Program Evaluation: Graduate and Employer Perceptions Regarding Job Preparedness Skills of Design Technology Graduates.

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Abstract

The purpose of this study was to investigate graduate and employer perceptions in regard to the job preparedness level of graduates from a design technology program at a single midwestern university in five skill category areas: (a) general work habits and skills, (b) communication skills, (c) technical skills, (d) graphic communication skills, and (e) project management skills. The design technology program at this university is a program in the Technological Studies Department (formerly Industrial Technology).

This study was conducted as evaluation research and implemented an internal formative evaluation conducted through the administration of surveys to two distinct groups. Fifty-nine (27.4%) program graduates from 2001-2006 completed and returned the 19-item survey, while twenty-seven (67.5%) employers of program graduates completed and returned the 15-item survey. The graduate and employer survey lengths were different because of the demographic data collected. This sample of employers may not have employed more than a small percentage of the graduates from 2001-2006, but rather employers from other years of graduation.

The responses of graduates and employers revealed definite strengths and weaknesses of graduates in the job skill categories, along with areas that were modestly rated, but still need improvement. Through the examination of graduate and employer perception data, the following strengths in job preparedness skills of program graduates were identified: (a) the ability to work in teams and (b) the ability to follow a project to completion. The remaining job skill items under study in this research were rated with moderate scores, revealing the need for improvement in those areas. The following weaknesses in job preparedness skills of program graduates were also identified through this study: (a) the ability to work with clients, (b) the ability to communicate with clients, (c) skills in sketching, (d) knowledge regarding issues of salary and benefits offered in the industry, (e) the ability to determine project estimates, and (f) skills in utilizing project management software. The process and tools utilized in this internal formative program evaluation can serve as a model for other design education programs to judge the effectiveness of design-related education programs as well as other programs in higher education.

Introduction

The challenges facing higher education in the twenty-first century are vast. The growing demand for accountability, increasing costs of a college education, and the implementation of distance and alternative types of course delivery, are all contributing to the questions: Are students receiving a quality education? Are students prepared for employment after graduation? Do graduates possess the skills that employers' desire? Universities attempt to ensure positive answers to these questions through a variety of avenues including formal accreditation at the institutional and programmatic levels, as well as informal, internal evaluation. Program evaluation is vital in determining if students are receiving a quality education with adequate preparation for careers in their field.

Fitzpatrick, Sanders, and Worthen identify three important stages in the evaluation process: "1) determining standards for judging quality and deciding whether those standards should be relative or absolute, 2) collecting relevant information, and 3) applying the standards to determine value, quality, utility, effectiveness, or significance" (p. 5) [1]. For this study, the standards by which quality was identified were determined by the program's objectives and industry related accrediting bodies' standards. The primary purpose of this formative evaluation was to determine the effectiveness of a particular program and to use the results for program improvement.

The program under study has evolved from a program of traditional technical illustration/graphic design to the current state. DT is a unique applied program that integrates design, illustration, and technology through an interdisciplinary approach with courses taught by Technological Studies (formerly Industrial Technology) and Visual Arts.

Through this interdisciplinary approach, students may choose one or more of four specializations: (a) digital design for print delivery, (b) digital design for electronic delivery, (c) exhibit design, and (d) model design. With this degree students seek employment in a variety of roles in the design field including: Art Director, Production Artist, Exhibit Designer, Graphic Designer, Multimedia Specialist, Pre-press Technician, Web Page Designer/Web Site Developer and Model Builder.

Standards for measuring the efficacy of Design Education have changed tremendously over the last several years. Changing technological, economic and social demands have altered the criteria by which the preparedness of design program graduates is measured [2]. Exclusively teaching the functionality of the latest software would be a useless exercise since the skills and knowledge would be outdated as soon as it was mastered. Design education programs need to determine the appropriate balance of technology instruction to other curricular demands such as communication skills and the knowledge and ability to apply visual composition. In addition to rapidly changing technology, economic and societal concerns have required design programs to expand and shift to meet the needs of the global industry. This study evaluated the BSU DT program based on industry trends and standards. These benchmarks were determined from the professional standards of accrediting bodies pertinent to the design field, in addition to the DT program objectives, which are analyzed

each year by the BSU DT advisory board made up of designers currently employed in the field.

Today, design education programs across the country are faced with several issues as they attempt to prepare students to enter the profession. The single largest issue of undergraduate design programs is that there simply is not enough time to teach everything necessary for students to graduate with the knowledge and skills of a well-rounded designer. In the article, "What This Country Needs Is a Good Five-Year Design Program," Heller states that there is insufficient time in the typical four-year undergraduate program to prepare students to function in the complex twenty-first century design field [3].

The ever-broadening design industry increases the demand put on design education programs to continually monitor and adjust curriculum to not only prepare students for today's design profession, but to continue to serve the students as the future of the field evolves and shifts. Students attending four-year colleges and universities will spend approximately two to three years of their education in their major courses, as general education requirements exhaust the remaining one to two years. Through the programmatic coursework, design educators are expected to deliver a wide range of design expertise during this limited number of credit hours.

Heller argues that mastery, not competency, is required by the profession, yet educators are struggling to determine the best way to equip designers with this vast amount of entry-level capabilities [4]. In addition to the concern of thoroughly teaching the required content in a limited amount of time, the question of technology's role in design education is also a subject under scrutiny.

There is a definite spectrum of programmatic beliefs regarding technology's place in design programs across the country. On one end are those programs that elude technology entirely, on the other end are programs that concentrate on technology and in the middle are programs that fall between the extremes. Faculty and administrators also question whether technical skills should be taught in design courses, or outside of class through workshops and seminars leaving class time open for concept development, theory, research, collaboration and critiques [5]. This broad gamut of technological importance in the curriculum summarizes the issue of determining the correct balance between technology skills and design knowledge.

Several topics fuel the debate of whether or not to increase or decrease the curricular commitment to instruction regarding specific software applications. Continual financial obligation including cost of computers, technical support, maintenance, and software upgrades are factors affecting the level of technology in design programs. Some administrations are willing and able to commit the funds necessary to provide students with the most up-to-date technologies, while others are not (American Institute of Graphic Arts and National Association of Schools of Art and Design, n.d.).

Philosophical reasons also dictate design educators stance on the importance of teaching software specifics during class. Arguments against technology's place in the curriculum

include the fact that software skills will be obsolete in one to two years. It is vital that students develop self-reliance in technology, rather than instructor dependency, and that they understand and are able to cope with technologies' ever-changing nature [6].

Design educators are concerned about growing trends where people use computers to shorten the conceptual process involved in developing an idea [7]. They merely create a final piece on the computer, without the rich ideation that accompanies research, questioning, and experimenting that results in effective form (visually pleasing composition) and function (the expected action of the audience). Lupton [8] and Garland [9] caution design educators about the dangers of falling slaves to the computer and allowing students' ideas to be dictated by their level of software knowledge.

Just as there are philosophies that underscore the negative effects of technology on a design program, there are also several arguments for the benefits of technology's role in design education. Students are excited about technology, they are hungry for technical knowledge and expect to gain the training as part of their education [10]. Not only do the students wish to gain software insight, but also the design industry demands that students have an effective and efficient usability level as employers simply lack the time to train graduates when they are hired. Design educators admit that both technology and traditional design skills are vital to a designer's success. Mages et al. state that "Technology literacy is undeniably part of design practice; students need a highly literate understanding of both hand-skills and technology to successfully execute their ideas" (p. 9) [11].

Technology's role in the education of a designer has administrators of design programs wrestling with the idea of a perfect balance of technology and design knowledge. Design educators do agree that technology is a tool that assists in achieving solutions to communication problems, but in the process, design content must not be compromised [12], [13], [14]. In a briefing paper, published by the American Institute of Graphic Arts (AIGA) and the National Association of Schools of Art and Design (NASAD), recommendations are made regarding the importance of a process that "keeps technological resources current with the demands of the curriculum, responsive to the profession, and consistent with student needs" (AIGA/NASAD, 2007, ¶ 13) [15].

Should design students specialize in one design discipline? Is it more important for design students to graduate with a deep understanding in a specialized aspect of design, or with a broad, shallower knowledge of all aspects of the design field? There are several disciplines in the field of design, such as editorial, corporate, advertising and branding, environmental, interactivity, and several additional specialties [16]. Just as design educators are trying to find the balance of technology in design education, so too are they debating the appropriate balance of specialized knowledge to generalized knowledge.

Today's complex design field often commands the need for specialization. Heller and Fernandes state that beginning designers would be wise to choose a media the designer plans to devote the time and energy to acquiring expertise in as a career, yet be fluent in as many other areas as possible [17]. As areas of design become

increasingly complex, it is nearly impossible for professionals in the field to expect graduates to possess expertise in all disciplines of design.

Design educators and professionals give several reasons why specialization should be avoided in undergraduate design education. In the article, "*Give Back, Grow Forward*", Katherine McCoy argues against specialization when she suggests that specialization narrows your entry-level job options [18]. By focusing on one discipline of design, students may hinder their ability to gain employment in design firms where designers are expected to assist on different aspects of several projects. Another argument by McCoy is that designers, who gain employment in smaller towns versus urban areas, will be expected to possess a broad range of design skills and knowledge [19].

In addition to McCoy's compelling arguments, Irwin speaks out against specialization as he promotes a broader design education for the good of the profession. He states the following:

> I believe that a more well-rounded and less specialized program of study for traditionally trained designers is important if we are to attain the stature and influence we want and gain the ability to participate in the design of meaningful solutions (¶ 7) [20].

This argument of specialization or generalization adds more weight to the question of what components create a design program that graduates designers who are innovative and responsive to the field.

Purpose of the Study

The purpose of this study was to determine if BSU DT graduates are prepared for jobs in the design industry. The study examined graduates' job preparedness in five skill category areas: (a) general work habits and skills, (b) communication skills, (c) technical skills, (d) graphic communication skills, and (e) project management skills. The following research questions were addressed:

1. What are the perceptions of BSU DT graduates regarding their preparedness in the five skill category areas (general work habits and skills, communication skills, technical skills, graphic communication skills, project management skills)?
2. What are the perceptions of employers of BSU DT graduates in regards to the graduates' preparedness in the five skill categories (general work habits and skills, communication skills, technical skills, graphic communication skills, project management skills)?

Methodology

This study was designed and implemented as evaluation research. This study encompassed an evaluation of the Design Technology (DT) program at Bemidji State University (BSU); which included survey development, a pilot test, survey distribution, and data analysis.

Subjects for this study included two distinct groups: 1) the 215 BSU DT graduates from 2001-2006, and 2) a sample of employers of DT graduates. Both groups of participants were asked to complete surveys regarding perceptions of the BSU DT graduates' preparedness in five skill categories.

Five separate but related sources were used to define job preparedness in terms of necessary skills required by entry-level designers. BSU DT program objectives, BSU DT faculty, industry professionals, and accrediting bodies were all considered during development of survey items.

The scale utilized in the survey to determine graduate's preparedness was "very prepared" (possesses knowledge and skills to effectively and efficiently complete tasks with little or no supervision and guidance), "somewhat prepared" (possesses knowledge and skills to effectively and efficiently complete tasks with a moderate amount of supervision and guidance), and "not well prepared" (needs constant supervision and guidance to effectively and efficiently complete tasks).

A pilot study was conducted for each survey to pretest the instrument, assess the content, and identify any ambiguity of the items. The graduate survey was administered to 25 current senior DT students who were approximately two weeks from graduation. A pilot study for the employer survey was also conducted with current designers in the industry. Designers were asked to examine the survey and provide feedback regarding content and clarity. Surveys were then mailed to the graduate group and employer group introducing the study and asking the recipients to participate. The participants could either complete the mailed survey or go to the supplied web address to complete the online version of the survey. If the participant chose to complete the online survey they were instructed to enter an assigned code to prevent a participant from completing both formats of the survey. After a three-week time period allowed for survey completion, non-participating subjects were sent a reminder notice.

Data Analysis

The graduate perception data and employer perception data were first analyzed separately for frequencies and percentages regarding job preparedness levels of BSU DT graduates in the five skill category areas.

Graduate and employer data were then analyzed through t-tests to determine if there were significant differences in the perceptions of graduates and the perceptions of employers regarding graduates' level of job preparedness in the five skill areas.

General Work Habits and Skills

A t-test revealed that there were significant differences between graduates and employer perceptions of graduates' preparedness in the ability to meet deadlines, $t(84) = 2.47$, $p = .015$, the ability to make decisions when necessary, $t(84) = 2.49$, $p = .015$, and the ability to work independently, $t(84) = 2.21$, $p = .030$ (Table 1). In each of the above variables, the ability to meet deadlines, the ability to make decisions when necessary and the ability to

work independently, the graduates perceived themselves to be more prepared than did the employers. However, these differences are of minor importance since both the graduates and employers rated graduates' preparedness levels in the somewhat prepared range.

Table 1. Significance Levels of Graduate and Employer Perceptions of Graduates' Job Preparedness in General Work Habits and Skills (N=86)

	Graduates	Employers		
	M	M	t-test	*p*
The ability to work in teams	2.61	2.56	.433	.666
Being motivated for success	2.36	2.44	-.635	.527
The ability to meet deadlines	2.58	2.26	2.472	.015
The ability to accept constructive criticism	2.66	2.41	1.899	.061
The ability to solve problems	2.42	2.37	.393	.695
To have confidence in your abilities	2.29	2.44	-1.077	.285
The ability to make decisions when necessary	2.46	2.15	2.489	.015
The ability to work independently	2.68	2.41	2.206	.030
The ability to be organized	2.36	2.44	-.615	.540
The ability to work with clients	1.90	1.93	-.170	.866
The willingness to work beyond "normal" working hours	2.58	2.41	1.162	.249
Ability to work with matters concerning diversity	2.20	2.30	-.533	.595

Communication Skills

Results indicate that both graduates and employers rate graduates' preparedness low in the ability to work with clients. There were significant differences between graduates and employer perceptions of graduates' preparedness in skills in the ability to speak in groups, $t(84) = 4.39$, $p < .000$ and the ability to give constructive feedback to others, $t(84) = 4.10$, $p < .000$ (Table 2). In each of the above variables, the ability to speak in groups and the ability to give constructive feedback to others, the graduates perceived themselves to be more prepared than did the employers.

Table 2. Significance Levels of Graduate and Employer Perceptions of Graduates' Job Preparedness in Communication Skills (N=86)

	Graduates	Employers		
	M	M	t-test	*p*
The ability to communicate verbally with peers	2.66	2.48	1.585	.117
The ability to communicate verbally with clients	2.12	1.89	1.297	.198
The ability to write clearly	2.20	2.07	.857	.394
The ability to use proper grammar	2.19	2.26	-.523	.602
The willingness to ask for clarification when necessary	2.56	2.33	1.669	.099
Listening skills	2.64	2.44	1.672	.098
The ability to speak to groups	2.54	1.89	4.338	.000
The ability to give constructive feedback to others	2.54	1.85	4.104	.000

Technical Skills

A t-test revealed that there were significant differences between graduates and employer perceptions of graduates' preparedness in skills in basic computer operation, t (84) = 5.95, p < .000 and skills in sketching, t (84) = 4.00, p < .000 (Table 3). In each of the above variables, skills in basic computer operation and skills in sketching, the graduates perceived themselves to be more prepared than did the employers.

Table 3. Significance Levels of Graduate and Employer Perceptions of Graduates' Job Preparedness in Technical Skills (N=86)

	Graduates	Employers		
	M	M	t-test	*p*
Skills in basic computer operation	2.63	1.70	5.954	.000
Skills in sketching	2.36	1.56	4.003	.000
The ability to render with artistic medium	2.31	2.52	-1.506	.136
Skills in digital imaging	2.37	2.22	.820	.414
The ability to use drawing software	2.34	2.26	.472	.638
The ability to prepare images for the intended output	2.03	2.04	-.016	.987
The ability to manage computer files	2.44	2.33	.720	.473

Graphic Communication Skills

Results indicate that both graduates and employers rate graduates' preparedness low in knowledge regarding issues of salary and benefits offered in the industry. A t-test revealed that there were significant differences between graduates and employer perceptions of graduates' preparedness in ability to apply typography theory, t (75) = 2.19, p = .037 and ability to use negative space, t (79) = 2.31, p = .023 (Table 4). In each of the above variables, ability to apply typography theory and the ability to use negative space, the graduates perceived themselves to be more prepared than did the employers. However, these differences are of minor importance since both the graduates and employers rated graduates' preparedness levels in the somewhat prepared range.

Table 4. Significance Levels of Graduate and Employer Perceptions of Graduates' Job Preparedness in Graphic Communication Skills (N=86)

	Graduates	Employers		
	M	M	t-test	*p*
Ability to apply elements and principles of design	2.56	2.50	.430	.668
Ability to apply color theory	2.51	2.45	.390	.698
Ability to apply typography theory	2.50	2.14	2.118	.037
Ability to use negative space	2.53	2.18	2.311	.023
Ability to conceptualize	2.54	2.42	.846	.400

Ability to utilize an ideation process	2.56	2.38	1.291	.200
Ability to conduct research necessary for assigned projects	2.36	2.43	-.471	.639
Knowledge regarding issues of salary and benefits offered in the industry	1.63	1.67	-.235	.815
Ability to effectively work on assignments with topics unknown or uninteresting to self	2.20	1.92	1.792	.077

Project Management Skills

Results indicate that both graduates and employers rate graduates' preparedness low in ability to determine project estimates and in skills in utilizing project management software. A t-test revealed that there were significant differences between graduates and employer perceptions of graduates' preparedness in ability to simultaneously manage elements of a project, t (84) = 2.55, p = .013 and ability to mange time relating to a project, t (84) = 2.96, p = .004 (Table 5). In each of the above variables, ability to simultaneously manage elements of a project and ability to mange time relating to a project, the graduates perceived themselves to be more prepared than did the employers. However, these differences are of minor importance since both the graduates and employers rated graduates' preparedness levels in the somewhat prepared range.

Table 5. Significance Levels of Graduate and Employer Perceptions of Graduates' Job Preparedness in Project Management Skills (N=86)

	Graduates	Employers		
	M	M	t-test	*p*
Ability to simultaneously manage elements of a project	2.56	2.22	2.549	.013
Ability to mange time relating to a project	2.54	2.19	2.956	.004
Ability to construct project schedules	2.31	2.08	1.507	.136
Ability to determine project estimates	1.71	1.58	.756	.452
Ability to assess project progress	2.29	2.11	1.259	.212
Ability to adjust the project plan when needed	2.20	2.15	.315	.753
Ability to follow a project to completion	2.73	2.74	-.108	.914
Skills in utilizing project management software	1.58	1.74	-.838	.405
Ability to prioritize projects when working on multiple projects with multiple deadlines	2.39	2.15	1.493	.139

Conclusions

The conclusions of this study are based upon an analysis of the data and major findings. The responses of the BSU DT graduates and employers of BSU DT graduates indicate definite strengths and weaknesses of graduates in the job skill categories, along with areas that were moderately rated, suggesting the need for improvement.

In general, employers rated BSU DT graduates lower in job preparedness skills than did the graduates. This is contrary to the findings of Hoey and Gardner which revealed that the

alumni rated their preparation considerably lower than did the employers [21]. This may be attributed to the fact that Hoey and Gardner's employer sample included only employers of the graduate sample. Further research may be needed to determine which methodology is more reliable [22].

In examining the statistical analyses of general work habits and skills, graduates and employers gave low ratings in the graduates' abilities to work with clients while giving strong ratings in the ability to work in teams. Ideally, more opportunities should be provided for students to work with "real-world" clients on projects outside of the university setting.

In the category of communication skills, a high percentage of graduates and employers gave ratings of not well prepared in the graduates' abilities to communicate verbally with clients. This result confirms the findings in the previous paragraph and should improve as students are provided more experience in working directly with clients.

In the category of technical skills, graduates and employers gave "not well prepared" ratings in skills in sketching. This reveals that the BSU DT faculty should examine whether or not the quantity and quality of the art and design foundations provide sufficient opportunities for DT graduates to develop skills in sketching necessary for the design field. No strengths were identified in this category as a high percentage of graduates and employers rated graduates as "somewhat prepared."

In the category of graphic communication skills, knowledge regarding issues of salary and benefits offered in the industry received a high percentage of "not well prepared" ratings. This reveals that graduates are not gaining salary and benefit knowledge as it relates to the design industry in BSU DT courses. Faculty need to examine the extent to which this concept is being taught in the curriculum and determine if it is an appropriate level.

In the category of project management skills, high percentages of graduates and employers gave "not well prepared" ratings in ability to determine project estimates and in skills in utilizing project management software. This indicates that determining project estimates is a weakness in the curriculum and must be addressed. Students need to be given opportunities to estimate what a project would cost to bring to completion. Project management software is also an area in which faculty need to consider the quantity and quality of instruction and make necessary modifications. In the category of project management skills, approximately two-thirds of graduates and two-thirds of employers gave "very prepared" ratings in the ability to follow a project to completion. This indicates a program strength in this area.

The process and results of this study have several implications for the DT Program at BSU. First, a process and data collection tools were created for evaluating the effectiveness of the program with regard to the level of graduates' job preparedness skills. This research can be repeated on a regular basis to gather current and relevant data to determine the job preparedness level of recent BSU DT graduates. Employer perception data, combined with graduate perception data, make this study more sensitive to the demands of the profession than merely gathering graduate perception data, and strengthens the validity of the results. Banta, Lund, Black, and Oblander concur as they state by surveying alumni and employers

the findings rank high in believability and can be valuable for formative and summative evaluations [23]. Secondly, through this study, BSU DT faculty are provided data regarding graduates' job preparedness level. This information can and should be used to initiate discussion and justify changes to increase the effectiveness of the program.

Finally, the recurring implementation of this internal formative evaluation process may increase the credibility of the program as employers, administrators, and future students realize the program is continually examining graduates' job preparedness levels and making the appropriate changes and modifications to the curriculum to provide the best opportunities for students and to meet the demands of the profession.

Implications for Higher Education

How do design education programs know they are preparing graduates for careers in the field? Some disciplines, such as medicine and law, have standards dictated by professional requirements and exams that require passing marks for the right to practice in the profession. However, design programs do not currently have professional standard exams and thus have a challenging task in developing the ideal curriculum for those wishing to practice in design-related occupations. Design is a diverse field and some design educators like Gunnar Swanson believe that standardizing design education is a mistake [24]. Swanson is quoted as stating, "Standardizing graphic design is about like standardizing dance or fishing. It may all go by one name, but it's not the same thing" (p. 5) [25]. Swanson does believe that "A primary task of design education is to find the balance between skills training and a general understanding that will benefit students, the field of graphic design and working professionals" (p. 29) [26]. How is the task of developing curriculum, which prepares students for the field and is sensitive to the needs of a profession, accomplished? The researcher of this study believes that the process and tools utilized in this internal formative program evaluation can serve as a model for other design education programs to judge the effectiveness of design-related education programs as well as other programs in higher education.

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