The Doctor of Industrial Technology Degree: A Unique Opportunity for Applied Technology Disciplines

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Abstract

In recent years, graduate programs in engineering and technology fields have experienced a variety of challenges. Many programs have been forced to adapt curriculum and delivery methods as new and emerging technology, heightened demand for graduates, and changing student demographics have altered the landscape of higher education. In this dynamic environment, the Doctor of Industrial Technology degree program at the University of Northern Iowa (UNI) is a unique contribution to the fields of industrial technology and technical education.

Forecasters and scholars have noted the increasing demand for university faculty with terminal degrees. The growing number of university faculty who will retire or leave the teaching profession in the next decade will put additional pressure on graduate programs to generate qualified persons to teach and conduct research. The Doctorate Recipients from United States Universities; Summary Report 2000 lists 48 different terminal research degrees (including the Doctor of Industrial Technology) and is recognized by U.S. government agencies.

This paper will analyze trends in graduate education, the purposes and goals of traditional vs. non-traditional technical graduate degree programs, and the needs in industrial technology and technical areas, such as technology and vocational education. A recapitulation of conventional graduate degree programs noting their orientation or emphases will be covered. The degree levels normally ascribed to graduate education will also be reviewed and contrasted by discipline. Doctoral program paradigms will be recognized, including an historical and contemporary portrayal, and an overview of doctoral program core components will be discussed. The configuration of the premise behind the Doctor of Industrial Technology program shall be reflected upon and compared to other doctoral programs in the field. The final aspect of this paper will note the challenges, transformations, and complex interactions that doctoral programs may face in the 21st century. As technology and applied science graduate programs seek to meet the needs of higher education and industry, the Doctor of Industrial Technology degree is a unique and increasingly relevant opportunity for technologists and technology educators.

I. Doctoral Antecedents

Doctoral degrees have a long yet consistent history of attainment. They have dispersed in type and number, however, the doctor of philosophy remains the most common. Because of the 800 year

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history and educational inertia of doctoral programs, amendments or alterations to the attainment process have not been easy in traditional universities.

Noble examined the European origins of the doctoral degree, particularly the terminology associated with higher education institutions [1]. It has been accepted by numerous writers that the university was conceived during the Middle Ages. Various influences nurtured its concept. Latin was the language of academe giving rise to *docere, profiteri, majister, studium,* and *universitas*. In the ninth and tenth centuries, Islamic institutions in Egypt (Al-Azhar established in AD 970) and Morocco (al-Qarawiyin founded in AD 859) awarded the *ijazah*, a license or diploma, to a scholar, thus allowing the profession to be practiced.

There were two educational institutions which have been recognized in the literature and identified as universities originating during the Middle Ages, the University of Bologna (Italy) around 1158, and the University of Paris formed around 1150. The university concept spread among the European countries over the next four or five hundred years. Some historians such as Ben-David are certain that Oxbridge (England) was the third institution in 1167 and the archetype developing eventually into Oxford and Cambridge. In the beginning of the sixteenth century there were about 80 universities across Europe.

The language of academe employed Latin but the founders of the university at Halle (Prussia, present day Germany), Christian Thomasius employed German while Gottfried Wilhelm Leibnitz used French. These efforts began the abandonment of Latin in academia

Wilhelm von Humboldt as minister of education established a university in Berlin in 1810-1812 which had the primary objective to create knowledge, or original research, (which also was a precept at Halle in 1694), but was coupled with teaching. The scholars staffing the university as " . . . professors were chosen not so much for their ability to teach, as for their reputation or willingness for original research in science or scholarship . . ." [2].

The award of *ijazah* is recognized by Noble as the forerunner of the doctoral degree which is presently granted by universities [1]. The earliest conferring of the doctoral degree is in dispute, but it is agreed that an honorary qualification was awarded in Paris about 1150. The Holy Roman Emperor, Frederick I, granted a charter to the university at Bologna and under this charter a doctorate was conferred shortly after 1158, possibly in civil law ". . . all graduates of Bologna could teach or practice their specialization without further examination." [3]. Thus began the practice of reciprocity prior to which many universities required the bearer of an external doctorate to take another qualifying examination before being allowed to teach. A papal bull delivered in 1292 raised the doctors at Bologna to the social level of prestige which had been reserved for priests and knights. Nicholas IV conferred on these exalted doctors the right of *ius ubique docendi,* the right to teach throughout the world. Green further reported that the earliest Philosophiae Doctor was documented at the University in Paris while Eels noted that the University of Paris granted a doctoral degree about 1150. During the nineteenth century there were three significant developments in the doctor of philosophy degree; a written thesis became a requirement, competence was recognized beyond philosophy as distinguished from law, medicine, and theology, and the awardees possessed acceptable

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academic abilities to undertake independent scholarly investigations. Thwing noted the speech of a doctor of philosophy graduate in Germany as specifying the three fundamental components of his degree: (a) now all that has been learned in this subject, (b) learn something not yet known, and (c) add to the sum of knowledge [4].

In the United States, the Ph.D. evolved from two geographical areas of influence, the German institutions and the British universities as the highest earned degree. During the early portions of the nineteenth century the United States was still without graduate level programs and those wishing to study at advanced levels beyond the baccalaureate degree travelled to the European continent. By the mid century, these academic pilgrimages resulted in significant numbers of American graduate returning from Europe. In the *Encyclopedia of Education* 1971, it is reported that the first doctoral degree in the U.S. was awarded *honoris causa* at Bucknell University in 1852. The first earned doctoral degree was conferred in 1861 by Yale University. The conditions were: a year of residence, a comprehensive examination, and a dissertation which contributed to knowledge in accordance to German practice. Johns Hopkins University, in 1876, emphasized graduate work with programs of study leading to the Ph. D. degree with their first doctoral degree awarded in 1878. Their courses used lectures and demonstrations which was the dominant practice in science-oriented subjects. Additionally, JHU instituted approaches, discussion group and the German-style seminar where the professor and the students practiced critical textual study and interpretations and to supplement the scholarly lectures. Most doctoral degree programs developed in the U.S. adapted European conditions. Most German doctorates required a two year program while the English and Scottish institutions had a five year doctorate. These early U.S. doctor of philosophy degree programs had requirements as ". . . two years of post-baccalaureate study, a final examination, a thesis, and proficiency in Greek and Latin . . ." [5]. Some institutions also used German and/or French for language proficiency. Furthermore, the German institutions emphasized the research component while the English placed emphasis on teaching.

By the end of the nineteenth century the prior requirements were strengthened and the thesis which had been adopted from the German practice embodied " . . . the results of original research bearing the written acceptance of the professor or department in charge." [6].

> In general, obtaining a Ph.D involves 20 or more increasingly specialized courses (may include master degree level courses), conducting research on a very narrow subject, and writing a dissertation that describes the research and its results. The course work usually takes several years to complete even though it is equivalent to three years of academic credit. Classes are usually smaller . . . and seminars are common. Typically, students must study articles in scholarly journals as well as textbooks; research papers are usually required. Graduate students have closer contact with their professors and other students in their departments . . . , but usually have less contact with other parts of university life. They tend to live off campus, are often married, and in many cases, have jobs or assistantship duties in addition to their studies [7].

Harvard University began the Doctor of Education degree in 1921 and recognized it as a research degree because of the thesis requirement. This program required a year of teaching experience, an internship or an appropriate education service. Such requirements have had scholars consider the Ed. D. as a practioner program.

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II. Contemporary Developments

The industrial arts education influence on doctoral programs seems to have been initiated at Teachers College, Columbia University during the expansion of manual training into industrial arts education. It appears that TCCU established a pattern to prepare industrial arts/industrial education teacher educators, supervisors, and leaders with technical skills and knowledge in selected industrial areas as woodworking, metalworking, mechanical drafting, and printing. During the early years of the twentieth century scholars in these technical areas pursued their graduate degrees other programs areas since industrial education specialization was not available at that time [8]. In the late 1920's, the first acknowledged dissertation regarding industrial arts was produced. William Warner became established at The Ohio State University and educated a cadre of doctoral degree recipients who spread the industrial arts verity across the United States. There are various institutions which then established doctoral programs in industrial arts or industrial education areas.
Other institutions which established similar doctoral programs were University of Missouri, University of Illinois, and Texas A & M University among others.

In 1978, the UNI was granted approval for the Doctor of Industrial Technology degree program by the Iowa Board of Regents and the North Central Association. The D.I.T. program was initiated by Dr. Alvin Rudisill (then Head of the Department of Industrial Technology) with a concept proposed by Dr. Howard O. Reed years earlier. Drs. David L. Passmore and Richard A. Swanson implemented the program which we are discussing today. Their fore thought and creativity to initiate the creature we acknowledge this day as the Doctor of Industrial Technology. The first degree was conferred in 1979. Through the latter decades of the twentieth century, academicians, scholars, administrators, educational organizations, and researchers began to analyze and critique doctoral programs. The result has been numerous studies, collaborative endeavors, and proposals undertaken to influence and reform doctoral education.

III. The Doctor of Industrial Technology Program

The Doctor of Industrial Technology has been in existence since 1979 and was the first doctoral program offered on the UNI campus. In this time period, The Graduate Faculty of the Department of Industrial Technology have awarded degrees to 85 graduates.

The Doctor of Industrial Technology is a graduate program at the post-masters level. The focus of the Program is to develop selected intellectual and technical competencies to be applied in the industrial, educational, and governmental fields. The intent of the DIT program is to contribute to the professional development of leaders in their respective areas of pursuit. The program consists of several components to satisfy the 64 semester hours of graduate course work. A further dissection identifies the major constituents to be a core of industrial foundations, seminars, research and statistical aspects, internship, and the dissertation. Other requirements involve a publication activity, a professional career development plan which includes a portrayal of competencies, a comprehensive examination, a dissertation proposal, and an interdisciplinary requirement. The student advisory committee also requires two graduate faculty from outside the Department of Industrial Technology. The D.I.T. program has gone through two major adjustments in its course composition. Its present

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format is shown on Table 1 below.

Table 1. Doctor of Industrial Technology Program's present format.

Doctor of Industrial Technology Degree Program at UNI	
Industrial Technology Foundations	**12 sh**
Historical Development of Industrial Technology	
Contemporary and Future Development in Industrial Technology	
Readings in Technology and Society	
Technology, Ethics, and the Technologist	
Seminar	**3 sh**
Seminar in Industrial Technology (one-hour seminar in three semesters)	
Research & Statistical Methods	**10 sh**
Research Methods in Industrial Technology	
Statistical Methods in Education and Psychology	
Research Design in Industrial Technology	
Research Prospectus Seminar	
Internship	**6 sh**
Doctoral Internship	
Dissertation	**12 sh**
Research (Doctoral Dissertation)	
Required Core Courses	**43 sh**
Supporting Coursework to be specified in PCDP	**21 sh**
Minimum Total Program Hours (Beyond the masters degree)	**64 sh**

The Graduate Faculty of the Department of Industrial Technology provide an environment for the D.I.T. degree program where scholars pursue their studies in the knowledge of Industrial Technology and in the practice of that knowledge in organizational settings. The program attempts to satisfy the following goals:

1. Provide the scholars with the intellectual tools necessary to pursue scholarly research and applied practice in industrial technology and related fields,
2. Provide leadership and ethical development in the areas of improving industrial technology program and operations in industrial or educational organizations,
3. Offer an individually planned program of studies for each scholar targeted at developing competencies toward designated career goals, and
4. And allow for the development of continued technical expertise and application of that technical expertise by each student.

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IV. D.I.T. Components

The common core courses for the program are designed to provide the student with the knowledge and skills that will serve as a necessary foundation for an advanced career goal in industrial technology. In the industrial technology foundation area, a sequence of courses aims to pursue opportunities for structured inquiry and knowledge of technology, technological change, historical aspects of technology, contemporary developments, future dimensions, and ethical concerns.
The seminar course series is intended to develop communication and presentation skills, and scholarly discussions of current technological or educational issues related to the students research interests. These first two aspects should also include the exploration of new ideas and issues.
Courses and experiences needed in the technical area can be built into the student's program of study. This characteristic is especially crucial to the college or university faculty member who sees the need for technical competencies as part of the doctoral program. Individuals with the career intent of teaching in the discipline of industrial technology, at the collegiate level, will find ample opportunity to take technical courses and gain experiences to build upon their previous degree work and upon their teaching experience in their technical field.

The *Professional Career Development Plan* (PCDP) is an individualized document developed in an orientation course under the supervision of a graduate advisor. The PCDP which details an integrative plan to develop the career competencies with the identification of coursework and other necessary graduate program experiences. This career, or cognitive map, plan is intended to reflect areas of interest and the career aspirations of the graduate student.

Publication experience is one of the program requirements and must be completed before a proposal for a dissertation can be approved. This means that a doctoral candidate would demonstrate to their advisor and committee that a manuscript has been: 1) published, 2) accepted for publication, or 3) submitted and under consideration for publication.

The required internship is an opportunity for the student to apply the knowledge gained in the doctoral program to a practical, career-related area. This internship is educational in nature and is initiated by application and may be fulfilled in either an industrial or educational organization. The intern works in industry or cooperating agency with supervision from the advisor. The internship may be related to the dissertation topic, or provide a capstone experience for the doctoral student.
Research activities encompass investigative study of a research topic related to the student's research interest, writing research proposals, reporting of research findings, and statistical methodologies. Computer literacy, integration of industrial systems, and development of applications are desirable areas of expertise.

Progression through the D.I.T. program is sequential and deliberate, and focuses emphasis on the development of the competencies detailed in the PCDP. At or near the end of the developed program of study, the candidate is required to pass a comprehensive examination prior to initiating the research activity for the dissertation. The final program requirement is the dissertation. The research topics depend on and relate to the student's career plan. The topics range from technology related educational concerns to the development and design and implementation of highly sophisticated

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technologies in a selected technical area. The key direction of these topics comes from the career goals and program experiences outlines by the student in their PCDP. This entails in-depth research through an approved proposal resulting in a completed dissertation.

V. Doctoral Challenges to Transformation

Graduate education as noted earlier in these pages had its beginnings in the twelfth century, its adoption in Europe in mid-nineteenth century, the inception in the U.S. in the late nineteenth, and its growth, refinement, and flourishment during the twentieth century. Most institutions and academicians recognize graduate education as scholarly work beyond the baccalaureate degree. Rhodes described "Graduate education is as old as the university. . . . [but presently] involves the advanced preparation of student for teaching, scholarship, and research, and increasingly for professional practice."[9]. Another description posed by Trivett "Graduate study is a complex enterprise; it is both a legacy of the past and a mixture of novel developments and potentialities for the present and future."[10].

While it was asserted that change in graduate education is on many fronts such as the rapid development of scientific knowledge and technology, the global economy, and the role of graduate education in the university as well as the role in society . As President of Johns Hopkins University, Steven Muller stated that " We are . . . already in an environment for higher education that represents the most drastic change since the founding of the . . . great universities some eight or nine centuries ago." He went on to assert that the university will be serving new clientele, delivering instruction in new ways, and reexamining what and how it is taught. Nyquist et al, conducting the Re-envisioning the Ph. D. Project noted that there were over 30 reports and calls for reform in graduate education which not only echoed earlier reports but emphasized the exact same issues [11]. The issues, which have been repeated, were: effective mentoring, economic concerns, narrowness of - or disconnected - specialization, overproduction, preparation for teaching, the need to foster an understanding of faculty roles and the academy, and time-to-degree. These issues were from such esteemed bodies as the American Council of Education, Council of Graduate Schools, Committee of Science Engineering and Public Policy of the National Academy of Sciences, National Board of Graduate Education as well as such higher education luminaries as Micheal Pelczar, W.G. Bowen, Burton Clark, Alan Cartter, and Jules B. LaPidus. A past president of the Massachusetts Institute of Technology, Paul E. Gray posited that our ignorance of science and technology possesses a threat to our nation, its society, and its institutions and the ability " . . . to provide students with a broad and comprehensive knowledge of both the liberal arts and science and technology. . . . [and concluded that] The next century will make exceptional demand on educators and educational institutions, and we have a responsibility to meet those demands."

The sustained proliferations of these reports note many recommendations, advisories, and proposals to higher education in general and those specific to graduate and/or doctoral programs. In the report, *Reshaping the graduate education of scientists and engineers*, the committee described the current state of graduate education as basic to achieving national goals.

First, our universities are responsible for producing the teachers and researchers /

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> investigators in industry or academe who will lay the groundwork for the paradigms and products of tomorrow and who will in turn educate future teachers and researchers. Second, graduate scholarship and research are key contributors to meeting broad national goals of technological, economic, and cultural development. The increase in scientific and technological knowledge and the ways in which that knowledge is applied are fundamental to the pursuit of many general national objectives, including developing new technologies and industries, combating disease and hunger, reducing environmental pollution, developing new sources of energy, and maintaining the competitiveness of American Industry.

The report continued that individual states have retained their long tradition since the Morrill Act of 1862 of supporting graduate education at state universities and land grant institutions. Federal support has expanded through agencies as the National Science Foundation and the National Institutes of Health. Funding grew through the National Defense Education Act of 1958. But since the 1980's these institutions have been pummeled by a series of political, economic, and social changes. With a rise in international economic competition, state governments tightening their economic and personnel budgets, criticisms of faculty productivity, and an increase of complex societal concerns, the academy, their faculty, facilities, and graduate students face expectations and change that require active and visible roles of participation, leadership, cooperation, and flexibility in addition to teaching, conducting research, and disseminating their knowledge. The report noted that "Society expects them to contribute to new debates on public policy, to improve our competitive position in global markets, to help create high-value jobs, and to improve the education of citizens at many levels."

The COSEPUP report cited three major recommendations. First, graduate programs should offer a wider variety of academic and career skills to gain breadth and versatility with the ability to communicate and work well in teams. Second, the need for more realistic, accurate and better career information, options, and trends for the students and their advisors. The last general recommendation was that a representative national discussion and reconsideration take place regarding goals, policies, conditions, and unresolved issues pertaining to graduate education. The *Re-envisioning the Ph. D.* Project reviewed recent national studies on doctoral education and agreed that three issues were expressed. These themes were:

> "Current graduate education does not adequately match the needs and demands of the changing academy and broader society; there is a lack of systematic, developmentally appropriate supervision for many who are seeking careers that require or benefit from the attainment of a Ph. D.; and there exists a growing concern about the high level of attrition among doctoral students."

From these three thematic issues, there were eight recommendations extracted as well as suggested implementation/supportive statements.

1. Provide explicit expectations for doctoral students.
2. Provide adequate mentoring.
3. Provide exposure to wide variety of career options.
4. Prepare students to teach in a variety of settings using a range of pedagogies based on research in teaching and learning.

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5. Recruit women and students of color and heritage to diversify the American intellect.

6. Produce scholar-citizens who see their special training connected more closely to the needs of society and the global economy.

7. Balance the deep learning of the disciplinary doctorate with the variety of interdisciplinary challenges.

8. Create partnerships with all involved in doctoral education, including the stakeholders.

A member of this research project authored "Preparing the next generation of faculty" which focused on the need to substantially alter the graduate student socialization environment. After defining the graduate socialization process, Austin characterized the "modern academic workplace [with] . . . student diversity, new technologies, changing societal expectations, a shift in emphasis toward the learner, expanding faculty work loads, and a new labor market for faculty." [12]. The implications are evident for the necessary knowledge, skills, and abilities that newly minted faculty members will need to demonstrate. The keynote address at the Re-envisioning the Ph. D.: A working Conference noted the long list of skills and abilities that a doctoral student should develop during the graduate experience. Austin declared that these competencies required by the changing academic workplace are vitally necessary in the socialization and preparation process experienced by doctoral students. Not only is this socialization an ongoing process but it must include aspects as observing, listening, and interacting with faculty, colleagues and peers, and family and personal friends. These are noteworthy and should be a cause for concern, Austin noted, for the lack of systematic professional development opportunities for focused and guided reflection. The article concluded with five recommendations:

1. More attention to regular mentoring, advising, and feedback.
2. Structural opportunities to observe, meet, and talk with peers.
3. Diverse, developmentally oriented teaching opportunities.
4. Information and guidance about the full array of faculty responsibilities.
5. Regular and guided reflection.

These studies, projects, and reports can be structured into three segments, the doctoral program, the doctoral advisor activities, and the doctoral student aspirations.

VI. Doctoral Program Transformations

After reviewing and analyzing the numerous recommendations, documented reforms, and well-intentioned counsel, the selected rendering to constitute a doctoral program will be now enumerated and described. Many of these reforms may only be successful when the amendments do not differ greatly from the current practices since the inertia inherent within programs and graduate faculty cannot be circumvoluted. The following passages describe selected items from the diverse advisories in order to improve/alter doctoral programs in the twenty-first century. One particular of grave importance has been noted in various fashions from mentoring to socialization. Noble noted that this particular reform has been documented in the literature for over 30 years and is an on-going concern. Here the concern will be delimited to advisor-advisee interactions. Girves and Wemmerus considered faculty advisors as the gatekeepers to professions and careers requiring scholarship and research [13]. The interaction and/or relationship of a doctoral student and the advisor have all the unexpected changes or shifts encountered in human life so these activities, discussions, and positions do not always possess joy, harmony, or jubilation. Austin contends that graduate socialization has the

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opportunity to begin mutually acceptable expectations and respect. Heiss stated:

> The quality and character of the relationship between the doctoral student and [the] major professor is unequivocally the most sensitive and crucial element in the doctoral experience, since it not only influences the graduate student's scholarly development but also has far-reaching aftereffects [14].

Such a cogent interaction could lead to the students' praise and respect for the program rather than the lack of association with the program, department, and university as uncaring, and impersonal.

Another reform detail reiterated widely was the notion of career information, orientation, or expectations. A survey conducted by Wells and Fagen cited career planning as the top concern by doctoral students [15]. Several writers [12 - 18] noted the necessity and obligation to present career information, descriptive career options, and guidance to prospective and current students. Regarding employment prospects and range of employment possibilities. This should consider university careers and career pathways and include careers beyond higher education, the various levels and missions of institutions, sources of career placement, and internet access. A variation in this particular is the expectations of the program. This must include concerns as the selection processes, developmental progression expected, career goals and aspirations, the means or methods of evaluation and assessment, time to degree, completion rates, program milestones, and organized orientation meetings. Orientation meetings should be mandated for all entering departmental graduate students. At this time details on requirements, assistantship responsibilities, the requirements for examinations, papers, and theses and dissertations, standards for quality performance should be discussed, introductions to advanced graduate students and to faculty. Graduate faculty should share their research interests, overview of courses they teach. Additional items of information should consider the associations and professional conferences related to the department discipline, serve on committees, and expand personal connections. Finally, the doctoral student should develop a portfolio to display their skills and writing samples, teaching evaluations, recognition and displays of leadership and initiative.

A strongly emphasized reform characteristic has been preparation and opportunities for teaching experiences or incorporating teacher training courses into the program [7, 13]. The acquisition of teaching competence involves more than being in front of a group of learners. They should be aware of the range of pedagogies, instructional theories, curricular organization or design, class management, grading mechanics, and motivational techniques. These may be acquired through scheduled classes, workshops, and seminars. The teaching opportunities need to be developed with increasingly complex and advance to more autonomous instruction with supervision, guidance, and feedback.

The program information and career goals must be acknowledged upon immediate arrival in the department environment. Orientation, program planning, goals and competencies, and career data and supportive information must be investigated and documented. Various writers have called for a cognitive map, a portfolio, and an orientation tailored to the individual student's needs. We call it a professional career development plan. With the guidance of a graduate advisor, a cognitive map is developed with major and secondary intellectual and professional goals, a career goal rationale (including needs or availability, and future prospects) an inventory of literature-supported

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competencies as possessed and desired, competency-related program of study based on students needs and goals. This document should be subject to the advice and consent of the advisor and the departmental graduate committee. Thus, the doctoral student embarks upon the initial self-appraisal to begin focused planning and decision-making. It could be recognized as a portfolio since it contains the investigations to document specific skills, abilities, and competencies.

VII. Summary

In conclusion, we have presented an anecdotal record of doctoral antecedents from the middle ages to the modern age in order to illustrate the nascence of the character of doctoral programs. The background and description of the Doctor of Industrial technology degree program as practiced at the University of Northern Iowa which is recognized as a research degree by several educational organizations. A brief discussion of the D.I.T. program components was presented. Then a retrospective survey from selected researchers, reports, and proposals in order to demonstrate the breadth and representiveness of thinking, expressions and concerns emanating from over 30 reports to solidify the bases for the numerous doctoral programs that flourish. The final segment attempts to set the stage for some realities, that we as graduate faculty must only say that it might be but make it so. There were selected reform particulars that were described which were critical considerations which are keystones in the D.I.T. programs. In "Preparing for the next generation of faculty" Austin [13] cited the intent of several respected writers of higher education:

> The modern academic workplace is characterized by student diversity, new technologies, changing societal expectations, a shift in emphasis toward the learner, expanding faculty workloads, and a new labor market for faculty . . . . [and] these characteristics indicate a major transformation in higher education, perhaps as extensive as the one that occurred in the latter part of the nineteenth century, when the modern American university emerged.

Please recognize that we in this room and those reading this paper are all participants in this modern, twenty-first century, academic workplace since as graduate faculty of the twentieth century, we have the designated responsibility to prepare and support the academicians and citizens of the twenty-first century.

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