to no. 4 and 5)
   will be discuss more details. Brainstorming session is
   as important to decide any proposal idea. so they
   will no 'waste basket' design/work at the end.
   Research should be drag to 2D and 3D sketches where
   solution and experiments could be innovatives idea.
   To achieve these technical knowledge is highly valuable to
   confirm the concept design .Design development are
   important to visualize intelligent idea in 3D or
   reality with good studio supervision which emphasis
   more on product appearance, features, technical
   aesthetic, industrial graphics, material and process
   and product marketing strategy.
   During lecture, the student should be exposed to any
   design issue and example. Sample of existing product,
   photographic or slide, design philosophy and future
   system. The meaning and example of green design,
   environmental awareness and material process.cultural
   issues and influence to the market.Feng-Shui or why
   Chinese like red colours as example.
7) Related design issues...and why it's emphasized.
   a) How do we appreciate quality of life ? Design
      more gadgetery objects or something functional yet
      practical? To design humane object which is more
      useful and meaningful.
   b) 'Design for old...Design for elderly
      people.Design for old but can be used for young
      generation .. kids. User friendly for both user group.
   c) 'New Basic in Furniture Design ' - to enhance
      basic elemental of design in traditional or cultural
influence furniture at home. The experimentation to
prove that functional and practical design is
important to satisfy modern life where aesthetic
without function is unnecessary.

Q & A on collaboration project.

1) It is very important for both industry and univ. I
strongly believe as high 'Technology' Institute this
collaboration play an important role as a bridge for
'realistic' Research and Development. The co-operation
will gather more information where both party will
gain the profit and recognition.

2) Yes it has, such as:
   a) MOFAZ - Go-kart design project
   b) Sapura - Phone design for future market
   c) BP Malaysia - Experimental Construction
   challenge and Exhibition
   d) Tenaga Nasional Research - Electric Vehicle
   Design

2a) The project benefit the student, the Univ and the
industry. Especially the design process, market study,
trend, colour and lifestyle. These direct experience
real project are more challenging and knowlegable with
the involvements of engineers from mechanical,
manufacturing, electrical, marketing executive and
architects. Working with tight schedule, various
discipline are more professional with positive project
outcome.

   Collaborative design project with industry is not a
compulsary project and not even in the curriculum
program. Most of the projects initiated and aproach by
the industry/firm or the Lecturer.

2b) I strongly recommend the collaborative design
projects as part of the IDE curriculum. If these
materialized, the IDE Dept. surely play an important
role as a center for Industrial Design Activities. In
other words it's also providing consultancies
services.

   How? Collaborative design projects as part of the
curriculum for final year students, this project will
measure their maturity, more manageable and as
important as their Final Degree Project. The Proposal
Collaborative Project approved by the Univ. especially
the IDE Dept. with selected Industry where the fund
will come from either party interm of finance,
material, production or the Degree Show sponsoring.
There are a lot of company with state of the art model
making facilities - CNC or rapid prototyping where the
student will benefited. Univ. of Art Helsinki, RCA,
Art Center Pasadena and other higher institute already
practising these collaborative. Now NASA sending
robotic craft to land at Mars, where the design
develop with collaborative with California Inst. of
Tech.

   There are long list of company willing to
coo-operate, but the Univ. (UITM) also should market
themselves to achieve to this standard. 

machine follow tight schedule which will be monitor 
also by the industry/firm

3) Personnaly i’m working for Ind Des Centre for R & D 
works. Result from Electric Vehicle collaborative 
project with Tenaga Nasional Research, now we have new 
studio and workshop which useful for student and 
atleast presentable enough to gain confidence about 
our setup to provide services and consultancies. 

Professional Practices subject has been altered to 
work closely to get link with industry where the 
student learn how to write proper letter to company 
for sponsoring their final year projects. 
The IDE dept. also encourage student to do project 
involves with the industry/firm where they did their 
practical training. 
The new curriculum for BDes (Hons) Ind Design 
already approved by the M’sian Ministry of Education, 
and there’s no formal collaborative project been 
discuss ....after more than 30 years, where are the 
direction is .... to compete with more hi-technology world.

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Subject: Re: Questions from Baha
Date: Tue, 30 Nov 1999 05:59:40 PST
From: "muhamad tamyez" <tamyez@hotmail.com>
To: ujang.l@osu.edu

Baha!! Here are the responses required. Kindly acknowledge once u received 
it. Chao!!

Interview Questions
>
> A study of collaborative projects in the field of industrial design 
>sponsored by corporate firms/industry with UniversityIndustrial Design 
>Department. 
>
> 1)How long have you been teaching in IDE dept. (UTM)? 
> Been teaching in UTM for almost 24 years.

>2)What do you think are the educational goals of the IDE dept.? 
Basically is to initiate interest in design and provide the necessary skills 
and tool to exercise as a potential designer.

>3)What are your classes you are teaching now(semester July99) or before> in 
>IDE dept.? 
I teach the Final year students and also the 04 students, mainly design 
projects.

>4)What is your teaching philosophy?
The philosophy has been to be a real down to earth designers and capable of generating new insighting ideas to satisfy the true needs of the market forces, within and outside the country.

>5) What do you hope students learn from your class?
Hopefully they would be sensitive to the profession of Ind. design and contributive to the society. Capable of doing good sketches and new innovative ideas.

>6) What is your emphasis in your studio design classes (project) or design lecture class?
The main target would be to make design or creative ideas manageable for production and not just 'great' ideas but not marketable etc.

>7) Are there any design issues (eg. environmental issue, cultural issue etc) emphasis in your studio design class (project) or design lecture class? If yes please describe why it is emphasized?
Design issue are of paramount importance and are normally stressed in projects. Design issues relating to cultures and ways of life and also environmental issues such as probs of pollution etc are often let known to students. This is important as to make them sensitive to the inter and multidisciplinairness of design to nature etc.

Question on Collaboration Industrial design project

>1) What is your opinion about Collaborative design project with industry/firm?
Collaboration is certainly vital as it motivates students to be associated with real life situations.

>2) In the past 3 years has the IDE dept. (UTM) been involved in collaborative design projects with industry/firm?
Yes, lots of projects were done based on real life situations and collaboration with selected companies involving in design.

>2a) If the answer is yes, what do you think of the projects in terms of benefits and challenges? Are collaboratives design projects part of the IDE dept. (UTM) curriculum program?
Collaborative projects are part of the necessary requirements in the IDE and the benefits have been very supportive in elevating students' confidence in facing design jobs after graduating. Students could learn a lot about methods of production etc and companies would be excited about new fresh ideas of the students etc.

>2b) If the answer is no, would you recommend the collaborative design project as part of the IDE dept. (UTM) curriculum? Explain.

>3) What are the future plans (eg. curriculum, programs...etc) of the IDE dept? Please describe.
IDE has to be more serious in penetrating into industries in their curriculum in order to benefit from their advances. Whilst grades are important, real grades would be being able to work in industries and contributive in making Malaysia an industrialised nation by 2020, and this could be achieved through design as a main factor not only for making the slogan 'buy Malaysian made product' but also 'buying Malaysia made and designed product'.

Thank you,
Tamyez
Kindly feel free to ask if u need further assistance.. regards to ya family etc..

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Subject: Answer to your questions
Date: Thu, 2 Dec 1999 23:53:50 -0800 (PST)
From: wan zayana <wanzayana@yahoo.com>
To: Baharudin <ujang.i@osu.edu>

Dear Baha, Assalamualaikum,
Well at last i got your e-mail from Prof.Tamyez. I've been asking your e-mail from everybody but it seems that no one bagi I and kalau bagi pun wrong address. Thank to Allah. anyway just want to thank you for everything and giving me the opportunity to further my MA. you must have heard alot I guess...
Back to your question, (Interview Questions)my answer no 1. I've been teaching in IDE dept. for about 4 years which officially I've been teaching for full-time ia about 2 years and part-time 2 years.
2) Educational goals of IDE dept? Do we have one? As far as i'm concern i never heard about educational goals of IDE but for UiTM generally the answer will be yes.
3) I taught semester 3, semester 6 and semester 7 in the previous semester which is July 99 session. and I've been servicing foundation dept. as well.
4) My teaching philosophy is to educate the student to be professional in their profession and to be the best.
5) Reality, that's what I hope the student to learn, to learn about real world and real bussines in this world. Make them understand my is reality and how they could combine their conceptual ideas to reality.
6) The emphasis will be depending on the class, i.e for semester 3 i will emphasis on form and aesthetic, for semester 6 i will emphasis on culture, production and aesthetic and as for semester 7 will be all.
7) Of course! I emphasized on cultural, political and enviromental issues. The cultural, political and enviromental issue, will be a research before they started to do their sketching. They will evaluate the sucess and failure of a product by earlier research. So that they will understand the factors that influence a design.

Answer on collaboration Industrial design project.
1) It is very good to colaborate design project with industry/firm.
2) If you are talking about student project colaborating with industry/firm the answer will be NO! but the lecturer yes and we only sent students for practical training.
2b) I would recommend the collaborative design project as part of the IDE dept. curriculum because it is a
very good opportunity and exposure for the student. So that they will take things seriously because they realized that they are doing the projects with an industry rather than doing it for the sake of passing their exams. It will give them more encouragement and appreciation in what they are doing.

3) I hope that every lecturer will sit down and discuss about lesson plan for the student and each lecturer hopefully will understand about teaching philosophy. and as for the student, I hope that there will be more educational activities, enter more competitions and more education workshop for them.

I think that's all about it and take care..and good luck!!
Regards, WAN

Do You Yahoo!? Thousands of Stores. Millions of Products. All in one place. Yahoo! Shopping: http://shopping.yahoo.com
To: OSU Industrial Design student participating in collaborative project with Dynacraft.

A study of collaborative projects in the field of industrial design sponsored by corporate firms/industry with University Industrial Design Department.

Currently I am a graduate student in the Art Education program and I'm interested in studying the collaborative project between your class at the industrial design department at The Ohio State University and Dynacraft Inc. as part of my dissertation research under the direction of Professor Dr. Sydney Walker. I am interested in understanding how the collaborative project program is conducted and the collaborative experience itself. The study will involve recording observation via audio tape as well as writing field notes. I also would like to interview you individually or in a group throughout the study. My function in the classroom will be to document and observe the students, faculty members and Dynacraft representatives.

In the final research report I will maintain participant confidentiality and use pseudonyms to protect anonymity. The anticipated duration of my study will be twice a week until June 1999.

You have the right to:
1) Refuse to answer any particular questions.
2) Ask any further questions about the study during your participation.

Could you please fill in the necessary details and detach the form below. Thank you for your consideration.

Signed: ______________________________ Signed: ______________________________

Principle Investigator Co-Investigator

I consent to participate in the research entitled, A study of collaborative projects in the field of industrial design sponsored by corporate firms/industry with University Industrial Design Department. Baharudin Ujang has explained the purpose of this study, the procedures to be followed, and the expected duration of my participation. I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Signed: ______________________________ Date: ______________________________

Witness: ______________________________ Signed: ______________________________
**What is Industrial Design?**

Industrial design deals with the planning and development for production of a variety of objects and interrelated systems. Consumer appliances, tools, safety equipment, business machines, furniture, medical equipment, architectural products, and transportation devices make up a partial list of those areas of specialization in industrial design.

Industrial design falls within a broader category of design, which is the professional area of activity concerned with planning and developing a wide variety of objects and spaces. Relationships among the users of the designed item, the efficient production of the designed item, and the aesthetic characteristics of the designed item are of particular importance. Design activities at Ohio State are divided into three majors: industrial, interior, and interior design.

**Career Opportunities in Industrial Design**

Students graduating with the Bachelor of Science in Industrial Design degree take positions with design consulting offices, corporate design departments, and government design agencies, working on consumer and industrial products, building and equipment systems, and public and corporate communication projects.

Students in industrial design can find employment opportunities with large corporations, industry, or small industrial design consulting firms.

**Salary Trends**

For a student holding a bachelor's degree with a major in industrial, interior, and visual communication design, with an average of 1.3 years of experience, the average base salary is $23,717 for the Midwest region.

**High School Preparation**

All freshman applicants are considered within a competitive admission process for Autumn, Winter, and Spring quarters for the Columbus campus. The primary criteria for admission are the completion of the applicant's high school college preparatory program, performance in that program as indicated by class rank and/or grade-point average, and performance on either the ACT or SAT.

It is recommended that students interested in industrial design complete a high school course in industrial arts or drafting.

**How to Major in Industrial Design at Ohio State**

In order to successfully attain enrolled status within the department, students must meet the following requirements:

- maintain a minimum cumulative point-hour ratio (CPHR) of 2.00;
- pass English 110 or equivalent, or higher-level course;
- pass Mathematics 116 or equivalent, or higher-level course;
- pass Industrial Design 160: An Introduction to Industrial, Interior, and Visual Communication Design; and
- submit an examination portfolio for evaluation by a select faculty committee.

Applicants are advised that maintaining a 2.00 CPHR is a minimum level for acceptance and that students qualifying for the program will be selected on the basis of highest qualifications in CPHR, assessment of quality in the examination portfolio, and assessment of overall aptitude for studies in the design program.

**General Education Curriculum Requirements**

Most students enter University College (UVC) upon enrolling at Ohio State and remain enrolled in UVC until they have qualified for and have been accepted into their chosen major and college.

While enrolled in UVC, students begin taking courses which will meet the General Education Curriculum (GEC) requirements. The GEC is a body of courses designed to ensure that each student becomes acquainted with the basic areas of academic study. To meet the GEC requirements, credit hours must be completed from the following eight areas of academic study: writing and related skills, quantitative and logical skills, foreign language and culture/international experience, social diversity in the United States, natural sciences, social sciences, arts and humanities, and the capstone experience.

The majority of students accepted for enrollment into the Department of Industrial, Interior, and Visual Communication Design apply through submission of the examination portfolio, a standardized exam which includes drawing assignments as well as written material. In order to apply through the examination portfolio, students must be currently admitted to The Ohio State University.

Transfer students and talented high school students have the option of applying for Direct Enrolled Status. A portfolio of studio work is evaluated by the coordinating adviser or faculty member in the major in order to determine if the applicant is qualified to enter the program. This option is available only to transfer students and high school students with a background in art or design sufficient to permit assembly of a portfolio.
Industrial Design Requirements
Currently enrolled Ohio State students who have been accepted into the industrial, interior, and visual communication design program through the College of the Arts must have:

* successfully completed English 110 or 111 or equivalent,
* successfully completed Industrial Design 160,
* successfully completed Mathematics 116 or equivalent,
* successfully completed the qualifying examination for Industrial Design 231, and
* maintained a cumulative point-hour ratio of 2.00.

Successful completion of these courses and the attainment of the requirements listed above are prerequisite to enrollment in Industrial Design 251 (first course in the design sequence) and will enable the student to be advised by faculty of the Department of Industrial, Interior, and Visual Communication Design. Prospective design students will be advised by the staff in the College of the Arts (152 Hopkins Hall) or in University College (lower level, Enarson Hall).

The curriculum leading to the degree Bachelor of Science in Industrial Design (BSID) calls for the completion of University requirements, major requirements (as described in the information for the area of specialization), and college requirements.

For More Information
Contact Karen Dimmick, Department of Industrial, Interior, and Visual Communication Design, 380 Hopkins Hall, 128 North Oval Mall, Columbus, Ohio 43210-1318. Ask for:
* Susan Roth, Associate Dean, 614-292-2298;
* Dennis Thompson, Academic Counselor, 614-292-2298; or
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* Susan Roth, Associate Dean, 614-292-2298;
* Dennis Thompson, Academic Counselor, 614-292-2298; or
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Design Brief:

This Spring Quarter will be dedicated to working with Dynacraft Golf Products, Inc. to re-design the traditional woods/drivers 1, 3, 4, and 5. Our main contact will be Jeff Jackson, President of Dynacraft. The project scope is entirely open - there are no restrictions other than the United State Golf Associations (USGA) rules of golf and golf equipment. The purpose for this collaboration is to provide Dynacraft with a competitive edge in an already mature industry. This competitive edge may be visual and/or performance attributes. The design criteria and limitations are: the game of golf cannot be altered and the USGA rules of golf equipment has to be followed.

Course concept:

ID462.04 is a Junior level product design studio course. You will be responsible for using and applying past knowledge and learning new skills throughout this course.

It is in your best interest to learn and play golf. Persons who are novices or very new to the game of golf may be paired with a project partner for the initial research/concept stages.

Course content:

All students are expected to improve and develop on previous design skills and methodologies of: research methods, conceptualization methods, design in multiple mediums, and communicate your ideas in textual and verbal presentation forms.

Golf is a performance based game. This component of the game cannot be fully realized or tested within a Quarter. However, this does not mean cannot apply your knowledge about materials and basic principles of physics. The other component of any sport, is the confidence a player gets from their equipment. Styling cues, proportions, semantics, graphics, and other visual and form related issues will be critical to this project.

Dynacraft is not a typical golf equipment distributor. Dynacraft is the only major component company that does not assemble its components. Dynacraft sells
components to individuals/shops to be custom assembled. We will have the opportunity to visit their assembly and golf school facilities the first week of class.

Guest lectures and field trips will be planned early in the Quarter. These will hopefully include Design Axis, Fitch, Priority Designs, and others. We will have at least one mid-term review with Dynacraft.

Course Deliverables:

Preliminary course deliverables agreed upon with Dynacraft include:

- Design Research and Documentation
- Appearance Models
- Virtual Models - if necessary
- Concept drawings and models leading to final design

1. Design Documentation
A final research report is of great value to industry sponsors. This document shows your design process and decision making steps. It is also a demonstration of your creativity - in regards to where you find inspiration, sport trends, innovation, etc.

2. Design deliverables
Students will demonstrate a professional level of:
- 2D sketches
- 3D mock-ups
- 2D and 3D final designs
- Computer generated stills or animations
- Slides of final model and iterations
- Written documentation books

Course requirements:

1. All class meetings are mandatory. Three absences will result in dropping of the course. Three unexcused absences does not mean you can select three days to take a vacation.

An excused absence is one whereby one of the instructors has been notified as to the reason for absence prior to class time. If illness or unanticipated events prevent notification prior to class time, contact me at any of the above numbers/addresses. Leave a message if I am not available or contact the Industrial Design Office at 292-6746 and leave a message that includes your reason for being absent.

2. All work must be completed on time to achieve a passing grade.
3. All work will be due on the date noted in the course schedule. There will be no late work or extensions to re-submit work. All work will be submitted for grading on presentation/critique day regardless of the status of completion. Work not submitted will be graded as failing.

4. Discussion, debate, and inquiry regarding are encouraged throughout studio, and is an essential component to learning and communication.

Grading and evaluation:
Student Evaluation: The following method of suggested evaluation of performance will be used to determine the final grade in the course:

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<thead>
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<tr>
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<tr>
<td>Concept Models and sketches</td>
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<td>Quality and Quantity of ideas</td>
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<td>Final Models and Drawings</td>
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<td>Quality of design and execution</td>
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<td>Presentation</td>
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Course Schedule:
Initial Meeting - April 6, Monday @ Dynacraft
Mid-term Meeting - May 8, Friday @ OSU/Dynacraft
Final Presentation - June 8, Monday @ OSU/Dynacraft

Notice:
This course is subject to change without notice. All student work is the property of the student but may be kept by the Department for one quarter for grading, display, or documentation purposes.

*Course schedule is subject to change
PRESS RELEASE 2/26/98

The Ohio State University &
Dynacraft
Begin A Joint Partnership

Beginning in March 1998, Dynacraft Golf Products, Inc., of Newark, Ohio, and the Ohio State University will partner in the design and development of a golf club with state of the art performance characteristics. "Combining Dynacraft's nearly 20 years in the golf business with Ohio State's industrial design capabilities creates an avenue for the creation of a golf club that could potentially revolutionize the industry", comments Jeff Jackson, President of Dynacraft Golf.

Headed at OSU by Lorraine Justice, IDSA, the project goal is the development and testing of a new wood model that will feature verifiable playing advantages as compared to current woods on the market today. Design, materials and cosmetics will be determined through computer modeling, CAD design, and metallurgical analysis. A finished product from the joint effort should be ready for distribution in late 1998.

States Ms. Justice, "OSU has worked with companies such as Westinghouse, Apple Computer and many other leading edge firms. The opportunity to work with Dynacraft is an exciting leap into the world of sports design; we are looking forward to being a valuable partner in Dynacraft's product development."

Dynacraft Golf Products, Inc., was founded in 1979 by Joseph Altomonte, Sr., and is considered the technical leader in the component golf club industry. Dynacraft recently announced a Direct Public Offering of shares of the company. If you wish to receive a prospectus, please call our Investor Relations Department at 800-321-4833 or visit our Investor Relations page.
PRESS RELEASE 4/13/98

DYNACRAFT/OHIO STATE PROJECT BEGUN

Following months of strategic planning, the Dynacraft Golf Products, Inc. and Ohio State University golf club project has begun in earnest. Combining over 100 years of technical experience at Dynacraft with top level industrial design students from Ohio State University, the development of a technologically superior golf club is beginning. The goal of the project, under the direction of Jeff Jackson, President of Dynacraft, and Wayne Chung, Associate Professor of Design at OSU, is to develop a driver or set of woods that may be proven to hit the ball longer and with more control than any currently available clubs of similar type.

Initial discussions have centered upon club head design specifications and how they directly or indirectly influence ball flight for various abilities of golfers. Important aspects of the new design will be center of gravity placement, club head volume, bulge and roll characteristics and sole configuration. In addition, many new material possibilities are being studied including titanium, metallic composites and ceramics. Dynacraft is currently involved in the development of a cryogenically treated club head that will be introduced later this year; cryogenics is being examined as a potential treatment for the Dynacraft/OSU projects as well.

In the developmental phase of the project, heads will be computer modeled using a variety of methods, including CAD-CAM technology. Such processes allow a computer to make subtle changes in a golf club that may produce dramatic playability benefits for the golfer. Utilizing epoxy and urethane molds, actual prototype designs will be produced and tested under a variety of conditions in order to prove the viability of the new clubs.

The Dynacraft/Ohio State University project is the first of its kind to be undertaken in the golf industry. Dynacraft is currently considered as the technical leader in the component industry; OSU has recently partnered in design work with companies such as Apple Computer and Westinghouse. Combining the golf experience of Dynacraft with the industrial design staff at Ohio State may possibly yield golf equipment quantifiably proven to improve a player’s game.
PRESS RELEASE 4/29/98

Designing The Ultimate Golf Club

Dynacraft/Ohio State Project Progressing

Combining the efforts of the Industrial Design team at Ohio State University and Dynacraft Golf Products, Inc., in Newark, Ohio, progress has been made in the search for the perfect golf club. During the past few weeks, drawings have been made and reviewed, patents have been searched and models have been designed - all toward the goal of making a technically superior golf club that will appeal to golfers of all abilities.

The OSU team, under the direction of Mr. Wayne Chung, Assistant Professor of Product Design, and the Dynacraft technical staff under the supervision of Jeff Jackson, President of Dynacraft have taken the new design from concept stage to model stage at present. Comments Jackson, "The fresh new ideas that Ohio State brings to the table are amazing. So often in the golf industry we are locked in to typical designs and concepts; the OSU staff brings literally hundreds of new ideas to the forefront. We are very impressed with their efforts and progress."

The next step in the development of the club will be producing a final model prior to computer analysis and testing. Several models will be tested form the myriad of designs that have been developed, each with its own unique playability elements. Once a design is chosen for the club, cosmetic work will be next. States Mr. Chung, "the visual appeal of any product is very critical to its success. You can have the greatest product in the world, but if it is not attractive, all of your design efforts could be wasted. We will be looking to many durable, high-tech finishes for the Dynacraft club; time will tell what we develop."

The club design, slated to be finished sometime in early summer, will potentially make its debut on the golf market sometime in the fall. "As this joint project is the only one of its kind to be taking place in the golf industry, we are tremendously excited about the possible results. Who knows, we could have the next Callaway out there." Says Jackson.

Dynacraft is located in Newark, Ohio, approximately 30 miles from Ohio State University. For more information concerning the project, contact Jeff Jackson at 800-321-4833 X247.
PRESS RELEASE 5/12/98

Dynacraft/Ohio State Project at Midpoint

The joint golf club design project between Dynacraft Golf Products, Inc., of Newark, Ohio, and The Ohio State University Department of Industrial Design has reached its midpoint. Student designers presented their ideas to Jeff Jackson, President of Dynacraft, and Jeff Summitt, Technical Advisor of Dynacraft, as well as to faculty and staff of OSU. A number of news media were present, including Clark Donnelly of Fox 28. Students and faculty were interviewed, with the program segment to air during the week of the Memorial Tournament in Columbus.

Each student presented a model of their "ultimate" golf club. The models, made of plaster, ceramic, clay and epoxy, were accompanied by detailed drawings of the club heads. Additionally, each model was accompanied by charts and graphs illustrating how the club would perform or how the club could be marketed. Many design variations were presented. Several of the students focused on creating a very accurate club for the average player. Some sought a design that would yield longer drivers without sacrificing accuracy. One student focused on a club that would provide women with a playing advantage, while another's design was geared strictly toward juniors.

Commented Jackson, "Today we have seen many useful design prototypes. We are clearly impressed with the work of OSU and its students. The next step is to quantify how each design will provide playing benefits to specific groups of golfers. We are looking forward to that!" Under the direction of Wayne Chung, Assistant Professor of Product Design, the designers will be refining their ideas into final production samples within the next few weeks. Says Chung, "This project is among the most exciting we have ever done here at Ohio State. Not only are the students enjoying the golf aspect of this project, but I am constantly receiving calls for faculty and community about the new clubs!"

Dynacraft is a leader in the component industry, having been in business for nearly 20 years. Dynacraft has divisions in Europe, Australia and Canada. Further information may be obtained by calling Jeff Jackson at 800-321-4833 x247.
PRESS RELEASE 6/30/98

Dynacraft/Ohio State Project Yields Impressive Results

Following nearly three months of intensive research and development, over two dozen of Ohio State University's brightest design students have produced models of 21st Century golf club designs. Under the direction of Wayne Chung and Doug Marshall from the Industrial Design Department at OSU and Jeff Jackson and Jeff Summitt of Dynacraft Golf, the student designs have incorporated playability and cosmetics never before seen in golf equipment.

Each of Mr. Chung's and Mr. Marshall's students, through literally hundreds of hours of development work, supplied a presentation theory and model of what they considered to be the ultimate golf club. Patents were searched, computer models tested, head materials determined and cosmetics reviewed in an effort to produce a club that will quantifiably hit the ball longer and/or straighter. "This has been one of the most labor intensive projects we have undertaken here at OSU", states Chung. "But, at the same time, has probably been the most enjoyable. Producing a quality leisure activity product has provided Dynacraft with several product opportunities while at the same time providing our students with a "real life" problem solving situation."

Some of the student ideas that may be incorporated into future designs include titanium/polymer heads for superior weight distribution, hosel treatments for both weight savings and adjustability, unique face insert materials from the aerospace industry and cosmetic applications targeted at specific age and playability groups. One model line has already been selected as a result of the Ohio State work. In process at present is a line of junior woods and irons that incorporate many features from other industries in an effort to attract young golfer interest and provide playability at the same time. Mathew Haws, designer of the junior model known as the Nucleus, used several ideas from the mountain bike industry to make club appeal to younger golfers.

"What's next?" is a question that Dynacraft President Jeff Jackson gets nearly every day. His response, "With so many practical and innovative ideas to choose from, we will probably sit back and evaluate what we can do to create a couple of key designs. The students were great to work with and brought a multitude of ideas to the table. The difficult decision of deciding what to do next is a good problem to have!"

Further information may be obtained by emailing Jeff Jackson at dynacraft@nextek.net.
The purpose of this paper is to present before you some thoughts on the future course of our nation and how we should go about to attain our objective of developing Malaysia into an industrialised country. Also outlined are some measures that should be in place in the shorter term so that the foundations can be laid for the long journey towards that ultimate objective.

• Hopefully the Malaysian who is born today and in the years to come will be the last generation of our citizens who will be living in a country that is called ‘developing’. The ultimate objective that we should aim for is a Malaysia that is a fully developed country by the year 2020.

• What, you might rightly ask, is ‘a fully developed country’? Do we want to be like any particular country of the present 19 countries that are generally regarded as ‘developed countries’? Do we want to be like the United Kingdom, like Canada, like Holland, like Sweden, like Finland, like Japan? To be sure, each of the 19, out of a world community of more than 160 states, has its strengths. But each also has its fair share of weaknesses. Without being a duplicate of any of them we can still be developed. We should be a developed country in our own mould.

• Malaysia should not be developed only in the economic sense. It must be a nation that is fully developed along all the dimensions: economically, politically, socially, spiritually, psychologically and culturally. We must be fully developed in terms of national unity and social cohesion, in terms of our economy, in terms of social justice, political stability, system of government, quality of life, social and spiritual values, national pride and confidence.

Malaysia As A Fully Developed Country - One Definition

• By the year 2020, Malaysia can be a united nation, with a confident Malaysian society, infused by strong moral and ethical values, living in a society that is democratic, liberal and tolerant, caring, economically just and equitable, progressive and prosperous, and in full possession of an economy that is competitive, dynamic, robust and resilient.
There can be no fully developed Malaysia until we have finally overcome the nine central strategic challenges that have confronted us from the moment of our birth as an independent nation.

The first of these is the challenge of establishing a united Malaysian nation with a sense of common and shared destiny. This must be a nation at peace with itself, territorially and ethnically integrated, living in harmony and full and fair partnership, made up of one 'Bangsa Malaysia' with political loyalty and dedication to the nation.

The second is the challenge of creating a psychologically liberated, secure, and developed Malaysian Society with faith and confidence in itself, justifiably proud of what it is, of what it has accomplished, robust enough to face all manner of adversity. This Malaysian Society must be distinguished by the pursuit of excellence, fully aware of all its potentials, psychologically subservient to none, and respected by the peoples of other nations.

The third challenge we have always faced is that of fostering and developing a mature democratic society, practising a form of mature consensual, community-oriented Malaysian democracy that can be a model for many developing countries.

The fourth is the challenge of establishing a fully moral and ethical society, whose citizens are strong in religious and spiritual values and imbued with the highest of ethical standards.

The fifth challenge that we have always faced is the challenge of establishing a matured, liberal and tolerant society in which Malaysians of all colours and creeds are free to practise and profess their customs, cultures and religious beliefs and yet feeling that they belong to one nation.

The sixth is the challenge of establishing a scientific and progressive society, a society that is innovative and forward-looking, one that is not only a consumer of technology but also a contributor to the scientific and technological civilisation of the future.

The seventh challenge is the challenge of establishing a fully caring society and a caring culture, a social system in which society will come before self, in which the welfare of the people will revolve not around the state or the individual but around a strong and resilient family system.

The eighth is the challenge of ensuring an economically just society. This is a society in which there is a fair and equitable distribution of the wealth of the nation, in which there is full partnership in economic progress. Such a society cannot be in place so long as there is the identification of race with economic function, and the identification of economic backwardness with race.

The ninth challenge is the challenge of establishing a prosperous society, with an economy that is fully competitive, dynamic, robust and resilient.

We have already come a long way towards the fulfilment of these objectives. The nine central objectives listed need not be our order of priorities over the next three decades. Most obviously, the priorities of any moment in time must meet the specific circumstances of that moment in time.

But it would be surprising if the first strategic challenge which I have mentioned -the establishment of a united Malaysian nation-is not likely to be the most fundamental, the most basic.
Since much of what I will say this morning will concentrate on economic development, let me stress yet again that the comprehensive development towards the developed society that we want — however each of us may wish to define it — cannot mean material and economic advancement only. Far from it. Economic development must not become the be-all and the end-all of our national endeavours.

Since this Council must concentrate on the issues of economic development and economic social justice, which for this nation must go hand in hand for the foreseeable future, let me expand on the perception of the central strategic challenges with regard to these two vital objectives.

At this point it is well to define in greater detail the objective of establishing an economically just society.

Of the two prongs of the NEP no one is against the eradication of absolute poverty -regardless of race, and irrespective of geographical location. All Malaysians, whether they live in the rural or the urban areas, whether they are in the south, north, east or west, must be moved above the line of absolute poverty.

This nation must be able to provide enough food on the table so that not a solitary Malaysian is subjected to the travesty of gross under-nourishment. We must provide enough by way of essential shelter, access to health facilities, and all the basic essentials. A developed Malaysia must have a wide and vigorous middle class and must provide full opportunities for those in the bottom third to climb their way out of the pit of relative poverty.

The second prong, that of removing the identification of race with major economic function is also acceptable except that somehow it is thought possible to achieve this without any shuffling of position. If we want to build an equitable society than we must accept some affirmative action. This will mean that in all the major and important sectors of employment, there should be a good mix of the ethnic groups that make up the Malaysian nation. By legitimate means we must ensure a fair balance with regard to the professions and all the major categories of employment. Certainly we must be as interested in quality and merit. But we must ensure the healthy development of a viable and robust Bumiputera commercial and industrial community.

A developed Malaysia should not have a society in which economic backwardness is identified with race. This does not imply individual income equality, a situation in which all Malaysians will have the same income. This is an impossibility because by sheer dint of our own individual effort, our own individual upbringing and our individual preferences, we will all have different economic worth, and will be financially rewarded differently. An equality of individual income as propounded by socialists and communists is not only not possible, it is not desirable and is a formula for disaster.

But I do believe that the narrowing of the ethnic income gap, through the legitimate provision of opportunities, through a closer parity of social services and infrastructure, through the development of the appropriate economic cultures and through full human resource development, is both necessary and desirable. We must aspire by the year 2020 to reach a stage where no-one can say that a particular ethnic group is inherently economically backward and another is economically inherently advanced. Such a situation is what we must work for efficiently, effectively, with fairness and with dedication.
"A full partnership in economic progress" cannot mean full partnership in poverty. It must mean a fair balance with regard to the participation and contribution of all our ethnic groups -including the Bumiputeras of Sabah and Sarawak -in the high-growth, modern sectors of our economy. It must mean a fair distribution with regard to the control, management and ownership of the modern economy.

In order to achieve this economically just society, we must escalate dramatically our programmes for national human resource development. There is a need to ensure the creation of an economically resilient and fully competitive Bumiputera community so as to be at par with the NonBumiputera community. There is need for a mental revolution and a cultural transformation. Much of the work of pulling ourselves up by our boot-straps must be done ourselves. In working for the correction of the economic imbalances, there has to be the fullest emphasis on making the needed advances at speed and with the most productive results -at the lowest possible economic and societal cost.

With regard to the establishment of a prosperous society, we can set many aspirational goals. I believe that we should set the realistic (as opposed to aspirational) target of almost doubling our real gross domestic product every ten years between 1990 and 2020 AD. If we do this, our GDP should be about eight times larger by the year 2020 than it was in 1990. Our GDP in 1990 was 115 billion Ringgit. Our GDP in 2020 should therefore be about 920 billion Ringgit in real (1990 Ringgit) terms.

This rapid growth will require that we grow by an average of about 7 per cent (in real terms) annually over the next 30 years. Admittedly this is an optimistic projection but we should set our sights high if we are to motivate ourselves into striving hard. We must guard against 'growth fixation', the danger of pushing for growth figures oblivious to the needed commitment to ensure stability, to keep inflation low, to guarantee sustainability, to develop our quality of life and standard of living, and the achievement of our other social objectives. It will be a difficult task, with many peaks and low points. But I believe that this can be done.

In the 1960s, we grew by an annual average of 5.1 per cent; in the 1970s, the first decade of the NEP, Malaysia grew by an average of 7.8 per cent; in the 1980s, because of the recession years, we grew by an annual average of 5.9 per cent.

If we take the last thirty years, our GDP rose annually in real terms by an average of 6.3 per cent. If we take the last twenty years, we grew by an annual average of 6.9 per cent. What is needed is an additional 0.1 per cent growth. Surely if we all pull together God willing this 0.1% can be achieved.

If we do succeed, and assuming roughly a 2.5 per cent annual rate of population growth, by the year 2020, Malaysians will be four times richer (in real terms) than they were in 1990. That is the measure of the prosperous society we wish and hopefully we can achieve.

The second leg of our economic objective should be to secure the establishment of a competitive economy. Such an economy must be able to sustain itself over the longer term, must be dynamic, robust and resilient. It must mean, among other things: A diversified and balanced economy with a mature and widely based industrial sector, a modern and mature agriculture sector and an efficient and productive and an equally mature services sector; an economy that is quick on its feet, able to quickly adapt to changing patterns of supply, demand and competition; an economy that is
technologically proficient, fully able to adapt, innovate and invent, that is increasingly technology intensive, moving in the direction of higher and higher levels of technology; an economy that has strong and cohesive industrial linkages throughout the system; an economy driven by brain-power, skills and diligence in possession of a wealth of information, with the knowledge of what to do and how to do it; an economy with high and escalating productivity with regard to every factor of production; an entrepreneurial economy that is self-reliant, outward-looking and enterprising; an economy sustained by an exemplary work ethic, quality consciousness and the quest for excellence; an economy characterised by low inflation and a low cost of living; an economy that is subjected to the full discipline and rigour of market forces.

Most of us in this present Council will not be there on the morning of January 1, 2020. Not many, I think. The great bulk of the work that must be done to ensure a fully developed country called Malaysia a generation from now will obviously be done by the leaders who follow us, by our children and grand-children. But we should make sure that we have done our duty in guiding them with regard to what we should work to become. And let us lay the secure foundations that they must build upon.

Some Key Public Sector Economic Policies For The Forseeable Future

Since the early 1980s, we have stressed that this country will rely on the private sector as the primary engine of economic growth. In a way we were ahead of the rest of the world, even the developed countries in entrusting economic growth to the private sector.

In the early years, our fledgling private sector could not fully respond to the challenge that was issued. Then came the unpredictable and difficult recession and slowdown years. However in the last three years the private sector has bloomed and responded. The policy is now bearing fruit. The outcome: in 1988, we grew in real terms by 8.9 per cent, in 1989, by 8.8 per cent, in 1990, by 9.4 per cent without expansionary budgetting by the Government. Even the tiger economies of North East Asia have not done so well.

No nation can afford to abandon a winning formula. And this nation will not. For the forseeable future, Malaysia will continue to drive the private sector, to rely on it as the primary engine of growth.

In the meantime the Government will continue to downsize of its role in the field of economic production and business. The State cannot of course retreat totally from the economic life of Malaysia. It will not abdicate its responsibility for overseeing and providing the legal and regulatory framework for rapid economic and social development.

The Government will be pro-active to ensure healthy fiscal and monetary management and the smooth functioning of the Malaysian economy. It will escalate the development of the necessary physical infrastructure and the most conducive business environment - consistent with its other social priorities. And where absolutely necessary the Government will not be so completly bound by its commitment to withdrawal from the economic role, that it will not intervene. It will play its role judiciously and actively.