ASSESSMENT OF CONTENT KNOWLEDGE IN THE INDUSTRIAL ENTERPRISE PRACTICUM COURSE AT UW-STOUT

by

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A Research Paper

Submitted in Partial Fulfillment of the
Requirements for the
Master of Science Degree
With a Major in

Industrial/Technology Education

Approved: 2 Semester Credits

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May, 2000

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ABSTRACT

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ASSESSMENT OF CONTENT KNOWLEDGE IN THE
(Title)
INDUSTRAIL ENTERPRISE PRACTICUM
COURSE AT UW-STOUT

Industrial/Technology Education | Mr. Scott M. Wisner | May/2000 | 51
(Graduate Major) | (Research Advisor) | (Month/Year) | (No. of Pages)

American Psychological Association Style Manual
(Name of Style Manual Used in this Study)

The purpose of this descriptive study was to describe the level of content knowledge acquired (alpha change) as measured by the difference between a pre-test and post-test examination administered to students enrolled during the Spring 2000 semester in the Industrial Enterprise Practicum course (INMGT-314/514) at the University of Wisconsin-Stout.

The pre/post-test instrument was identical and was composed of content that emphasized technology and business. The sample was 56 students consisting of technology education, industrial technology, business, and apparel design majors.

The findings of the study revealed that there was change in the level of content knowledge acquired by the technology education, industrial technology, business, and apparel design majors.

ACKNOWLEDGMENTS

The author would like to express his sincere gratitude and appreciation to Mr. Scott M. Wisner for his participation in this endeavor. His roles as leader, mentor, and friend were instrumental to the development and success of this study, as well as to my professional development. His commitment to strive for excellence as a professional and as an educator has provided me with a truly rewarding experience.

The author would like to dedicate this research paper to his brother, Richard John Locy, who passed away on December 31, 1998.

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INTRODUCTION

Introduction

Society is entering into what could be the most important era of human history - the millennium. Will the new millennium destroy education, or will it build a resourceful world filled with knowledge? Aristotle (384-322 B.C.) stated "All men naturally desire knowledge" (Seldes, 1960, p.66). The millennium will introduce a new age of technology and a new age of learning, both requiring a change in knowledge.

Humans have lived in an age that has gone from cow chips, potato chips, computer chips, to nanochips (Parnell, 1990). As Nicholas Negroponte (1995) explains in his book, *Being Digital*, one way to look at the world might be to view it as consisting of atoms and bits. Living and non-living things are made up of atoms. Thus the physical world is made up of atoms. "The information world is made up of bits or digits" (Sterry and Hendericks, 1999, p.5). "Tomorrow's students are inheriting a world that will be profoundly different. They will live in a world of unlimited information" (Caine and Caine, 1997, p.47). There is an old cliché; "Information is the key to success".

Is the key to entering the education information highway based on 1's and 0's? Computers are revolutionalizing the publishing industry, the defense industry, the manufacturing industry, and the education industry (Parnell, 1990).

Computers allow students the capability to access information at their fingertips. Dr. W. Edward Deming defined information as facts about the past. "A dictionary is full of information, yet it has no knowledge" (Jenkins, 1997, p.23).

Is this information knowledge? Information is different from knowledge (Sterry and Hendericks, 1999, p.13).

Sterry and Hendericks (1999) suggest that information is a raw resource that can be brought to a system in several different ways. It is also a static resource that can be accessed from libraries and databases. They further state:

> Knowledge resides in people; that is, we mentally process information, internalize it, make some order from it, add to its refinement and application, make judgement about it, convert it to expertise and wisdom, and then ultimately bring this expertise to a situation where it can be applied (p.13).

In 1597 Francis Bacon stated "Knowledge is Power" and it remains true today (Bartlett, 1990, p.3). According to Dr. W. Edward Deming (as cited in Jenkins, 1997, p.33), "there are three sources of power: formal; knowledge; and personality and persuasive power". He further states a successful manager of people develops a source of knowledge power, and personality and persuasive power; does not rely on sources of formal power. He has nevertheless an obligation to use sources of formal power, as this source of power enables him to change the system-equipment, materials, and methods-to bring improvement. He is in authority, but if lacking knowledge or personality he must depend upon his power. He unconsciously fills a void of knowledge in his qualifications by making it clear to everybody that his is a position of authority.

In an article from The Educational Digest, the author states, "we have come to believe that knowledge and power are fundamental data and methodology, when we should entertain the notion that knowledge and power motivate us toward the a quest for meaning and truth" (Hartoonian, 1989, p.12). "In other words, acquiring knowledge is

not only memorizing numbers and facts, but develops into meaning, and thus change" (Esterby, 1998).

Is the measurement of acquiring knowledge a product of a single three-digit number with a decimal point -- grade point average? Could the change in knowledge be obtained by having a student step on a scale at the beginning of a semester, then again at the end of the semester and comparing the two? According to Mehrens and Lehmann (1995), "it is important to point out that we never measure or evaluate people. We measure or evaluate characteristics or properties of people: their scholastic potential, knowledge of algebra, honesty, perseverance, ability to teach, and so forth" (p.4).

Historically, educational institutions have defined educational success in terms of numbers - grade point, enrollment, graduation, and placement - and not in terms of competencies attained. As a result, they have failed to provide dependable information about the change in students' knowledge. The reality is that both knowledge and information are products that are obtained from the educational classroom learning experiences. Knowledge is measured through assessment, and assessment can determine if change has occurred. More specifically, the assessment of change that occurs across several domains of knowledge can be accomplished through three methodologies including alpha, beta, and gamma change.

The following research will focus mainly on alpha (real) change as it occurs within the classroom of the Industrial Enterprise Practicum course at the University of Wisconsin - Stout.

The University of Wisconsin-Stout was founded in 1891 by James Huff Stout. The original school name was Stout Manual Training School (1891-1908). In 1908, the

name was changed to The Stout Institute. In 1911, following Senator James Huff Stout's death, ownership transferred to the State of Wisconsin (Office of University Relations).

Another name change occurred in 1955, with that being Stout State College. Under the authorization by the Board of Regents in 1964, the name was changed to Stout State University, while maintaining traditional focus, but adding new majors and new directions to established majors. Lastly, in 1971 the Wisconsin State Universities and the University of Wisconsin Campuses merged to form the University of Wisconsin System, with the present name being University of Wisconsin-Stout.

Senator James Huff Stout recognized that the industrial revolution would change the face of America. His philosophy was that of preparing students to live in an industrialized society. This philosophy and the philosophy of Dr. Douglas Stallsmith lead to the development of the Industrial Enterprise Practicum course at the University of Wisconsin-Stout.

Dr. Douglas Stallsmith (personal communication, April 17, 2000) was recruited to Stout State University in 1966 as the curriculum instructor for the American Industry Major. The development of the American Industry Major was derived from the American Industry Project, which was funded by the Ford Foundation and the U.S. Office of Education. The first students were hand picked and the class size was restricted to 13 students. The Manufacturing course was first offered in 1968. Later, the course name was changed to Production Systems, which integrated the American Industry and the Industrial Arts curriculum.

Only the American Industry Majors were required to take the Production Systems course, until the early 1970's when all Industrial Art Majors were required to take it.

Later, in the 1970's, the course name was changed to Industrial Enterprise Practicum (INMGT-314), which remains today. A void in the textbook market lead to the development of the Industrial Enterprise Practicum book in 1976 by Dr. Douglas Stallsmith. The book consists of 492 pages with sub-topics such as Research and Design, Management, Production, Chief Executive Officer, Production Manager, Personnel Manger, Financial Manager, Marketing Manager, Material Manager, Product Engineer, Production Control, Flow Process, Methods Engineer, Manufacture Engineer, Quality Control, and Plant Engineer.

Dr. Douglas Stallsmith taught at the University of Wisconsin - Stout for 29 years and retired in 1995. The current instructor is Mr. Scott M. Wisner, who has been teaching the course for five years. The current Industrial Enterprise Practicum course description is " a course designed to give students a culminating experience in applying leadership, management, and production skills. The elements of business and industry are directly applied by the students, as they become actively involved in a manufacturing enterprise. The course content is oriented around laboratory activities necessary to organize and operate an enterprise, which will research, plan, produce, and market a product. The elements of business and industry are applied in the selection, design, financing, production planning, manufacturing, marketing, sales and distribution of a product" (Wisner, 1999).

It is important to note that currently the majority of the Industrial Enterprise Practicum course curriculum is structured around laboratory activities with a minimal amount of content lecturing. Content lecturing presently occurs during the first five weeks of the course.

Statement of the Problem

The University of Wisconsin - Stout Industrial Enterprise Practicum class has been in existence for approximately three decades enrolling business and technology students, but no systematic study has been completed that describes the effectiveness of the class.

Purpose of the Study

The purpose of this study is to describe the level of content knowledge acquired (alpha change) as measured by the difference between a pre-test and post-test examination administered to students enrolled during the Spring 2000 semester in the Industrial Enterprise Practicum class at the University of Wisconsin - Stout.

Objectives

The objectives of this study are as follows:

1. To determine the change in level of knowledge by the students enrolled in the Industrial Enterprise Practicum course.
2. To determine the change in level of business knowledge by the technology majors enrolled in the Industrial Enterprise Practicum course.
3. To determine the change in level of business knowledge by the business majors enrolled in the Industrial Enterprise Practicum course.
4. To determine the change in level of technological knowledge by the technology majors enrolled in the Industrial Enterprise Practicum course.
5. To determine the change in level of technological knowledge by the business majors enrolled in the Industrial Enterprise Practicum course.

Significance of the Study

The University of Wisconsin-Stout is currently researching various methodologies for the implementation of new curriculum content for the Industrial Enterprise Practicum course that meets the needs of business and technology students. The results of this study will assist in the development and implementation of course content that will support the needs of all students enrolled in the Industrial Enterprise Practicum course.

This study will identify the students' level of business and technology content knowledge prior to the exposure of the Industrial Enterprise Practicum course. This information will be beneficial to the business and technology instructors at the University of Wisconsin-Stout. The information will identify the need to reinforce or change the curriculum that is currently being taught to the students prior to their enrollment in the Industrial Enterprise Practicum course.

Limitations of the Study

The limitations of this study are as follows:

1. The test will not be validated; consequently the test data will only be generalizable to Industrial Enterprise Practicum students enrolled during the Spring 2000 semester.
2. The Industrial Enterprise Practicum instructor and the researcher developed the test content.
3. Absenteeism on the day the pre/post test was administered.
4. The population for this study was derived from three out of the five sections of students enrolled in the Industrial Enterprise Practicum course.
5. The ratio of business to technology majors enrolled in the course.

CHAPTER II

REVIEW OF LITERATURE

Introduction

As we enter into the 21st century, our society's political education system is calling for inclusion of students and the assessment of students' knowledge. To be effective, classroom educators need to determine the students' change in level of knowledge that results from classroom learning experiences.

In the past, society has called for increased academic standards, each time society has ignored the affective side of the educational enterprise, and each time society has returned to an ethic of Social Darwinism where only the best and the strongest survive (Schmuck and Schmuck, 1998). Our assessment history reveals layer upon layer of tests at exorbitant costs with little evidence of positive impact on student success. "For some reason, we became mesmerized by the belief that each new layer of testing would accomplish what prior layers had failed to do—stimulate education improvement" (Stiggins, 1999).

An integral part of educational intervention and evaluation research is the assessment of change. Millsap and Hartog (1988) stated that:

> Planned interventions generally attempt to induce change in individuals across time. Unfortunately, rigorous evaluation of intervention effects can be difficult. First, individuals may change in the absence of an intervention. Any evaluation of change must therefore attempt to link observed change to the intervention. Second, individuals can change in different ways, and observed

> change measures may have multiple interpretations, depending on the processes believed to be responsible for the change (p.574).

"Ideas in the effective-school research are paralleled by ideas in contemporary organizational literature from business and industry" (Schmuck and Schmuck, 1988). Education is at the same place the automobile industry was several years ago. "Every year a new model would be introduced, but the car was essentially unchanged" (Jenkins, 1997, p.5). These changes may be appealing changes, but not improvements. Jenkins (1997) further stated:

> The management theory of Dr. W. Edwards Deming improves student learning. Some may ask, "Didn't he advise manufacturers? What does that have to do with teaching school?" Dr. Deming advised owners of manufacturing firms on how to better manage their people to create an improved manufactured product. He gave the same advice to educators on how to better manage their people to create improved learning. It matters not that a person is managing 25 people producing brakes or 25 people producing better learning. It matters not that some people are tall and some are short. The theories of Dr. Deming are as powerful for teachers and their leaders as they are for businesses"(p.xvii).

To determine if a learning process or procedure is effective, thus an improvement, change must occur. Three methodologies used to assess change include alpha, beta, and gamma change. The majority of researchers agree to the significance of alpha change, although the major concern is the practical significance of beta and gamma change or the relative utility of various approaches to the measurement of beta and gamma change (Schmitt, Pulakos, Lieblein, 1984).

Alpha Change

"Alpha change can be defined as the change from pretest to posttest corresponding to an actual or absolute change"(Millsap and Hartog, 1988, p.574). It is considered the real change in the variable of interest. "It corresponds to absolute quantitative change" (Millsap and Hartog, 1988, p.574). "For example, if the measure is an evaluative rating of supervisory behavior, the change in the rating corresponds to an actual change in behavior" (Millsap and Hartog, 1988, p.574).

Schmitt and Pulakos, Lieblein, (1984, p. 249) interpreted the definition of Golembiewski, Billingsley, and Yeager (1976) alpha change "as the change that involves comparing the means of "Pre" and "Post" intervention responses, and any differences between these measures are thought to occur along relatively stable dimensions of reality".

Golemiewski et al. (1976) defined alpha change as "a variation in the level of some existential state, given a constantly calibrated measuring instrument related to a constant conceptual domain" (p.134). They gave the example:

> ...growth in baby's feet between this visit to the shoe store and the preceding one. The crucial measurement of change occurs within a relatively fixed system of stable dimensions of reality (our conventional concepts of "length" and "width") as defined by indicators whose intervals are more or less constant (the calibrated marks on the measuring rod against which the baby's foot is compared) (p.135).

Golembiewski et al. (1976) classified observed change in two other categories, that being beta and gamma change. They further stated that the (as cited in Millsap and

Hartog, 1988) " intent of an intervention might be to induce beta or gamma change, rather than alpha change" (p.574).

Beta Change

Golemiewski et al. (1976) defines beta change as "involves a variation in the level of some existential state, complicated by the fact that some intervals of the measurement continuum associated with a constant conceptual domain have been recalibrated" (p. 135). They elaborated on the previous example by stating that if beta change occurred "a parent could not know how much a child's feet had grown between visits to the shoe store. It would not be meaningful to compare the two measurements because the intervals on the measuring rod had somehow changed" (p.135). Change could have occurred because of the expansion or contraction of the measuring device.

Millsap and Hartog (1988) viewed beta change as a change of scale in the present or potential variables underlying the observed pretest and posttest measures (p. 575). "Beta change results from the respondent's subjective recalibration of the measurement scale" (Millsap and Hartog, 1988, p. 574). For example, if a respondent's change in rating pain has resulted not from any actual change in pain, but rather from a change in the respondent's evaluative rating scale for pain - beta change occurred. Beta change can be conceptualized as a stretching or shrinking of the measurement scale (Millsap and Hartog, 1988).

Gamma Change

Golemiewski et al. (1976) defines gamma change as "involves a redefinition or reconceptualization of some domain, a major change in the perspective or frame-of-

reference within which phenomena are perceived and classified, in what is taken to be relevant in some slice of reality" (p.135).

Golemiewski et al. (1976) further states that gamma change can be detected by comparing the factorial structure of the pretest and posttest measures. "Factorial change could result from maturation or from environmental influences operating between pretest and posttest" (Millsap and Hartog, 1988, p.575). Gamma change results from the respondent's reconceptualization of the measured variable (Millsap and Hartog, 1988, p.574).

Gamma change is the most difficult to measure. "Measuring gamma change is extraordinarily difficult since the preintervention instrument is no longer appropriate - the postintervention response is "off the scale." (Golemiewski et al., 1976, p.139).

The foundation for measuring alpha, beta, and gamma change can be the classroom. The Industrial Enterprise Practicum classroom provides an ideal footing for measuring alpha, beta, and gamma change.

Industrial Enterprise Practicum

Dr. Douglas Stallsmith developed the Industrial Enterprise Practicum course at the University of Wisconsin Stout in 1968. The current course number is INMGT-314/514 and is a three-credit course offered to Technology Education, General Business, Industrial Technology, and Apparel Design/Manufacturing majors. The students are required to have a junior or senior level standing.

The course description as taken from the syllabus:

> The Industrial Enterprise Practicum course is designed to give students a culminating experience in applying leadership, management, and production

skills. The elements of business and industry are directly applied by the students, as they become actively involved in a manufacturing enterprise. The course content is oriented around laboratory activities necessary to organize and operate an enterprise, which will research, plan, produce, and market a product. The elements of business and industry are applied in the selection, design, financing, production planning, manufacturing, marketing, sales and distribution of a product.

The general course objectives as taken from the syllabus:

1. Demonstrate knowledge and comprehension of various functional areas within a manufacturing enterprise.

2. Comprehend the interrelationships of various functional areas to each other and the manufacturing enterprise as a whole.

3. Apply problem-solving techniques to problems as they occur in the operation of the manufacturing enterprise.

4. Analyze production planning requirements and production methods.

5. Demonstrate the ability to work cooperatively with others in a team environment.

The current syllabus (Appendix A) includes information on the instructor, course materials, policies - safety, attendance, grading, and a statement of "Enterprise Philosophy and Expectations".

Summary

A review of literature has determined that society is calling for increased academic standards and accountability. Society is at one end of the spectrum, with the school district at the other end, and the classroom teacher in the middle. The classroom teacher is at the center of the learning process. If a learning process or procedure is to be

effective, an improvement, or change must occur. An integral part of educational intervention and evaluation is the assessment of change, with the majority of researchers agreeing to the significance of alpha (real) change. There is a major concern as to the practical significance of beta and gamma change.

Comparing the means of pretest and posttest responses can assess alpha change. A positive change is thought to occur along relatively stable dimensions of reality. A negative change is also thought to occur along relative stable dimensions of reality, but will allow for educators to reflect on how their own teaching practices contribute to the learning process.

As educators, we must be aware of the changes that do, or do not occur through the students' educational classroom learning experiences. Society will continue to call for increased academic standards and accountability. Therefore, as educators we need to develop classroom-learning experiences that increase the level of content knowledge acquired by students.

CHAPTER III

METHOD

This chapter will outline the methods and procedures used in this study of the change in level of knowledge by students. The purpose of this quantitative descriptive study was to describe the level of content knowledge acquired (alpha change) as measured by the difference between a pre-test and post-test examination for students enrolled during the Spring 2000 semester in the Industrial Enterprise Practicum course at the University of Wisconsin - Stout.

The objectives this study addressed are as follows:

1. To determine the change in level of knowledge by the students enrolled in the Industrial Enterprise Practicum course.
2. To determine the change in level of business knowledge by the technology majors enrolled in the Industrial Enterprise Practicum course.
3. To determine the change in level of business knowledge by the business majors enrolled in the Industrial Enterprise Practicum course.
4. To determine the change in level of technological knowledge by the technology majors enrolled in the Industrial Enterprise Practicum course.
5. To determine the change in level of technological knowledge by the business majors enrolled in the Industrial Enterprise Practicum course.

Sample Selection

The subjects of the study were college students enrolled at the University of Wisconsin-Stout in the Industrial Enterprise Practicum course during the Spring 2000

semester. There are five course sections (see Table 1) and students chose a section that "fit" within their overall class schedule.

Table 1

Fall 2000 Industrial Enterprise Course Schedule

	Section				
	1	2	3	4	5
Day					
Monday	8:00-10:00	10:10-12:10		3:35-6:05	
Tuesday			8:00-10:00		11:15-1:45
Wednesday	8:00-10:00	10:10-12:10		3:35-6:05	
Thursday			8:00-10:00		11:15-1:45
Friday	9:05-10:00	10:10-11:05	12:20-1:15		

Students enrolled in course sections one, two, and three were used for this sample. The criteria for selecting the course sections were based on the availability to the researcher, the course content covered, and the instructors' course experience. This criteria was chosen so that the sample would represent a normal classroom situation. The instructor for section four and five is relatively new to the course and has limited experience with the course content.

The population for this study was junior and senior level college students. There were forty-eight male students and seven female students providing a sample size of 55 students *(n=55)*. Their majors included Technology Education, General Business, and Industrial Technology. Participation by the subjects was optional.

Instrumentation

The pre-test and post-test instrument was identical. The researcher developed the test instrument (Appendix B) with the assistance of the researcher's advisor, who is the lead instructor for the Industrial Enterprise Practicum course at the University of Wisconsin-Stout. A majority of the pre/post-test items were taken from prior semester administered examinations in the Industrial Enterprise Practicum course. The test was thirty-four questions composed of true-false, multiple-choice, problem solving, and matching items. Test questions 1-17 were identified as being business related questions composed of marketing, finance, and general business content. Test questions 18-34 were identified as being technology related questions composed of content concerning materials, processes, manufacturing, production, and equipment. The students' demographics were also requested.

Procedures

The pre-test examination (Appendix B) was administered to course sections one, two, and three by the researcher during the first class period of each section in the Spring 2000 semester. This decision was based primarily on the need to prevent students from being exposed to course content material. The course instructor gave a brief description of the purpose of the pre-test. He then explained to the students to use the (E) "No Response" answers if they were not previously exposed to the test question content. He also stated that if a student was exposed to the content, but was not sure of the answer, that it was acceptable to take an educated guess. The purpose was to have the students mark the (E) "No Response" category only when they had never been exposed to the subject content of the question.

The researcher provided the following instructions to the students: (a) this test is optional, (b) use a no. 2 pencil, (c) mark only on the scantron sheet and scratch paper provided, (d) follow all instructions on the test, and (e) when finished place the test in the envelope labeled "TEST IEP SPRING 2000", and the scantron sheet and scratch paper in the envelope labeled "SCANTRON IEP SPRING 2000". Students completed the pre-test within forty-five minutes. The researcher collected the pre-test from the three sections and delivered the scantron sheets to the University of Wisconsin-Stout Computer Education & User Services department for statistical analysis. The exams were locked in the office of the researcher.

The post-test examination (same as pre-test) was administered to sections one, two, and three by the researcher four weeks prior to the end of the Spring 2000 semester. This decision was based primarily on the fact that students would not be exposed to any further lecturing of course content material. The same test administration procedures that were used for the pre-test were followed.

Limitations of the Study

The limitations of this study are as follows:

1. The test will not be validated; consequently the test data will only be generalizable to Industrial Enterprise Practicum students enrolled during the Spring 2000 semester.
2. The Industrial Enterprise Practicum instructor and the researcher developed the test content.
3. Absenteeism on the day the pre/post test was administered.
4. The population for this study was derived from three out of the five sections of students enrolled in the Industrial Enterprise Practicum course.
5. The ratio of business to technology majors enrolled in the course.

CHAPTER IV

RESULTS

The purpose of this study was to determine the change in level of knowledge by the students enrolled during the Spring 2000 semester in the Industrial Enterprise Practicum course at the University of Wisconsin-Stout. An identical pre-test/post-test was developed and administered to gather the data for this quantitative descriptive research. See Appendix B for pre/post-test.

The population of this study was junior and senior level college students enrolled in sections one, two, and three of the Industrial Enterprise Practicum course at the University of Wisconsin-Stout. The sample students were chosen from these sections because of the availability to the researcher, the course content covered, and the instructors' prior course experience. The three combined sections provided a sample size of 55 students. The class sizes varied in number. Also, the ratio of Technology Education, General Business, and Industrial Technology majors varied.

The total number of students that had taken the pre-test was 67 and the post-test was 57 students. Due to students adding the course, absenteeism, and attrition, the researcher used matched data analysis to arrive at the sample size of 56 students that had taken the pre-test and post-test. The final sample size was reduced to 55 *(n=55)*, because the sample size of one student from the Apparel Design/Manufacturing major *(n=1)* was too small to make any valid comparisons. This final sample was comprised of 17 students from section one *(n=17)*, 20 students from section two *(n=20)*, and 18 students from section three *(n=18)*.

Demographic Information

Table 2 describes the demographic information of the sample group. Three items of the test identified each respondent's gender, school year status, and major. Of the 55 students, 48 (87.3%) identified themselves as males, 7 (12.7%) as females; 19 (34.6%) as juniors in college, 36 (65.4%) as seniors in college; 30 (54.6%) as Technology Education majors, 15 (27%) as General Business majors, and 10 (18.1%) as Industrial Technology majors. The Apparel Design/Manufacturing major *(n=1)* was omitted.

Table 2

Sample Demographics

Demographic	Frequency	Percent
Gender		
Male	48	87.3
Female	7	12.7
Status		
Junior	19	34.6
Senior	36	65.4
Major		
Tech. Education	30	54.6
General Business	15	27.3
Industrial Tech.	10	18.1

Note: Valid Cases = 55.

Change in Business and Technology Knowledge by Major

This portion of the research study was to determine if the overall sample population *(n=55)* had a positive change in the level of content knowledge for the business and technology content areas. Table 3 shows that there was an overall positive change in the business and technology content knowledge for students enrolled in the Industrial Enterprise Practicum course.

Using paired samples statistics on items 1-34 and the three majors combined, the pre-test mean is 18.15 and the post-test mean is 22.60, indicating a net change, or increase of 4.45. The standard deviation illustrates the dispersion of scores around the mean, with the pre-test standard deviation being 4.81 and the post-test standard deviation being 4.21.

Table 3

Positive Change in Business and Technology Knowledge by All Majors

	All Majors	
	M	SD
Pre-test	18.15	4.81
Post-test	22.60	4.21
Change	4.45	

Note: Valid Cases = 55

Pre/Post-test items = 34

Using paired samples statistics on items 1-34 and looking at the individual majors, the post-test means increased beyond the pre-test means, indicating that the

individual majors showed a positive change in business and technology content knowledge (see Table 4).

Table 4

Positive Change in Business and Technology Knowledge by Major

	Pre-test			Post-test		
Major	M	SD	n	M	SD	n
Tech. Education	19.33	3.73	30	22.53	3.12	30
General Business	15.73	5.44	15	22.00	4.55	15
Industrial Tech.	18.20	5.79	10	23.70	6.40	10

Note: Data for test-items 1-34

Change in Business Knowledge by Major

Using paired samples statistics on items 1-17 and looking at the individual majors, the post-test means increased beyond the pre-test means, indicating that the individual majors showed a positive change in business content knowledge (see Table 5).

Table 5

Positive Change in Business Knowledge by Major

	Pre-test			Post-test		
Major	M	SD	n	M	SD	n
Tech. Education	5.80	2.12	30	7.93	2.20	30
General Business	8.67	2.06	15	10.8	2.27	15
Industrial Tech.	6.90	2.13	10	10.10	3.48	10

Note: Data for test-items 1-17

Change in Technology Knowledge by Major

Using paired samples statistics on items 18-34 and looking at the individual majors, the post-test means increased beyond the pre-test means, indicating that the individual majors showed a positive change in business content knowledge (see Table 6).

Table 6

Positive Change in Technology Knowledge by Major

	Pre-test			Post-test		
Major	M	SD	n	M	SD	n
Tech. Education	13.53	2.19	30	14.60	1.79	30
General Business	7.07	4.73	15	11.20	3.80	15
Industrial Tech.	11.30	4.37	10	13.60	3.57	10

Note: Data for test-items 18-34

It is important to note that the number of students who answered (E) "No Response" on the pre-test had changed to a response on the post-test indicating that students were exposed to business and technology content during the semester.

Table 7 illustrates the "No Response" frequency of 234 for the pre-test business questions 1-17, which decreased to 59 "No Response" frequencies on the post-test. Table 7 also illustrates the "No Response" frequency of 161 for the pre-test technology questions 18-34, which decreased to 54 "No Response" frequencies on the post-test.

Table 7

"No Response" Frequency to Business and Technology Questions

	"No Response" Frequency	
	Business	Technology
Pre-test	234	161
Post-test	59	54
Change	<175>	<107>

Response to Individual Business Questions by Major

The results in this section are based on the pre/post-test business questions 1-17. Table 8 describes the findings. The Technology Education majors showed a positive change to correct responses from pre-test to post-test on 16 out of 17 questions. The General Business majors showed a positive change on 13 out of 17 questions, and the Industrial Technology majors showed a positive change of 15 out of 17 questions.

Table 8 also illustrates that the Technology Majors scored at 70%, or above, on 4 out of 17 post-test business questions. The General Business majors scored at 70%, or

above, on 10 out of 17 post-test business questions and the Industrial Technology majors scored at 70%, or above, on 7 out of 17 post-test business questions.

Table 8

Correct Responses to Business Questions by Major

	Three Majors Combined *(n=55)*		Technology Education *(n=30)*		General Business *(n=15)*		Industrial Technology *(n=10)*	
Question no.	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1	37.5%	44.6%	36.7%	43.3%	46.7%	46.7%	20.0%	40.0%
2	19.6%	53.6%	13.3%	43.3%	33.3%	73.3%	10%	50.0%
3	39.3%	48.2%	26.7%	43.3%	80.0%	73.3%	20.0%	20.0%
4	12.5%	33.9%	16.7%	23.3%	13.3%	46.7%	0.0%	50.0%
5	82.1%	87.5%	80.0%	90.0%	93.3%	86.7%	80.0%	80.0%
6	37.5%	53.6%	40.0%	43.3%	40.0%	86.7%	30.0%	40.0%
7	60.7%	78.6%	66.7%	86.7%	46.7%	60.0%	60.0%	80.0%
8	17.9%	26.8%	0.0%	16.7%	53.3%	40.0%	20.0%	40.0%
9	23.2%	37.5%	20.0%	30.0%	26.7%	33.3%	20.0%	60.0%
10	62.5%	73.2%	56.7%	70.0%	66.7%	73.3%	70.0%	80.0%
11	76.8%	80.4%	76.7%	83.3%	80.0%	80.0%	80.0%	70.0%
12	37.5%	62.5%	13.3%	46.7%	53.3%	73.3%	80.0%	90.0%
13	44.6%	57.1%	20.0%	26.7%	86.7%	93.3%	50%	90.0%
14	7.1%	28.6%	10.0%	30.0%	6.7%	26.7%	0.0%	20.0%
15	71.4%	64.3%	83.3%	60.0%	40.0%	73.3%	90.0%	60.0%
16	28.6%	39.3%	13.3%	26.7%	46.7%	33.3%	40.0%	80.0%
17	21.4%	48.2%	6.7%	30.0%	53.3%	80.0%	20.0%	60.0%

Note: Apparel Design/Manuf. Major *(n=1)* omitted

Decrease from Pre-test to Post-test

Response to Technology Questions by Major

The results in this section are based on the pre/post-test technology questions 18-34. Table 9 describes the findings. The Technology Education, General Business, and Industrial Technology majors showed a positive change to correct responses from pre-test to post-test on 15 out of 17 technology questions. Table 9 also illustrates that the Technology Majors scored at 70%, or above, on 13 out of 17 post-test technology questions. The General Business majors scored at 70%, or above, on 10 out of 17 post-test technology questions and the Industrial Technology majors scored at 70%, or above, on 14 out of 17 post-test technology questions.

Table 9

Correct Responses to Technology Questions by Major

	Three Majors Combined *(n=55)*		Technology Education *(n=30)*		General Business *(n=15)*		Industrial Technology *(n=10)*	
Question no.	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
18	51.8%	51.8%	70.0%	63.3%	26.7%	40.0%	40.0%	40.0%
19	55.4%	66.1%	73.3%	76.7%	20.0%	26.7%	50.0%	90.0%
20	42.9%	51.8%	60.0%	63.3%	6.7%	26.7%	50.0%	60.0%
21	85.7%	83.9%	93.3%	96.7%	73.3%	60.0%	80.0%	80.0%
22	28.6%	50.0%	46.7%	50.0%	0.0%	53.3%	20.0%	40.0%
23	85.7%	89.3%	90.0%	96.7%	73.3%	73.3%	90.0%	90.0%
24	32.1%	58.9%	33.3%	56.7%	13.3%	53.3%	50.0%	70.0%
25	55.4%	87.5%	56.7%	83.3%	40.0%	93.3%	70.0%	90.0%
26	41.1%	60.7%	56.7%	73.3%	6.7%	33.3%	50.0%	70.0%
27	83.9%	91.1%	100.0%	100.0%	53.3%	80.0%	90.0%	80.0%
28	75.0%	98.2%	93.3%	100.0%	46.7%	93.3%	70.0%	100.0%
29	92.9%	94.6%	100.0%	100.0%	80.0%	86.7%	90.0%	90.0%
30	71.4%	92.9%	93.3%	100.0%	40.0%	80.0%	60.0%	90.0%
31	76.8%	89.3%	96.7%	100.0%	40.0%	73.3%	80.0%	90.0%
32	82.1%	89.3%	100.0%	100.0%	53.3%	73.3%	80.0%	90.0%
33	87.5%	92.9%	96.7%	100.0%	66.7%	80.0%	90.0%	90.0%
34	82.1%	98.2%	93.3%	100.0%	66.7%	93.3%	70.0%	100.0%

Note: Apparel Design/Manuf. Major *(n=1)* omitted

Decrease from Pre-test to Post-test

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Few will argue that, historically, society has called for increased academic standards. The attainment of academic standards can be measured through the assessment of knowledge, which resides in people, and more specifically in students. The attainment of knowledge is more than memorizing facts and figures; it is the mental processing of information that is internalized for current, or future application. Knowledge must be developed into meaning, before change can occur.

The first intention of the researcher was to study the change in business and technology content knowledge by the students enrolled in the Industrial Enterprise Practicum course at the University of Wisconsin-Stout. The second intention was to study the change in business content knowledge by the Technology Education, General Business, and Industrial Technology majors. Lastly, it was the intention of the researcher to study the change in technology content knowledge by the Technology Education, General Business, and Industrial Technology majors.

Purpose of the Study

The purpose of this study was to describe the level of content knowledge acquired (alpha change) as measured by the difference between a pre-test and post-test examination administered to students enrolled during the Spring 2000 semester in the Industrial Enterprise Practicum class at the University of Wisconsin - Stout.

Objectives

The objectives of this study are as follows:

1. To determine the change in level of knowledge by the students enrolled in the Industrial Enterprise Practicum course.
2. To determine the change in level of business knowledge by the technology majors enrolled in the Industrial Enterprise Practicum course.
3. To determine the change in level of business knowledge by the business majors enrolled in the Industrial Enterprise Practicum course.
4. To determine the change in level of technological knowledge by the technology majors enrolled in the Industrial Enterprise Practicum course.
5. To determine the change in level of technological knowledge by the business majors enrolled in the Industrial Enterprise Practicum course.

Research Method

The data for this quantitative descriptive study was gathered through the administration of an identical pre/post-test (see Appendix B). The instrument equally addressed two content areas, business and technology, with a total of 34 examination questions. The majority of the examination questions were taken from prior semester Industrial Enterprise Practicum course exams.

Matched data analysis was performed on all collected data and was provided to the researcher by the University of Wisconsin-Stout Computer Education & User Services Department.

Conclusions

The conclusions are divided into three areas: change in knowledge by all students, change in business knowledge by major, and, finally, the change in technology knowledge by major.

Change in Knowledge by All Students

From the data collected, it can be concluded that there was a positive change in knowledge by all students. The pre-test mean score of 18.15 increased by 4.45 to generate a post-test mean score of 22.60. This was an approximate 25% change from pre-test to post-test mean scores. More importantly, this states that the Technology Education, General Business, and Industrial Technology majors, on average, have increased their business and technology knowledge by completing the Industrial Enterprise Practicum course.

Of the total 34 post-test questions, two questions, (15 and 21), indicated a negative change. They were the following questions:

15. If a liability account has $100.00 beginning balance and you post a $10.00 credit, and then a $20.00 debit, what is your ending balance?

21. Which of the following sandpaper grits would be considered the coarsest?

The selections of answers and the correct answer can be viewed in Appendix B.

It is also important to note that approximately 12 students, or 20% of the population, who were enrolled in the class where not included in the study, because they missed taking either the pre-test, or post-test.

Change in Business Knowledge by Major

First, from the data collected, it can be concluded that there was a positive change in business knowledge by the Technology Education majors. The pre-test mean score of

5.80 increased by 2.13 to generate a post-test mean score of 7.93. This was an approximate 37% change from pre-test to post-test mean scores. The Technology Education major showed a decrease from pre-test to post-test on 1 of the 17 total business questions. The question was:

15. If a liability account has $100.00 beginning balance and you post a $10.00 credit, and then a $20.00 debit, what is your ending balance? (see Appendix AA).

Secondly, the data illustrates that it can be concluded that there was a positive change in business knowledge by the General Business majors. The pre-test mean score of 8.67 increased by 2.13 to generate a post-test mean score of 10.80. This was an approximate 25% change from pre-test to post-test mean scores. The General Business major showed a decrease from pre-test to post-test on 4 of the 17 total business. The questions were:

3. Which one of the following types of stock is given a guaranteed return if a profit is declared by the Board of Directors?

5. Which one of the following positions is the most responsible for public, employee, and labor relations?

8. Money received from the sale of stock is called?

16. Which of the following would best describe the "accounting equation"?

The selections of answers and the correct answer can be viewed in Appendix B.

Lastly, the data illustrates that it can be concluded that there was a positive change in business knowledge by the Industrial Technology majors. The pre-test mean score of 6.90 increased by 3.20 to generate a post-test mean score of 10.10. This was an approximate 46% change from pre-test to post-test mean scores. The Industrial

Technology major showed a negative decrease from pre-test to post-test on 2 of the 17 total business questions. The questions were:

11. Which of the following would be a reason for involuntary liquidation of an enterprise?

15. Which one of the following positions is the most responsible for public, employee, and labor relations?

The selections of answers and the correct answer can be viewed in Appendix B.

Change in Technology Knowledge by Major

From the data collected, it can be concluded that there was a positive change in technology knowledge by the Technology Education majors. The pre-test mean score of 13.53 increased by 1.07 to generate a post-test mean score of 14.60. This was an approximate 8% change from pre-test to post-test mean scores. The Technology Education major showed a decrease from pre-test to post-test on 1 of the 17 total technology questions. The question was:

18. Which of the following is the actual finished dimensions of a construction lumber with the nominal dimensions of 2"(thick) x 4"(wide) x 8'(long)? (see Appendix B).

The data also illustrates that it can be concluded that there was a positive change in technology knowledge by the General Business majors. The pre-test mean score of 7.07 increased by 4.13 to generate a post-test mean score of 11.20. This was an approximate 58% change from pre-test to post-test mean scores.

The General Business major showed a decrease from pre-test to post-test on 1 of the 17 total technology questions. The question was:

21. Which of the following sandpaper grits would be considered the coarsest? (see Appendix B)

Furthermore, it can be concluded that there was a positive change in technology knowledge by the Industrial Technology majors. The pre-test mean score of 11.30 increased by 2.30 to generate a post-test mean score of 13.60. This was an approximate 20% change from pre-test to post-test mean scores. The Industrial Technology major showed a decrease from pre-test to post-test on 1 of the 17 total technology questions. The question was 27, which asked to match the picture of laboratory equipment with its correct descriptor (see Appendix B).

It appears that students who have enrolled in the Industrial Enterprise Practicum course at the University of Wisconsin-Stout have increased their business and technology content knowledge. We, as educators, now have to determine if the positive change in knowledge was acceptable, and if not, how to improve the effectiveness of the course.

Recommendations

Based on the findings of this study, the following recommendations are made.

1. The researcher believes the pre/post-test instrument developed in this study has merit, however, the researcher recommends further development of pre/post-test instrument before administration. It would be beneficial to include the Business Department Faculty and Staff in the development of the business test questions. Also, it would be beneficial to include the Technology Education and Industrial Technology Faculty and Staff in the development of the technology test questions.
2. The researcher suggests the study be replicated into a correlation or group comparison study.

3. The population of the study to include all Industrial Enterprise Practicum course sections. The population of this study included sections one, two, and three out of the five course sections.
4. Increase business and technology content lecturing, along with increase of assessment throughout the course timeframe.

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INMGT – 314 / 514 INDUSTRIAL ENTERPRISE PRACTICUM

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Course Description:

The Industrial Enterprise Practicum course is designed to give students a culminating experience in applying leadership, management, and production skills. The elements of business and industry are directly applied by the students, as they become actively involved in a manufacturing enterprise. The course content is oriented around laboratory activities necessary to organize and operate an enterprise which will research, plan, produce, and market a product. The elements of business and industry are applied in the selection, design, financing, production planning, manufacturing, marketing, sales and distribution of a product.

Course Materials:

Required -- OSHA approved Safety Glasses with side shields or goggles

Recommended -- Industrial Enterprise Practicum Packet
Author: Dr. Douglas Stallsmith
Available from University Bookstore

Recommended -- Ear Plugs

Statement of Enterprise Philosophy and Expectations:

We in the Industrial Enterprise Practicum class believe that our success is based on total class participation, working in a team environment, and the quality of our products, and services we provide to our customers -- both internal and external customers.

- Because **TEAMWORK** is the basis for our success, all class members are expected to:

    1. Share responsibilities by doing whatever it takes to get the job done.

    2. Treat each other with Respect and Trust.

3. Appreciate individuality while working toward common goals.
4. Become a mentor to promote the growth of others.
5. Make class attendance a goal.
6. Keep a neat and clean work/class environment.

- All class members are expected to openly **COMMUNICATE** by:
  1. Sharing suggestions, ideas and concerns.
  2. Being honest, open-minded and willing to accept constructive criticism.
  3. Admitting mistakes and expressing your need for help.
  4. Being a good listener.
  5. Completing all company/enterprise documents/assignments properly and in a timely manner.
- All class members are expected to demonstrate a high level of **PERFORMANCE** by:
  1. Being self-motivated.
  2. Displaying professionalism.
  3. Being prepared and organized.
  4. Having a positive attitude.
  5. Continually looking for ways to improve all aspects of our enterprise.
  6. Using time efficiently and effectively.
  7. Consistently meeting quality requirements.
  8. Meeting deadlines.
  9. Proper use and care of equipment.

- Because **SAFETY** is everyone's responsibility, all class members are expected to:

    1. Adhere to all safety policies and procedures at all times.
    2. Point out unsafe conditions.
    3. Promptly report all accidents and injuries, regardless of how minor they may seem.
    4. Maintain a clean working/class environment.
    5. During class, be totally free from the influence of drugs and alcohol.

- Because **QUALITY** is essential, all class members are expected to:

    1. Deliver defect-free products and services to our customers -- both internal and external customers.
    2. Give your personal best effort and take pride and ownership in all enterprise activities performed.
    3. Seek out and understand the requirements of your/our customers, and meet or exceed those requirements everytime.
    4. Understand that the accuracy and completeness of your work determines the effectiveness of the entire enterprise.
    5. Continually improve work methods and processes to prevent potential quality problems from occurring.

General Course Objectives:

1. Demonstrate knowledge and comprehension of various functional areas within a manufacturing enterprise.
2. Comprehend the interrelationships of various functional areas to each other and the manufacturing enterprise as a whole.
3. Apply problem-solving techniques to problems as they occur in the operation of the manufacturing enterprise.
4. Analyze production planning requirements and production methods.
5. Demonstrate the ability to work cooperatively with others in a team environment.

Important Note: It is a **requirement** of this course that everyone be involved in the **manufacture/production** and **sales** of the enterprise product.

Evaluation:

1. A research paper on your specific position within the manufacturing enterprise.
2. Your daily contribution to the enterprise -- individual student journals will be kept on a daily basis and evaluated periodically by the instructor.
3. Your ability to recognize problems, or potential problems, within the manufacturing enterprise, and your ability to find effective solutions.
4. Creativity in your company position.
5. The quality of work demonstrated in everything you do within the manufacturing enterprise.
6. Your ability to work with others in a team environment by volunteering to fulfill responsibilities and complete assigned tasks in a timely manner.
7. Your cooperation in following enterprise policies and procedures.
8. Your attendance in class and promptness in turning in assignments. Note: Assignments are expected to be complete, well organized, and neat in appearance.
9. Your ability to follow safe working practices and procedures.
10. Your willingness to work with various "hands-on" production activities.
11. Your willingness to actively participate in product sales.
12. Your ability to conduct yourself in a mature and professional manner at all times.
13. Exam(s)

Your final course grade will reflect all of the above evaluation criteria as well as the expectations spelled out in the "Statement of Enterprise Philosophy and Expectations". You will be rewarded points for each assignment and enterprise responsibility. These points will be totaled at the end of the semester to determine your grade. Each person will have the opportunity to receive the same number of points regardless of their enterprise position. Your grade will be based on a percentage of total possible points. **Graduate students** will be required to complete an additional written assignment.

Attached to this syllabus you will find an evaluation sheet, which indicates the possible points for each category. Letter grades will be awarded according to the following scale: **100 - 94% = A, 93 - 91% = A-, 90 - 88% = B+, 87 - 85% = B, 84 - 82% = B-, 81 - 79% = C+, 78 - 76% = C, 75 - 73% = C-, 72 -70% = D+, 69 - 67% = D, 66 - 64% = D-, < 64% = F.**

Note: If circumstances dictate, the instructor reserves the right to adjust any student's letter grade up or down by one full letter grade. Any serious breach of ethics such as stealing from the enterprise or committing fraud may result in dismissal from the class with a failing grade.

Laboratory Safety Policies:

Attached is a copy of the General Laboratory Safety Policies. These policies will be enforced at all times. Violations will reflect negatively on your final grade. Examples of violations, not wearing safety glasses, improper use of machines, and not assisting with clean up.

Attendance:

Attendance is **required** in this course because of the importance of teamwork to the success of the manufacturing enterprise. The tasks you are responsible for completing will have a direct impact on the ability of others to complete their assigned tasks. Simply stated, everyone needs to do his/her "fair share" to assure the success of the enterprise. You will be expected to be on time for class and remain in class the entire class period unless otherwise directed or excused by the instructor.

Excused absences will be given only if you contact the instructor **before** class begins on the day of your absence. All absences and tardiness will reflect negatively on your grade.

Enterprise Experiences:

The organization of this course is such that it primarily involves independent laboratory activities inside and outside of class. There is a minimum of lecture only to acquaint you with the course and available resource materials. Much of the work will require you to develop, plan, apply and problem solve.

List of Enterprise Positions:

Note: This list of positions is not to be viewed as the "prescriptive" list of positions for your enterprise. Your enterprise is free to eliminate, add, modify, and/or rename positions as required. For instance, your enterprise may wish to add a Risk Control position, an Information Systems position, a Training and Development position and/or a Packaging Engineer position.

1. Product Research and Development

   a. Explore, select and build product prototypes
   b. Develop product and material specifications
   c. Develop product bills of materials
   d. Complete product sketches
   e. Develop and apply market research
   f. Complete a product financial analysis
   g. Complete a competitive analysis

2. Chief Executive Officer

   a. Organize the enterprise
   b. Select the type of company ownership
   c. Develop company name and logo
   d. Develop company by-laws, articles of incorporation and mission statement
   e. Develop company objectives and policies
   f. Develop enterprise schedule
   g. Develop administrative budget
   h. Provide leadership for departmental functions
   i. Evaluate and maintain enterprise schedule
   j. Assist with the development of the corporate report

3. Human Resources

   a. Develop department policies and procedures
   b. Develop department budget
   c. Develop the company organization chart
   d. Develop necessary personnel documents/forms
   e. Organize and maintain personnel records
   f. Maintain production job sheets
   g. Develop and administer a safety and training program
   h. Maintain safety and training records

4. Marketing, Sales and Distribution

   a. Develop department policies and procedures
   b. Develop department budget
   c. Develop marketing, sales and distribution strategies
   d. Develop market research instruments
   e. Analyze market research results
   f. Develop and implement advertising plans and methods
   g. Organize and maintain sales and distribution records
   h. Develop product instructions and warranty information

5. Finance

   a. Develop department policies and procedures
   b. Develop department budget
   c. Develop and maintain Chart of Accounts
   d. Develop and maintain journal and ledger systems
   e. Develop Balance Sheet
   f. Develop Income Statement
   g. Develop and chart break-even analysis
   h. Develop and maintain stockholder/owner records
   i. Maintain financial records for auditing
   j. Develop necessary financial documents/forms

6. Materials

   a. Develop department policies and procedures
   b. Develop department budget
   c. Develop and maintain a materials / inventory control system for raw materials, Work-in-process (WIP), finished goods and supplies
   d. Develop and maintain materials record sheets
   e. Develop and maintain materials estimate sheets
   f. Develop and maintain purchase requisitions
   g. Develop and maintain purchase orders
   h. Develop and maintain receiving documents
   i. Contact suppliers for cost, availability and delivery lead-time
   j. Purchase materials and supplies

7. Production / Production Activity Control

   a. Develop department policies and procedures
   b. Develop department budget
   c. Organize and manage production department
   d. Develop and maintain production schedule
   e. Develop, issue and maintain production work orders
   f. Maintain daily, weekly and final production quantity records
   g. Assist with development of Operation / Flow Process charts
   h. Assist with development of Bills of Materials (BOM) and routings
   i. Develop and maintain Engineering Change Order system

8. Production Engineering

   a. Develop department policies and procedures
   b. Develop department budget
   c. Develop product research prototype drawings
   d. Develop product engineering drawings including specifications

e. Develop tooling drawings (jigs, fixtures and/or patterns)
f. Assist with development of Operation / Flow Process charts
g. Assist with development of Bills of Materials (BOM) and routings

9. Manufacturing Engineering

a. Develop department policies and procedures
b. Develop department budget
c. Assist with development of Operation / Flow Process charts
d. Assist with development of Bills of Materials (BOM) and Routings
e. Design and construct jigs and fixtures
f. Train workers to perform operations using tooling and equipment in a safe Manner
g. Develop product packaging -- (Packaging Engineer)

10. Plant Engineering

a. Develop department policies and procedures
b. Develop department budget
c. Implement and monitor compliance to all safety policies
d. Develop plant layout drawing
e. Develop product flow diagram
f. Develop material handling plan
g. Monitor production flow and material handling activities

11. Quality Assurance

a. Develop department policies and procedures
b. Develop department budget
c. Develop a quality assurance system encompassing receipt of raw materials through the distribution of finished goods
d. Develop list of inspection gauges and instruments
e. Design and construct inspection gauges to verify product conformance to Specifications
f. Train production workers to perform on-line inspections
g. Check and maintain accuracy of jigs, fixtures, tooling and inspection gauges

Industrial Enterprise Practicum
INMGT-314/514
Spring 2000 Semester

Indicate "No Response": when you have no knowledge of the topic or concept.

Multiple Choice

1. Which one of the following is not an advantage of a corporation?

A. owners have limited liability
B. continuous life
(C) legal requirements
D. raise large sums of money
E. No Response

2. The type and number of shares of stock to be authorized for issue by a corporation is specified in the :

(A) articles of incorporation
B. corporate procedures
C. stockholders records
D. corporate policies
E. No Response

3. Which one of the following types of stock is given a guaranteed return if a profit is declared by the Board of Directors?

A. par value stock
B. standard stock
C. common stock
(D) preferred stock
E. No Response

4. The corporate document which gives the detailed description of the powers of the stockholders, directors, and officers is the:

A. corporate charter
B. articles of incorporation
(C) corporate by-laws
D. board of directors polices
E. No Response

5. Which one of the following positions is the most responsible for public, employee, and labor relations?

(A) personnel manager
B. production manager
C. finance manager
D. marketing manager
E. No Response

6. Which one of the following positions is most responsible for establishing a budget for product materials, overhead expenses, and tooling expenses?

A. personnel manager
(B) production manager
C. finance manager
D. marketing manager
E. No Response

7. Which one of the following would be best described as an indirect material?

A. stain
B. lumber
C. hinges
(D) sandpaper
E. No Response

8. Money received from the sale of stock is called:

A. sales income
B. capital assets
(C) owners' equity
D. venture capital
E. No Response

9. Which of the following is a variable cost?

(A) direct materials
B. tooling
C. advertising
D. facilities rent
E. No Response

10. When does the breakeven point occur?

A. variable cost minus fixed costs equals sales income
B. variable cost equals fixed costs
(C) variable costs plus fixed costs equals sales income
D. sales income equals fixed costs
E. No Response

11. Which one of the following would be a reason for involuntary liquidation of an enterprise?

A. low profits
B. retirement of owner
C. merger
(D) bankruptcy
E. No Response

12. Which of the following financial statements would show assets, liabilities, and owners' equity?

A. income statement
B. capitalization report
(C) balance sheet
D. cost flow statement
E. No Response

13. Which of the following is <u>not</u> identified as one of the four "P's" of marketing?

A. product strategy
B. price strategy
(C) production strategy
D. place strategy
E. No Response

14. In today's typical manufacturing company, which one of the following is the largest cost contributor to the total cost of manufacturing?

A. direct labor
B. overhead/burden
(C) direct materials
D. utilities
E. No Response

15. If a liability account has $100.00 beginning balance and you post a $10.00 credit, and then a $20.00 debit, what is your ending balance?

A. $130.00
B. $110.00
(C) $90.00
D. $70.00
E. No Response

16. Which one of the following would best describe the "accounting equation"?

A. assets + liabilities = stockholders equity
B. stockholders equity - assets = liabilities
(C) assets - liabilities = stockholders equity
D. asset + stockholders equity = liabilities
E. No Response

17. If a cash account has $100.00 beginning balance and you post a $20.00 credit, and then a $10.00 debit, what is the ending balance?

A. $130.00
B. $110.00
(C) $90.00
D. $70.00
E. No Response

18. Which of the following is the actual finished dimensions of construction lumber with the nominal dimensions of 2"(thick) x 4"(wide) x 8' (long)?

A. 2" x 4" x 8'
(B) 1 1/2" x 3 1/2" x 8'
C. 1 7/8" x 3 7/8" x 8'
D. 1 3/4" x 3 1/2" x 8'
E. No Response

19. Which of the following is not classified as a hardwood?

A. maple
B. birch
(C) pine
D. basswood
E. No Response

20. Which of the following is the correct calculated board footage (bf) using the dimensions of 1"(thick) x 6"(wide) x 4' (long)?

(A) 2 bf
B. 4 bf
C. 8 bf
D. 24 bf
E. No Response

21. Which one of the following sandpaper grits would be considered the coarsest?

(A) 60 grit
B. 80 grit
C. 100 grit
D. 180 grit
E. No Response

22. Which of the following is an ideal wood moisture content for cabinet and furniture woods?

A. 2 - 6%
(B) 7 - 10%
C. 15 - 20%
D. 21 - 25%
E. No Response

23. If you purchased 5/4 (thickness) lumber and planed 1/4" off, what would you have remaining?

A. 3/4"
B. 1/2"
(C) 1"
D. 5/8"
E. No Response

24. The bill of materials (BOM) serves the following purpose(s):

A. lists all the components of a product
B. lists all the sequence of machines or processes through which a component travels
C. shows the relationship among the product components
(D) both A and C
E. No Response

25. A product routing serves the following purpose(s):

A. lists all the components of a product
(B) lists the sequence of machines or processes through which a component travels
C. shows the relationship among the product components
D. both A and C
E. No Response

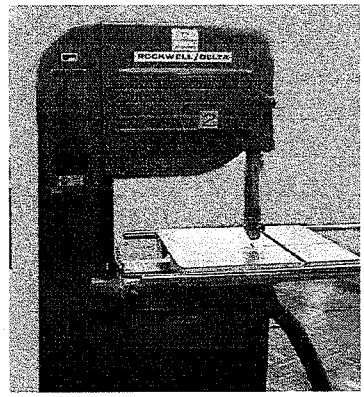
26. Which of the following would be most appropriate for inspecting the thickness of a 1000 component parts with a tolerance of + or - 1/64 inch?

A. inside micrometer
B. bench rule/tape measure
(C) go-no-go gauge
D. combination square
E. No Response

Continued

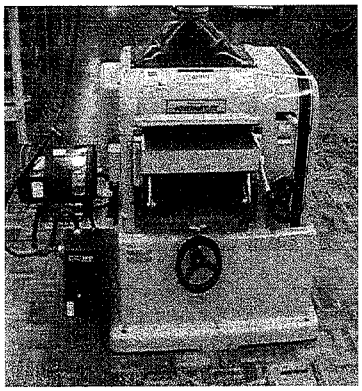
Note: On questions 27 through 34, match the picture with the letter A, B, C, D, or E.

27.



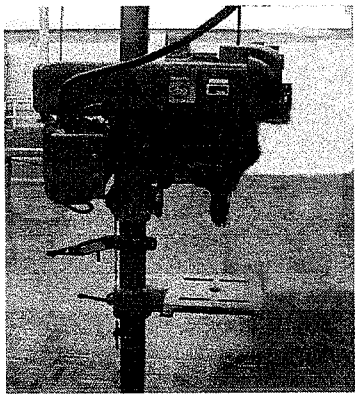
A. drill press
B. jointer
C. planer
(D). bandsaw
E. No Response

28.



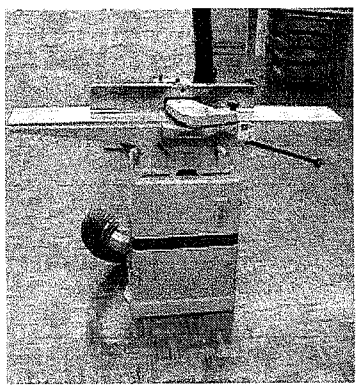
A. drill press
B. jointer
(C). planer
D. bandsaw
E. No Response

29.



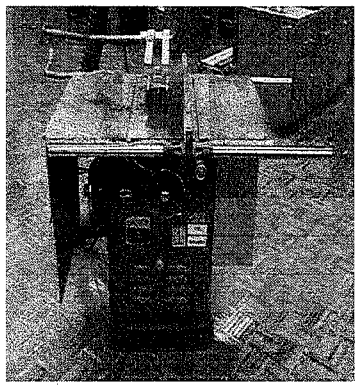
(A). drill press
B. jointer
C. planer
D. bandsaw
E. No Response

30.



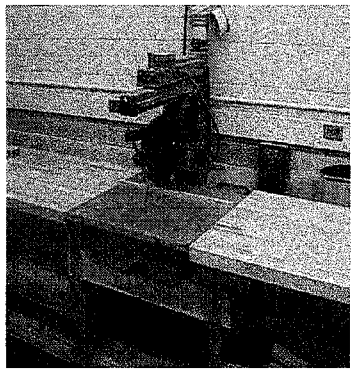
A. drill press
(B). jointer
C. planer
D. bandsaw
E. No Response

31.



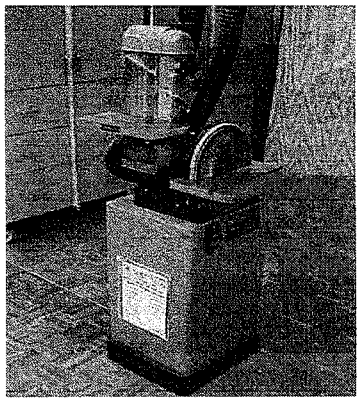
A. radial arm saw
(B.) table saw
C. wide belt sander
D. disk & belt sander
E. No Response

32



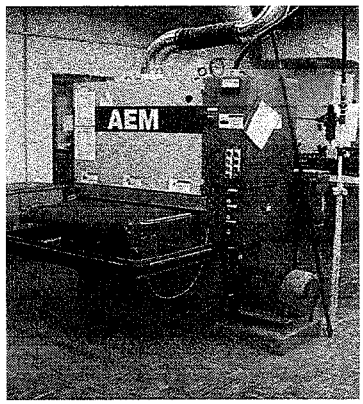
(A.) radial arm saw
B. table saw
C. wide belt sander
D. disk & belt sander
E. No Response

33.



A. radial arm saw
B. table saw
C. wide belt sander
(D.) disk & belt sander
E. No Response

34.



A. radial arm saw
B. table saw
(C.) wide belt sander
D. disk & belt sander
E. No Response

35. What is your class section number?

A. section 01 (8:00 - 10:00 MW)
B. section 02 (10:10 - 12:10 MW)
C. section 03 (8:00 - 10:00 TTH)

36. What is your major?

A. Technology/Vocational Education
B. General Business Administration
C. Industrial Technology
D. Apparel Design/Manufacturing
E. Other

37. What is your student status?

A. Freshman
B. Sophomore
C. Junior
D. Senior
E. Graduate

38. What is your gender?

A. male
B. female

Thank you for completing this test.