

AN ABSTRACT OF THE THESIS OF

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Title: AN INVESTIGATION OF THE EFFECTS OF FEEDBACK ON  
VARIABILITY AND CENTRAL TENDENCY OF GROUP  
OPINION WHILE EMPLOYING THE DELPHI TECHNIQUE

Abstract approved: Redacted for Privacy  
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The purpose of this study was to determine the effects of the Delphi Technique on two types of judgment; factual judgment and value judgment. Other considerations were the effect of the process on mean response and variability of response.

In testing the Delphi Technique this study arrived at five definite conclusions:

1. The Delphi Technique did not promote a significant change in mean response to factual judgment items.
2. The Delphi Technique did not promote a significant change in mean response to value judgment items.
3. The Delphi Technique did not produce a consistent change in variance of response to factual judgment items.
4. The Delphi Technique did not produce a significant change in variance of response to value judgment items.

5. The Delphi Technique caused a reduction in the number of responses to the last survey in the process.

In addition to these five conclusions there were some noteworthy observations about the procedure of the Delphi Technique. The most outstanding observation was the fact that the investigator was continually facing a time deadline for analyzing the results of the first survey in order to provide feedback for the second survey. The investigator was faced with the same rush schedule to analyze the results of survey two in order to provide feedback for survey three. On top of being faced with a continuous rush schedule, the unavailability of a survey instrument necessitated a separate study to develop the research instrument for this study.

The Delphi Technique was used to identify the goals of the Industrial Education Department on the Oregon State University campus. Participants in the study consisted of five groups. The groups were: Industrial Education faculty, Industrial Education undergraduates, administrators of the School of Education, employers of Industrial Education graduate students and recent graduates of the Industrial Education department. Out of the five groups recent graduates and employers were deleted from the study due to their lack of response to the recurring surveys of the Delphi Technique.

The general Delphi procedure followed was:

1. A survey instrument was administered to the five groups of respondents.

2. The data provided were analyzed to provide feedback for a second survey. A new survey instrument was printed incorporating the feedback. The instrument was used to survey the same groups of respondents.

3. The data provided by the second survey were analyzed to provide feedback for a third survey. At this point the group of employers was deleted from the study since zero returns were received from this group.

4. The results of the third survey were analyzed to provide an indication of the responses to the third survey. At this point the group of recent graduates was deleted since they returned only two instruments.

5. Tests for significant difference between survey one and survey three provided the basis for conclusions drawn by this study.

### The Pilot Study

A 43-item preliminary instrument was developed and administered to a group of students that were not involved in the Delphi (undergraduate and graduate students). The results of this survey were factor analyzed to eliminate spurious items and group the remaining usable items. Thirty items were identified as suitable for the instrument. These 30 items were placed in the following four groups:

1. Goal statements dealing with student development in the affective domain.

2. Goal statements dealing with student development in the cognitive domain.

3. Goal statements dealing with curriculum flexibility.

4. Goal statements dealing with a student oriented faculty.

An Investigation of the Effects of Feedback on  
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by

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## TABLE OF CONTENTS

<u>Chapter</u>		<u>Page</u>
I	INTRODUCTION	1
	The Problem	2
	Statement of the Problem	3
	The Purpose of the Study	4
	Need for the Study	4
	Variables in the Study	6
	Definition of Terms	7
	The Hypothesis	8
	Research Design	8
	Data Collection	8
	The Survey	11
	The Null Hypothesis	12
II	REVIEW OF RELATED LITERATURE	13
	Theoretical Framework	13
	Group Versus Face-to-Face Interaction	13
	Effects of Feedback	15
	The Delphi Technique	16
	Literature about the Classic Delphi	17
	Literature about the Contemporary Delphi	18
III	THE PILOT STUDY	20
	The Survey Instrument	20
	Treatment of Pilot Study Data	21
	Reliability	21
	Factor Analyses	22
	The Revised Opinionnaire	27
	Grouping of Opinion Items	27
	Scoring of the Instrument	34
	Reading Level of the Instrument	35
	Naming the Instrument	37
	Summary	37
IV	INVESTIGATION PHASE	39
	Survey One	39
	Administering the Instrument	39
	Return of the First Survey	40
	Summarizing Survey One	41
	Factual Judgment Items Summarized	41



<u>Chapter</u>		<u>Page</u>
	Value Judgment Items Summarized	43
	Generating Feedback	45
	Survey Two	46
	Administering the Second Survey	48
	Returns of the Second Survey	48
	Summarizing Survey Two	49
	Factual Judgment Items Summarized	49
	Value Judgment Items Summarized	52
	Generating Feedback	53
	Survey Three	55
	Summarizing Survey Three	56
	Factual Judgment Items Summarized	59
	Value Judgment Items Summarized	59
	Investigating the Delphi Technique	60
	Testing Convergence of Opinion	61
	Testing for a Shift in Central Tendency	62
	F-Test of Undergraduate Response	63
	t-Test of Undergraduate Response	64
	F-Test of Faculty Response	64
	t-Test of Faculty Response	67
	F-Test of Administrators Response	67
	Confidence Limits of the Mean	68
	Chapter Summary	70
V	SUMMARY, CONCLUSIONS, RECOMMENDATIONS	72
	Summary	72
	Mechanics of the Delphi Technique	73
	Conclusions	74
	Substantiated Conclusions	74
	Observations	76
	Conclusions Itemized	77
	Recommendations	78
	BIBLIOGRAPHY	80
	APPENDICES	
	Appendix A	83
	Appendix B	87
	Appendix C	91
	Appendix D	95
	Appendix E	100
	Appendix F	104
	Appendix G	107

## LIST OF TABLES

<u>Table</u>	<u>Page</u>
1      Eigen Values of Random Data and Real Data	24
2      Spurious Items Found on the Preliminary Instrument	25
3      Factor 1 Items and Their Respective Loadings	28
4      Factor 2 Items and Their Respective Loadings	30
5      Factor 3 Items and Their Respective Loadings	32
6      Factor 4 Items and Their Respective Loadings	33
7      Influence of Direction of Factor Loading on Item Scoring	36
8      Mean Response to Factual Judgment Items on Survey One, For All Groups	42
9      Mean Responses to Value Judgment Items on Survey One, For All Groups	44
10     Overall Average of Responses to Survey One in Each of Four Factors	47
11     Mean Responses to Factual Judgment on Survey Two, For All Groups	50
12     Mean Responses to Value Judgment Items on Survey Two, For All Groups	51
13     Overall Average of Responses to Survey Two in Each of Four Factors	54
14     Mean Response to Factual Judgment Items on Survey Three, For All Groups	57
15     Mean Response to Value Judgment Items on Survey Three, For All Groups	58

<u>Table</u>		<u>Page</u>
16	Undergraduate Response to Survey One Compared With Undergraduate Response to Survey Three (Including F-Test Values, t-Test Values and Level of Significance)	65
17	Faculty Response to Survey One Compared With Faculty Response to Survey Three (Including F-Test Values, t -Test Values and Level of Significance)	66
18	Administrators Response to Survey One Compared With Administrators Response to Survey Three (Including F-Test Values, t -Test Values and Level of Significance)	69
19	Confidence Limits of the Means Produced in Survey Three	71

# AN INVESTIGATION OF THE EFFECTS OF FEEDBACK ON VARIABILITY AND CENTRAL TENDENCY OF GROUP OPINION WHILE EMPLOYING THE DELPHI TECHNIQUE

## I. INTRODUCTION

In an effort to circumvent the face-to-face communication problems associated with committee work, the Rand Corporation developed the Delphi Technique. The goal of this procedure was to obtain consensus without bringing individuals together in a face-to-face meeting. This was accomplished by having the individuals complete a series of questionnaires containing controlled feedback (Uhl, 1971). Proponents of the Delphi Technique have made enthusiastic claims about the power of the technique to produce a consensus. Moreover, the technique has been lauded for its ability to bring about a high degree of accuracy in forecasting technological advances. The Delphi Technique has also been praised for its ability to overcome the problems found in face-to-face meetings, such as, committees, panels, forums, etc. By overcoming the problems of face-to-face encounter the Delphi Technique has been reported to provide its results in a shorter time period than other methods designed to promote consensus. Supporters of the Delphi Technique have indicated that since the technique produces accurate results in a short period of time, there is a substantial reduction in financial investment. However, it would appear that the degree to which financial investment was reduced would be a function of the situation in which the Delphi Technique was used rather than an attribute of the technique. Recently

the Delphi has achieved wide acceptance as a method of research for identifying institutional goals. However, the process has become distorted from the true Delphi Technique as developed by the Rand Corporation. The original Delphi Technique used a small number of carefully selected experts to predict what will happen. The distorted version used a large number of randomly selected experts to predict what should happen (Cyphert and Grant, 1971). Moreover, recent attempts have initiated the process with a previously developed instrument. The traditional approach simply asks the experts to indicate their views on a particular issue in order to develop an instrument (Weaver, 1971).

With the before-mentioned differences in mind, both the traditional and the recent uses of the Delphi Technique follow the same basic procedure: (1) the results of the first survey are summarized and returned to the participants; (2) the participant is asked to re-evaluate his position and either change it or tell why he didn't; (3) the second survey is then summarized and the procedure is repeated. There may be three or more surveys done with feedback each time. The net effect of this process is to promote a convergence of opinion.

### The Problem

The Delphi Technique is used to promote convergence of opinion, or the reduction of the standard deviation of a distribution of responses.

Normally, however, some measure of central tendency is used to indicate the position of group opinion, not an indicator of variation such as standard deviation (Smith, 1970). It would appear that since the recent uses of the Delphi Technique involve more than 150 respondents (instead of small groups of experts, or committees) there is a need to investigate the significance of any change of the central tendency in the process. Consensus has been defined by other studies as the interquartile range (Cyphert and Gant, 1971). This definition, however, gives no indication of the significance of convergence of opinion--a major claim of the Delphi Technique.

#### Statement of the Problem

The primary problem of this study was to determine the effects of feedback on variability and central tendency of group response to the Delphi Technique. Questions to be answered by this study were:

1. When the Delphi process is used and factual judgments are asked for, is a significant change in central tendency effected?
2. When the Delphi process is used and value judgments are asked for, is a significant change in central tendency effected?
3. When the Delphi process is used and factual judgments are asked for, is a significant change in variance effected?

4. When the Delphi process is used and value judgments are asked for, is a significant change in variance effected?

#### The Purpose of the Study

The purpose of this study is to test the process of applying the Delphi Technique to research studies that involve the use of large and small samples. The findings of this study will indicate the appropriateness of applying feedback in surveys using large and small samples.

#### Need for the Study

Robert C. Judd, a Delphi user, has indicated that the Delphi Technique is enjoying increasing utilization in both industrial planning and identification of goals for education (1970). This is demonstrated by studies, to identify goals, performed by scholars like Cyphert and Gant (1971), Weaver (1971), Dalkey (1969), Anderson (1970), Chickering (1969), Uhl (1971) and others.

The study by Norman P. Uhl seems to typify the type of study that has recently been employed using the Delphi Technique, although modified to accommodate large samples. In his study Uhl surveyed a total of 989 respondents and selected his samples

from on-campus and off-campus groups as follows:

... students, selected by stratified random sampling in order that, whenever possible, a male and female were included from each academic department; faculty, selected by stratified random sampling in order that, whenever possible, each department was represented; all academic administrators, ... active trustees, ... active alumni, ... parents of the students, ... and leaders of community groups....

In his study Uhl surveyed the participants the first time with a previously prepared opinionnaire. He then provided the participants with feedback from that survey and had them complete a second survey. Feedback was again given to the participants and they were asked, for a third time to complete the survey (Uhl, 1971).

It can be seen from Uhl's study that the sample was both elaborate and large (as compared to an advisory committee). Furthermore, the summarizing of results and additional surveys constitutes a considerable amount of effort, not to mention cost. The significant issue, at this point, becomes the question: if the process does not provide a significant change in the opinion position, or variance, what is the reason for continuing beyond the initial survey? The point appears to be that since the process is being so widely accepted it will probably be considered for use in other similar studies in the future.. Information regarding the significance of convergence and



alteration of central tendency may be of great value in deciding if the additional cost of the feedback stages is warranted.

### Variables in the Study

When an appropriately selected sample of sufficient numbers is used there is less chance of differences between individuals becoming a significant factor (Best, 1970). Thus, for the purpose of this study variation in intelligence, personality, age, socio-cultural background, economic status, and marital status were not controlled. The variables that were controlled by this study, however, are discussed below.

Independent variable. This study considered two aspects of opinion and feedback of information as the independent variables in the following relationship:

1. Feedback of information concerning opinions involving factual judgment.
2. Feedback of information concerning opinions involving value judgment.

Dependent variable. For both of the above independent variables the following two dependent variables will be considered.

1. Changes in the central tendency of the sample.
2. Changes in the variance of the sample.

### Definition of Terms

Feedback. Providing the participants with general information about the central tendency of the entire sample for each item on the instrument, was considered feedback.

Convergence. Convergence (of opinion) was considered a significant reduction in the standard deviation of the responses to an item by the entire population.

Factual Judgment. Factual Judgment was considered the respondents perception of what the goals of the Industrial Education department were at the time of this study.

Value Judgment. Value Judgment was considered the respondents perception of what the goals of the Industrial Education Department should be.

Factor Analysis. Factor Analysis was the process of intercorrelating all pairs of scores, analyzing the intercorrelation matrix and extracting those groups of scores that account for the patterns of intercorrelation among items. The intercorrelation was between items on the instrument rather than respondents to the instrument, (this is known as the R-mode).

Factor. A factor was the correlated groups of scores identified by the factor analysis.

Overall Average. For the purpose of generating feedback, a mean of the individual sub-sample means was considered an overall average.

### The Hypothesis

This study deals with the general hypothesis as follows: when dealing with large groups, feedback will change the central tendency and variance of opinion. This is more clearly stated in the following four aspects of the general hypothesis.

1. Feedback of information about factual judgment produces a change in central tendency .
2. Feedback of information about factual judgment produces a change in variance.
3. Feedback of information about value judgment produces a change in central tendency.
4. Feedback of information about value judgment produces a change in variance.

### Research Design

Since the purpose of this study was the testing of a particular research procedure, (the Delphi Technique), the outcome of the survey

was of secondary importance. The main emphasis in the research design was the statistical study of the effects of feedback on opinion-naire type studies. In order to perform this type of test, data of an opinion nature was collected.

### Data Collection

Data was collected for this study in a manner consistent with the methods currently used in studies of this nature. This means that the procedure was initiated by the use of a previously developed instrument.

The Instrument. The instrument was developed by the investigator, based upon the form and style of those instruments that have been used in studies employing the Delphi Technique. In the development of the instrument consideration was given to the following areas:

1. Readability was assessed by the application of the Flesch formula for predicting readability (Fry, 1972).
2. Reliability was evaluated by the application of the Spearman-Brown formula for testing split-half reliability (Brown, 1971).
3. The validity of an opinion is a questionable issue. However, an effort to validate the instrument was undertaken by determining the content validity of the instrument.

4. The responses to the pilot study were factor analyzed in order to identify spurious items and to provide a basis for grouping of the items within the instrument.

Once the instrument was developed and tested by the pilot study, it was applied to population samples consistent with recent trends for studies using the Delphi Technique.

Sampling. In order to obtain samples that were truly representative of their population, random sampling was done. Where the population was less than 40, the entire population was surveyed (100 percent sample).

Analysis of Data. The data generated by the three surveys were analyzed by the following statistical procedures: The responses to each survey were analyzed to determine the mean response and standard deviation for each item on the instrument. This was done to provide feedback for the following surveys. In addition to providing statistics for the feedback a t-test was performed to test for a significant difference in mean responses to items on survey one and the same items on survey three. Bartlett's F-test was used to test for a significant difference in variance between responses to items on survey one and the same items on survey three.

## The Survey

As mentioned before, the purpose of this study was actually the testing of a particular research procedure. However, for a research procedure to be tested it had to be applied. Since the procedure involved the use of opinion feedback in a survey of opinions, this section of the text will be devoted to the survey itself.

Objective. Since one of the main uses of the procedure to be examined (the Delphi Technique) has been the identification of educational or institutional goals, then goal identification was the objective of this study. More specifically, the survey attempted to identify the goals of the Department of Industrial Education on the Oregon State University campus. The respondents were asked to give their opinion about the present goals (factual type of judgment) and they were asked to give their opinions about what the future goals should be (value type judgment).

Populations to be Surveyed. Samples were taken from the following populations: (1) undergraduate students from the department, (2) departmental faculty, (3) university administrators, (4) employers of graduates from the department, and (5) recent graduates of the department.

### The Null Hypothesis

As indicated before, this study tested four hypotheses:

$$H_{0_1} : \sigma_1 = \sigma_2 \quad (P = .01)$$

There is no significant difference in variance between the results of the first survey (without feedback) and the third survey (with feedback) on items calling for value judgment.

$$H_{0_2} : \sigma_1 = \sigma_2 \quad (P = .01)$$

There is no significant difference in variance between the results of the first survey (without feedback) and the third survey (with feedback) on items calling for factual judgment.

$$H_{0_3} : \mu_1 = \mu_2 \quad (P = .01)$$

There is no significant difference in central tendency between the first survey (without feedback) and the third survey (with feedback) on items calling for value judgment.

$$H_{0_4} : \mu_1 = \mu_2 \quad (P = .01)$$

There is no significant difference in central tendency between the results of the first survey (without feedback) and the third survey (with feedback) on items calling for factual judgment.

## II. REVIEW OF RELATED LITERATURE

There seemed to be two logical subdivisions of the literature related to this study: (1) literature relating to the use of the Delphi Technique, and (2) literature providing a theoretical framework for both the study and the technique.

### Theoretical Framework

Since this particular process involves the use of feedback with groups of people, there seemed to be two major areas to investigate: (1) group behavior relevant to the process, and (2) feedback and its effect on group communication.

### Group Versus Face-to-Face Interaction

One of the central aspects of group (committee) action is that of problem solving. In a carefully controlled study, by Rotter and Portugal, the effects of group efforts (versus individual efforts) at problem solving were tested. Productivity of solutions was the criterion used. It was determined that individual problem solving was significantly more productive than group problem solving. It was also concluded that the reason a combined approach was often more successful than a group approach alone was the fact that the



combined effort used a small amount of individual problem solving (1969). The findings of Rotter and Portugal are borne out by parallel studies performed by Dunnette et al. (1963), Taylor et al. (1958), and others.

A study allied to the one performed by Rotter and Portugal was done by Bouchard and Hare. In this study half of the subjects brainstormed individually while the other half worked in groups of five, seven and nine. The results of this study seemed to indicate the same pattern as found by Rotter and Portugal. In the discussion of the study Bouchard and Hare say, "Although our major results are disappointing to proponents of group problem solving, they clearly do not preclude further research on the problem" (1970).

John P. Campbell, of the University of Minnesota, has published the results of a study, entitled, Individual Versus Group Problem Solving In An Industrial Sample. In this study Campbell indicated that the group effort was inferior to the average individual solution. He also stated that, "Groups seemed to settle very early on a particular line of attack, and alternative work procedures were seldom explored in the group discussion" (1968).

It appears, from the foregoing studies, that there are some serious problems associated with face-to-face communication. Perhaps the three major problems encountered are:

1. Group opinion is influenced a great deal by dominant individuals who frequently talk the most, even though there is little correlation between pressure of speech and knowledge.

2. Much discussion in group situations is often irrelevant or biasing because it is usually concerned with interests other than the problem at hand.

3. Group pressure to conform can distort individual judgment (Asch, 1958).

Another aspect of face-to-face interaction was approached by Arie Y. Lewin, et al. The judgmental process of peer rating was studied to determine the significance of face-to-face interaction. The conclusion arrived at in this study was that "face-to-face interaction is not a critical variable in this judgmental process."

It has also been shown, in a study by Richard Centers et al. , that people identified, by the study, as authoritarian tend to be influenced by what they think is expert opinion (1970).

### Effects of Feedback

In a study performed to determine the effects of group variance on conformity, it was discovered that when feedback was controlled to indicate agreement a significant change in opinion occurred. However, when the feedback was altered to indicate disagreement, on the issue, the change in opinion was not significant. It should be noted

that the number of participants in this study was small and the subjects were allowed to meet face to face, although the feedback was altered as an independent variable and did not necessarily indicate the true opinion of the group (Jastrebske and Rule, 1970).

Another study, entitled, Group Feedback Analysis, was done using several small groups given feedback from the completion of a questionnaire. The feedback was given to the groups while they were meeting face-to-face and the ensuing discussion was recorded. The information from the recording provided the final data. The investigator Frank A. Heller, indicated that the process used in his study should probably be investigated from a cost-effectiveness standpoint (1969).

### The Delphi Technique

At this point there should be a distinction made between the original Delphi, as developed by the Rand Corporation, and the distorted version that is currently being used with large samples. For that reason the literature on the Delphi Technique will be grouped into two separate divisions. The first major division will be devoted to the classic Delphi and the second will be given to the distorted process.

### Literature about the Classic Delphi

Since the Rand Corporation performed much of its work with the Delphi Technique while under Civil Defense contracts, much of the literature was unobtainable due to security regulations. The earliest literature found by this investigator was produced by the Rand Corporation in 1963. This was an eight-page mimeograph report of some considerations for the use of the Delphi Technique (Helmer, 1963). Probably the next development in the Delphi was in 1964 when the process was used as an experimental trend-predicting exercise, again by the Rand Corporation (Gordon and Helmer, 1964). What appears to be the next major step in the growth of the Delphi Technique, and probably the one that started interesting educators, was the work of Helmer in forecasting innovations in educational methods and budget allocations to achieve these innovations (1966).

Critics of the Delphi Technique seemed to recognize that there was convergence of opinion taking place but questioned the accuracy of predictions. In 1968 the Rand Corporation released a thirteen-page mimeographed report on some experiments focused on the use of information that could be verified. The results indicated the Delphi was accurate (Dalkey, 1968). Since 1968 the Delphi process has been used by the Rand Corporation in numerous studies such as: predicting political feasibility (Dror, 1969), exploration of evaluation versus judgment (Rescher, 1969), improving the creativity of

company research (Schmidt, 1971), and predicting the state of computer technology by 1980 (Blackwell, 1971). It should be noted that all these studies used small groups of carefully selected experts for the Delphi Technique.

### Literature about the Contemporary Delphi

Some observations were made by Cyphert and Gant, based on their study to identify goals for a school of education. These observations include: (1) participants must be made to feel like an important part of the study so they will take part, (2) variation in agreement ranged greatly from one individual to another, (3) when feedback was tampered with it could be used to mold opinion, (4) respondents that disagreed with the consensus attributed the consensus to a group other than the one they were in, (5) if consensus occurred it would do so by the third questionnaire.

Cyphert and Gant used an initial sample of 421 persons and completed the study with sixty-two percent of those responding to the final questionnaire. The population was taken from faculty, administrators, politicians, newspaper editors, and educators of national reputation. The questionnaire contained sixty-one items (1971).

W. Timothy Weaver, a research fellow at Syracuse University, indicates that the Delphi has some fundamental weaknesses. These weaknesses have to do with interpreting the significance of convergence of opinion. Weaver also indicates that at present the Delphi

Technique cannot make any distinction between reasonable judgment and mere guessing. Moreover, the method does not distinguish priority and value statements from rational arguments (1971).

Robert C. Judd, chairman of the Department of Operations Analysis at the University of Toledo, has some positive things to say about the Delphi Technique. Judd used the process in the development of a new curriculum and used the faculty as the respondents. About the experience, Judd (1970) makes this comment:

We came out of this Delphi experience with a highly innovative and experimental type of curricular [sic] program that has been adopted by an extremely conservative faculty.

Judd (1970) also mentions some limiting factors to the Delphi Technique. Among these factors are a need for dedication of the respondents in answering the several questionnaires and the fact that his planning committee was "always on a crash schedule in getting the several questionnaire instruments prepared and circulated."

In Uhl's (1971) comprehensive study using the Delphi Technique, the central tendency is shown to shift in some cases and to remain stationary in others. Furthermore, although convergence was demonstrated to occur in most cases, there was an occasional divergence of opinion.

### III. THE PILOT STUDY

During the regular summer term of 1972, on the campus of Oregon State University, 75 undergraduate and graduate students were asked to take part in a study designed to help identify the goals of the Industrial Education department. In fact, however, the data that were collected were used only for perfecting the survey instrument. The students were asked to make note of any item that was confusing ambiguous, or otherwise troublesome since the instrument would be used again the following school year. Thus, the opinionaire was administered in an actual survey setting.

#### The Survey Instrument

The survey instrument used in the pilot study was developed from 38 items from an instrument used by N. P. Uhl, while identifying institutional goals at several universities. These items were modified slightly to fit the present study and an additional five items were developed by the investigator. These 43 items were grouped according to their apparent orientation. Five groups were identified from this face-validity standpoint. The five groups were: student oriented goals, faculty oriented goals, vocationally oriented goals, institution oriented goals, and society oriented goals. This grouping of items was evaluated for content validity by graduate students in the

department of industrial education, the research specialist at the Oregon Board of Education, two professors from the psychology department, and the psychometrist from the Oregon State University counseling center. On suggestions from these evaluators the items were placed in order very carefully so that items from one particular group would not appear, on the opinionnaire, next to another item from the same group. Consideration was also given to establishing a positive set (toward the survey form) with the respondent. This was done by placing easy items first. Easy items were considered to be items that were not controversial yet were of a nature that the respondent would probably have an opinion. The items were also ordered such that each group was equally represented in odd numbered items and even numbered items (for the sake of testing internal consistency by a split-half correlation).

#### Treatment of Pilot Study Data

The data generated by the pilot study was analyzed by the following statistical procedures.

#### Reliability

Reliability was tested by treating an odd-even, split-half correlation coefficient with the Spearman-Brown formula. The resulting reliability score was 0.48. This seems to fall in an acceptable range



since the instrument deals with opinions that can be neither right nor wrong and considering that the reliability of most classroom tests fall between 0.75 and 0.80 (Brown, 1971).

### Factor Analysis

The data from the pilot study was factor analyzed to more accurately determine the proper grouping of items. The basic procedure for the factor analysis involves intercorrelating all pairs of scores, analyzing the intercorrelation matrix and extracting the factors needed to account for the pattern of intercorrelations among items. There are two basic techniques: the R-mode and the Q-mode. The Q-mode would tend to group (by intercorrelation) respondents in respect to how they responded to the items. The R-mode would tend to group items with respect to how they were responded to. Thus the R-mode was used. Computer center facilities at Oregon State University were utilized for data processing.

When using the technique of factor analysis, one problem was determining the proper number of factors to isolate. This problem was greatly reduced by plotting the eigen values of each of several factors for both real data and random data. The point at which the

real data achieved a higher eigen value was used as an indication of the number of factors to be used (Sundstrom, 1972). (See Table 1).

Another problem occurred when the investigator attempted to determine the lowest acceptable factor loading value. This problem was lessened by determining the standard error of the factor loading ( $1/N$ ) and multiplying that value by 2 or 2.5 (or values within that range). This yielded the lowest acceptable value of 0.3800 (Weiss, 1971). It would appear that cut-off values higher than this would be acceptable also, particularly if the lower values cause other problems such as numerous items loading into several different factors at the same time.

The factor analysis of the pilot study data (and random data) indicated four factors were appropriate. The four factors loaded 30 items with factor loadings of .4300 or higher. The 13 items that did not load at a sufficiently high level were considered to be spurious items and deleted from all additional survey instruments. (See Table 2 for spurious items.) These 13 deleted items dictated a revision of the original opinionnaire.

Table 1. . Eigen Values of Random Data and Real Data.

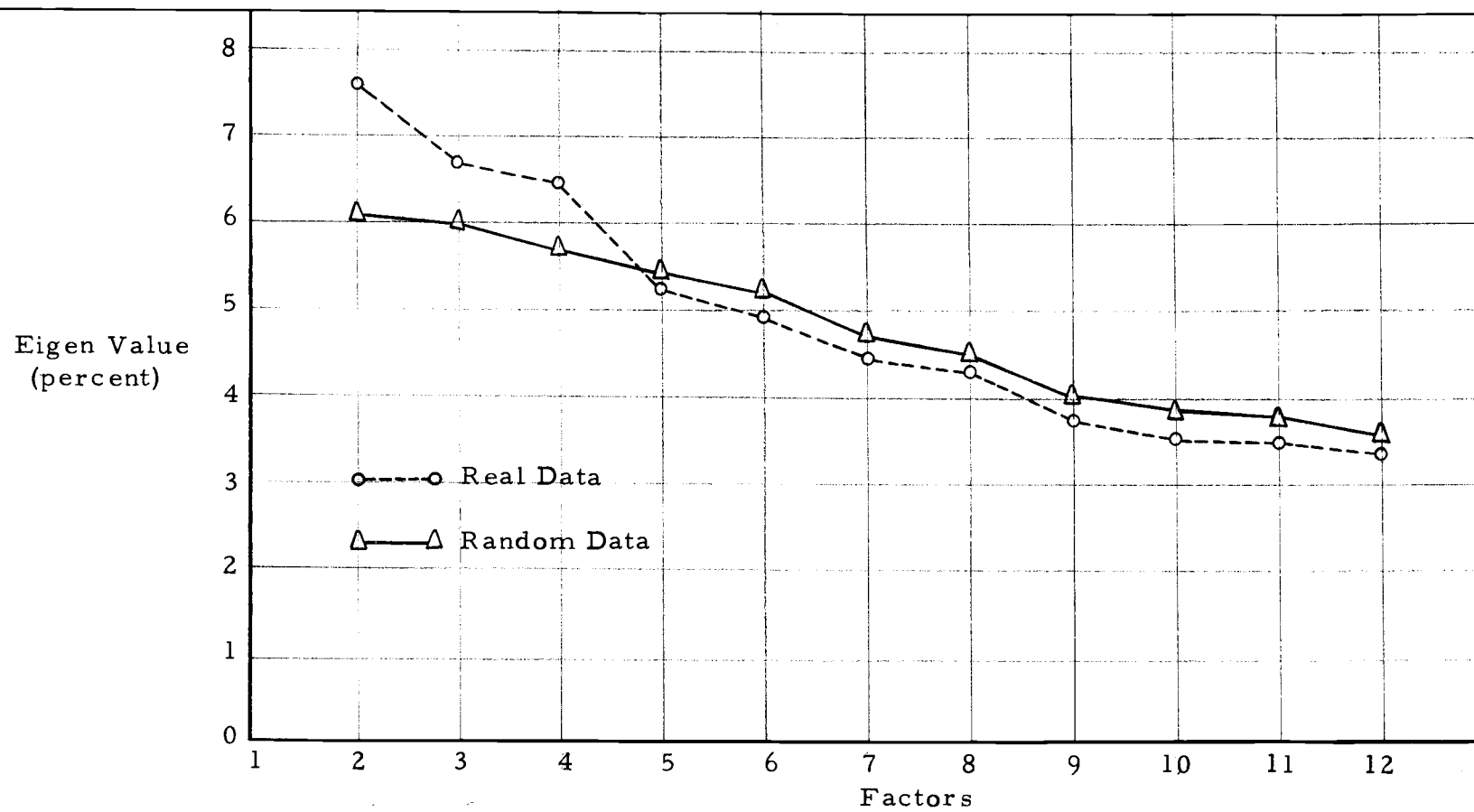


Table 2. Spurious Items Found on the Preliminary Instrument.

Preliminary Number	Goal Statement	Factor			
		1	2	3	4
3	To provide the student with up-to-date laboratory equipment	.12633	-0.32091	-0.16714	-0.17257
7	To provide an opportunity for students to acquire a broad understanding of the variety of occupational possibilities	.13042	-0.33410	.22806	-0.39257
8	To help the students to develop competency as a teacher	-0.13165	-0.29989	.20347	.04266
9	To experiment with new forms of instruction	.42602	.14698	.05351	.13857
17	To increase the desire and abilities of students to undertake self-directed study	.18362	-0.34250	-0.13111	-0.18639
20	To provide an opportunity for re-education and retraining those whose vocational capabilities have become obsolete	.42559	-0.09151	-0.27890	.20497
22	To conduct research which may facilitate the solution of specific social economic, or technical problems	.19259	-0.28509	-0.18037	.42869
28	To avoid having the reputation of the department damaged by the action of a few students or faculty	.11750	-0.37673	-0.14054	.18158

Table 2. Continued.

Preliminary Number	Goal Statement	Factor			
		1	2	3	4
32	To encourage mutual trust and respect among faculty, students, and administrators	.35723	-0.34861	.17096	-0.02804
34	To help students achieve positions of status and leadership in society	.17774	-0.33076	-0.06322	.17648
37	To serve the higher education needs of youth from the surrounding community	.27962	-0.33843	-0.04122	.23596
42	To ensure that all those who are affected by a departmental decision have an opportunity to express their views on it before it is made	.30670	-0.32227	-0.19148	-0.35958
43	To assist graduates from the department to obtain suitable employment	.11611	-0.24364	-0.38597	.03218

### The Revised Opinionnaire

The revised instrument consisted of the 30 items comprising the four factors. The items within each of the four factors were examined to assess common content and identify the area of commonality. The examination of these items identified one distinct area of concern for each factor. Factor one contained 11 goal statements concerning student development in the affective domain. Factor two contained 10 goal statements concerning student development in the cognitive domain. Factor three contained five goal statements concerning curriculum flexibility. Factor four contained four goal statements concerning a student oriented faculty. Tables 3-6 show the items within each factor and their loading.

### Grouping of Opinion Items

The items were grouped on the revised opinionnaire by the factor to which they belonged. All items contained in factor two were placed first on the revised opinionnaire. This was done in an effort to establish a positive set toward the test, in the respondent, since the items of a cognitive nature appear straight-forward and easy to respond to. Items from factor one were placed immediately after the items from factor two since they both dealt with student development (one in the cognitive domain and the other in the affective

Table 3. Factor 1 Items and Their Respective Loadings.

Preliminary Number	Revised Number	Goal Statement	Factors			
			1	2	3	4
2	18	To prepare students for the duties and responsibilities of citizenship	.48549			
12	15	To enable students to develop a set of principles to guide their behavior	.59243			
16	11	To help students to see members of religious groups, minority groups, etc., as individuals rather than as members of a particular group	.68910			
19	16	To provide some form of education for any student, regardless of his academic ability	.58525			
24	19	To ensure the right of students to engage in off-campus political and social activities without fear of reprisal from the department	.47705			
25	20	To protect a faculty member against intimidation by those who do not approve of ideas he may present in the classroom	.45345			

Table 3. Continued.

Preliminary Number	Revised Number	Goal Statement	Factors			
			1	2	3	4
29	14	To allocate percentages of total enrollment for minority groups or groups having low socio-economic status	.62650			
31	13	To help students learn how to change society	.63488			
33	21	To provide educational opportunities for adults in the local area	.43546			
36	12	To promote concern in students for the well being of others	.65551			
41	17	To provide a supportive environment for highly creative individuals	.50878			



Table 4. Factor 2 Items and Their Respective Loadings.

Preliminary Number	Revised Number	Goal Statement	1	2	3	4
1	9	To help the student develop his technical skills		.49417		
5	4	To attract faculty who are technically well qualified		.52630		
6	10	To help students develop a respect for their own abilities and an understanding of their limitations		.43777		
10	2	To help students develop the ability to synthesize knowledge from different sources		.56914		
21	8	To help students develop the ability to speak and write effectively		.51099		
23	3	To help students acquire depth in at least one area of knowledge		.54796		
26	6	To help students develop the ability to apply critical thought to all areas of life		.51570		

Table 4. Continued.

Preliminary Number	Revised Number	Goal Statement	Factors			
			1	2	3	4
27	5	To help students acquire the ability to adapt to new occupational requirements as technology and society change	.44141	.51686		
30	1	To help students develop the capacity to assume leadership		.59343		
35	7	To provide a continuing plan of curricular and instructional evaluation		.51271		

Table 5. Factor 3 Items and Their Respective Loadings.

Preliminary Number	Revised Number		Factors			
			1	2	3	4
13	25	To ensure that students will be well qualified for a vocation			-0.50158	-0.43141
14	26	To permit an undergraduate student wide latitude in selecting the courses he will take toward his degree			-0.45588	
15	22	To clearly define the purposes which the department will serve, according to a long-range plan			+ .57196	
39	23	To innovate in developing educational programs for special categories of students e. g. disadvantaged, very bright, foreign students, etc.			-0.51814	
40	24	To help the student develop competency as an industrial manager or supervisor			-0.51548	

Table 6. Factor 4 Items and Their Respective Loadings.

Preliminary Number	Revised Number	Goal Statement	Factors			
			1	2	3	4
4	27	To help students in the choice of a personally satisfying vocation				-0.55636
11	29	To base faculty promotion and tenure more on an estimate of teaching effectiveness than on the value of scholarly research				-0.43858
18	28	To attract faculty who have distinguished themselves through research and scholarly contributions				+ .53507
38	30	To maintain an atmosphere of intellectual excitement among faculty, students, and administrators				+ .43823

domain). Items from factors three and four followed in that order.

No attempt was made to randomize the distribution of the items within the instrument for several reasons.

1. The covert nature of the items was such that leaving them in their groups did not appear to reveal the objective of the group.
2. Having all items in a particular factor adjacent to one another rendered the instrument easier to score.
3. The data generated by the instrument would lend itself better to machine processing by the Oregon State University computer facility.

### Scoring of the Instrument

In order to obtain meaningful scores from the instrument a valid scoring key was necessary. Since a five point Likert-type scale was used, the only major consideration was the relationship of each item to the rest of the items in a particular factor, or group. If all items within a particular factor loaded in the same direction (positive or negative loading) then the Likert-type scale was kept consistent. With all items loading in the same direction the Likert scale, with a value of one assigned to no importance and five assigned to very great importance, was used. However, if a particular factor contained factor loadings in two directions (positive and negative) then factors containing

the positive loading would be assigned an inverse Likert scale, i. e. , one for very great importance and five for no importance. (For an example, see Table 7).

The positive and negative manipulation of the Likert-type scale was an effort to provide consistently meaningful results when computing means and variances of survey data.

### Reading Level of the Instrument

Consideration was given to the readability of the instrument. The Flesch formula for readability was applied to the pilot study instrument and the revised instrument. This formula makes use of average sentence length (words per sentence), the number of syllables per 100 words, two multiplication factors and a constant from which the foregoing is subtracted according to the following formula:

$$\text{Readability} = 206.835 [ (1.015 \times W) + (0.846 \times S) ]$$

where:

W = Words per sentence

S = Syllables per 100 words

After treating the pilot study instrument with this formula the readability score was 43.235. The readability score of the revised questionnaire was 47.235. Both instruments fell within the range of college level reading, which is between scores of 30 to 50 using the above formula.

Table 7. Influence of Direction of Factor Loading on Item Scoring.

Direction of Factor Loading		Likert Scale Method of Scoring				
+ .53507	To attract faculty who have distinguished themselves through research and scholarly contributions	5	4	3	2	1
-0.43858	To base faculty promotion and tenure more on an estimate of teaching effectiveness than on the value of scholarly research	1	2	3	4	5

Note: When the direction of factor loading (+ or -) is positive the Likert scale is reversed.

### Naming the Instrument

The opinionnaire was given the name of Survey of Departmental Goals (SDG). A logo was developed for the initial page of the instrument to provide it with a professional appearance. This attention to detail was done to further instill a positive set in the respondent due to the official appearance of the instrument.

### Summary

A preliminary instrument containing 43 items was developed for the purpose of determining goals of the department of Industrial Education. This instrument was used under survey conditions for the purpose of supplying data for testing and revising the form of the opinionnaire. The instrument tested sufficiently high with respect to reliability, yet not high enough to hinder efforts of the Delphi Technique to promote convergence (or reduction of the variance). Factor analysis of the data led to identifying four factors, or groups, of items. Factor analysis also indicated 13 items on the preliminary instrument related to the rest of the items only slightly. They were deleted from the revised instrument, which consisted of 30 items in four separate groups. The groups were: student development in the affective domain, student development in the cognitive domain, curriculum



flexibility, and student oriented faculty. The factor analysis further indicated that there was a need of special scoring techniques, which were accounted for in the format of the revised opinionnaire. Reading level of the instrument was tested and proved to be appropriate for the population.

Throughout the development of the instrument, an effort was made to provide the respondent with a positive set toward completing the instrument and completing it accurately. This was manifested in the organization of the items as well as the general format of the test.

#### IV. INVESTIGATION PHASE

This chapter has been devoted to the survey techniques used and the mechanics of the Delphi Technique. A second major subdivision of this chapter will discuss the treatment of the data developed in the investigation of the Delphi Technique.

##### Survey One

The instrument used in the first survey of the Delphi Technique was the Survey of Departmental Goals. The form of this instrument was developed in the pilot study and is discussed in Chapter III of this dissertation. The Survey of Departmental Goals is found in Appendix A.

##### Administering the Instrument

The Survey of Departmental Goals was administered either by mail, personal delivery or in the classroom depending upon the population from which the participants came. The instrument was mailed to 14 graduates of the Industrial Education Department and their employers. Administrators from within the School of Education were delivered the instrument in person and asked to return it by mail to insure anonymity. Undergraduate Students were surveyed, through the cooperation of the faculty, in their classes. Every student in every undergraduate Industrial Education class, offered in Winter Term

1973, was asked to complete the Survey of Departmental Goals. The faculty were asked to complete the form while administering the Survey of Departmental Goals to their students.

### Return of the First Survey

The undergraduate population surveyed returned a total of 72 opinionnaires, 17 of which were incorrectly completed. The remaining 55 returns were used in the statistical treatment of the data. Out of the 55 acceptable responses three were freshmen, 14 were sophomores, 15 were juniors and 23 were seniors.

At the time of this survey the Industrial Education Department consisted of nine teaching faculty members. Eight faculty members were given the Survey of Departmental Goals with six being returned. This consisted of 75 percent of the eligible faculty.

Seven administrators from the School of Education were given the Survey of Departmental Goals with five being returned. This consisted of 71.4 percent.

The Survey of Departmental Goals was mailed to 14 recent graduates of the Industrial Education Department (graduating in 1971 or 1972). The criteria for the selection of these 14 respondents were the recentness of their contact with the University program and the fact that they were teaching in Oregon schools. These 14 teachers were also asked to have their immediate supervisor complete a copy of the

Survey of Departmental Goals. Out of the 14 graduates of the department only five responded giving a return of 35.8 percent. Out of the 14 employers of those graduates only four responded. Thus, only 28.6 percent of the employers returned the survey instrument.

### Summarizing Survey One

The summarizing of data consisted of determining the mean response of a particular group of respondents to each item on the Survey of Departmental Goals. Respondents were grouped in the following five categories: Undergraduate Industrial Education Majors, Industrial Education Faculty Members, Administrators from the School of Education, Recent Graduates from the Industrial Education Department and Employers of Recent Graduates from the Industrial Education Department. Responses were given a code number to identify the group from which they came. The coded responses were transferred to Hollerith (key punch) cards and entered into storage in the Oregon State Computer (Control Data Corporation Model Number 3300). The computer was then used for data processing.

### Factual Judgment Items Summarized

Table 8 presents a comparison of the means, for each group, on factual judgment items. It is interesting to note that the

Table 8. Mean Response to Factual Judgment Items on Survey One, For All Groups.

FACTUAL JUDGMENT ITEMS (is)																															
Cognitive Domain (factor 2)											Affective Domain (factor 1)										Curriculum (factor 3)					Faculty (factor 4)					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
5.0																															
4.8																															
4.6																															
4.4																															
4.2									A																						
4.0			A	A			A													A					A						
3.8																															
3.6					A					A						A		A										A		A	U
3.4	FA	FA		U							A	A										U									
3.2		U		F								F																	A		FA
3.0					U		U	A	U						A				A									U			
2.8	U		F		F	F	U			U		U				U	FA	U	F						U				U		
2.6					UA	F		UF	F		F		A		FU	U	FA	F		U	UA	F	FA	U	U	U	U	U	F	F	U
2.4		U								F			U	UA					U			A	U	A	F	F	F	F	F		
2.2											U																				
2.0													F							F											
1.8																F															
1.6																															
1.4																															
1.2																															
1.0																															
A - Administrators											U - Undergraduate																				
F - Faculty																															

responses for administrators were generally quite high whereas, the responses of the faculty group were generally quite low. Often the administrators offered the highest rating to a particular item and the faculty gave the lowest rating to the same goal. Since these goals were to be rated with regard to their present importance, two speculations seem in order: Either the faculty were overly critical of their efforts and the administrators pleased--or, the communication between faculty and administrators was in need of attention. These speculations may or may not be true, however, the dichotomous responses to items, such as item 20, is evidence that there was a definite difference in perception of the importance placed on that particular goal, at the time of the survey.

While item 20 provides an example of dichotomous response, item six was just the opposite. The mean response of all groups tended to cluster together between 2.62 and 2.83. This appeared to be a consensus of opinion.

#### Value Judgment Items Summarized

Table 9 presents a comparison of the means, for each group, on value judgment items. Administrators, again, tended to place more importance on items as indicated by their generally high response. However, no single group consistently responded with low ratings. The item with the greatest range of responses (both high and

Table 9. Mean Responses to Value Judgment Items on Survey One, For All Groups.

VALUE JUDGMENT ITEMS (Should Be)																															
Cognitive Domain (factor 2)											Affective Domain (factor 1)										Curriculum (factor 3)					Faculty (factor 4)					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
5.0																															
4.8																															
4.6																															
4.4					A																	F									
4.2	U	A	A	U	U	A	A		AU	A	A	A		A		A	A								U	U	U			A	
4.0	F	F	F	F				F				U				U	F				U	A	A	F	F	A	FA				
3.8	A	U	U	A				UF	A	F	UF	F	U																		
3.6					F	F		U						A		U	F			F				U	U	A	F		F	FU	
3.4						U					U				U	F					FA								F	A	F
3.2																			U												
3.0																		F	A		F	U	F					U			
2.8													U	FU								A						A			
2.6																															
2.4																F															
2.2																															
2.0																															
1.8																															
1.6																															
1.4																															
1.2																															
1.0																															
A - Administrators											U - Undergraduate																				
F - Faculty																															

low ratings) was item 14. This item was concerned to some extent with minority groups. Item 11 also dealt with minority groups and the range of response was also great on this item. It seems interesting to note that administrators placed high importance on both of these items. Graduates, however, responded to these items with the lowest importance rating of any group. This may suggest that the administrators responding were somewhat liberal in their outlook while the graduates responding tended to be much more conservative. With regard to this issue, all groups responded noticeably lower on item 13; "To help students learn how to change society." This pattern of response seems consistent with the conjecture that Oregon State University has traditionally been a conservative campus.

As in the factual judgment items, a consensus of opinion seems to occur in value judgment items one, two and nine. Mean scores tended to cluster between a low of 4.00 and a high of 4.37. All three items were from those in factor two, dealing with student development in the cognitive domain.

### Generating Feedback

The overall average response to each item was determined by treating the mean response for each group as an individual score. The mean of these scores were then determined for each item on the Survey of Departmental Goals. In this manner each group contributed



equally to the overall average regardless of the size of the group. Although the technique was not precise it was acceptable since the scores were to be severely rounded-off. This overall average was the figure used for feedback in survey two (Table 10). Some speculation might be drawn from the consistency of responses to the items contained in factor two, (relating to the Cognitive Domain). In factors one and three the is items fluctuate but response to items in factor two all fall at three. Investigation of the overall average response to should be items show that while factors one, three and four fluctuate between three and four, the responses to all items in factor two fell at four.

Any attempt, at this point, to determine why this consistency occurred in only one group would be pure speculation. However, the items concerning student development in the cognitive domain seem to be of a less controversial nature than items of the other three factors.

### Survey Two

The Survey of Departmental Goals was used in the second survey. In addition the respondents were given information about the results of the first survey. This feedback took the form of a mark in the location of the mean response for each item on survey one. The participants were asked to consider the feedback when responding

Table 10. Overall Average of Responses to Survey One in Each of Four Factors.

Item Number	Factor 1		Factor 2		Factor 3		Factor 4	
	Affective Development		Cognitive Development		Curriculum Flexibility		Student Oriented Faculty	
	is	should be	is	should be	is	should be	is	should be
1			3	4				
2			3	4				
3			3	4				
4			3	4				
5			3	4				
6			3	4				
7			3	4				
8			3	4				
9			3	4				
10			3	4				
11	3	4						
12	3	4						
13	2	3						
14	2	3						
15	3	3						
16	3	3						
17	3	4						
18	3	3						
19	2	3						
20	3	4						
21	3	3						
22					3	4		
23					3	3		
24					2	4		
25					3	4		
26					3	4		
27							3	4
28							3	3
29							3	3
30							3	4

to the second Survey of Departmental Goals. The Survey of Departmental Goals format for survey two can be seen in Appendix B.

#### Administering the Second Survey

The procedure used for the first survey was followed for survey two, with one exception; the cover letter sent to recent graduates and their employers was worded in such a manner as to stress, very strongly, the importance of a rapid, but accurate, response to the second Survey of Departmental Goals. This was done in an effort to increase responses.

#### Returns of the Second Survey

The undergraduate population surveyed produced a total of 63 completed opinionnaires, three of which were incorrectly completed. The remaining acceptable responses (60) compares favorably with survey one (55). Out of the 60 acceptable respondents four were freshmen, 16 were sophomores, seven were juniors, 26 were seniors and seven indicated undergraduate without specifying status.

Out of the eight Industrial Education faculty members six again, responded to the second survey. This comprised 75 percent of the faculty surveyed.

The administrators from the School of Education returned five

responses. Since seven were administered this constituted 71.4 percent of those asked to respond.

The Survey of Departmental Goals was mailed to the same 14 recent graduates of the Industrial Education Department and their immediate supervisors. Out of these 28 participants only three recent graduates responded. This constituted 21.4 percent of the recent graduates and no employers of those graduates. Since the employers did not contribute to this phase of the study they were deleted from further input. They would not have adequate exposure to the feedback.

#### Summarizing Survey Two

The steps taken to summarize survey one were followed in the summarization of the second survey. The same grouping of respondents was used and the means and standard deviations for those groups were obtained. Likewise, Table 11 presents the mean response made by each group, for each item dealing with factual judgment. Table 12 presents the same information for items dealing with value judgments.

#### Factual Judgment Items Summarized

By comparing Table 8 with Table 11 several observations were made; 1) the distance between extreme means was decreased

Table 11. Mean Responses to Factual Judgment on Survey Two, For All Groups.

FACTUAL JUDGMENT ITEMS (is)																																
Cognitive Domain (factor 2)											Affective Domain (factor 1)										Curriculum (factor 3)					Faculty (factor 4)						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
5.0																																
4.8																																
4.6																																
4.4																																
4.2																																
4.0																																
3.8																																
3.6			A	A																												
3.4	F								A													A			A							
3.2	A				AF												A										A					
3.0	U	UF		UF			A		F	AF		A						A		F		F			F	A		A		A		
2.8			F	F	U	A	U	A	U	U	A				AUF	UA					A	FA			A		F	U	F	U	A	
2.6			U			U		UF				U					U				U			A	U	U	F	U	U	UF	U	
2.4					F						U			A		F					U		U	U							F	
2.2											F				U				F						U							F
2.0														UF	FA					U					F							
1.8																																
1.6																																
1.4																																
1.2																																
1.0																																
A - Administrators F - Faculty U - Undergraduate																																

Table 12. Mean Responses to Value Judgment Items on Survey Two, For All Groups.

VALUE JUDGMENT ITEMS (Should Be)																															
Cognitive Domain (factor 2)											Affective Domain (factor 1)										Curriculum (factor 3)					Faculty (factor 4)					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
5.0																															
4.8		F															F														
4.6			A	F	FA	F	F			F																					F
4.4	F	A				A		AF			F	AF			F							F			F		F				
4.2	A		F	AU					AU	A								F		F	F	F	AU	F	F	AU	U	F			A
4.0	U		U		U		AU		F		A						U		F								F				
3.8		U				U		U		U		U					A	A											F		U
3.6											U		F			A	U				U		A			A	A	A	A	U	
3.4													A	AF	AU	F		U			A	U			A						F
3.2																								U	A						
3.0												U								AU								U			
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1.0																															
A - Administrators											U - Undergraduate																				
F - Faculty																															

on some items while on other items the distance increased, 2) the dichotomy between administrators and faculty was no longer obvious, 3) the graduate group changed its mean response on many items by large amounts (as great as 1.2 points on the 5 point scale).

An example of the distance between extreme means decreasing was item 19. On survey one the mean responses ranged from 1.5 to 3.0, a range of 1.5. On survey two, however, the mean responses ranged from 2.0 to 2.3, a range of 0.3. This represented a decrease of 1.2 points on a 5.0 point scale. On the other hand, item 17 had a range of mean responses from 2.6 to 2.8, a range of 0.2. On survey two, however the scores ran from 2.3 to 3.2, a range of 0.9. This represents an increase in range of 0.7 on the same 5.0 scale.

This apparent changeability of response may have been due to education of the respondent since survey one or a change in mood, environment, or some other possible variable.

#### Value Judgment Items Summarized

Table 12 provides the mean responses of the groups, to value judgment items. The mean response of the graduate group tended to fluctuate dramatically between high importance and low importance, with little temperance. Among the highest scores recorded (4.67) were those of the graduate group, likewise, the lowest score recorded was that of the graduate group (2.0). The investigator would

have seriously questioned the reliability of these responses. However, the high marks occurred when the rest of the groups tended to rate high and the low marks occurred when the rest of the groups tended to rate the goal of lower importance. It appears, however, that the range of means within each item did not decrease with the consistency encountered in factual judgment items. Item 20, for example has a much greater range (1.87 points range on a 5.0 scale) on survey two. Even if the extreme score of the graduate group is ignored the range is still 0.5 points greater on survey two. The investigator can give no reason for the behavior of this type of judgment on the second survey.

### Generating Feedback

Table 13 presents the overall average responses for all items on the second Survey of Departmental Goals. By comparing the data contained in Table 10 with those in Table 13 it can be seen that a shift in the overall average response occurred in eight items between survey one and survey two. Items 13, 15, 18, 21, 23 and 29 increased one point while items 20 and 24 decreased one point. Since these numbers were severely rounded-off, these changes should not be considered significant--merely observations made from the feedback data. One interesting observation, however, is the fact that not one of the items dealing with cognitive development made any shift in



Table 13. Overall Average of Responses to Survey Two in Each of Four Factors.

Item Number	Factor 1		Factor 2		Factor 3		Factor 4	
	Affective Development		Cognitive Development		Curriculum Flexibility		Student Oriented Faculty	
	is	should be	is	should be	is	should be	is	should be
1			3	4				
2			3	4				
3			3	4				
4			3	4				
5			3	4				
6			3	4				
7			3	4				
8			3	4				
9			3	4				
10			3	4				
11	3	4						
12	3	4						
13	2	4+						
14	2	3						
15	3	4+						
16	3	3						
17	3	4						
18	3	4+						
19	2	3						
20	3	3-						
21	3	4+						
22					3	4		
23					3	4+		
24					2	3-		
25					3	4		
26					3	4		
27							3	4
28							3	3
29							3	4+
30							3	4

+ increased since survey one

- decreased since survey one

overall average. After the second survey is items in factor two remained at three and should be items remained at four. Thus, another speculation about these items appears to be in order. Since the overall average of this single group did not change (while there was noticeable change in other groups) it seems possible that the opinions people hold, in regard to the cognitive domain, are more firm. Perhaps opinions of this nature are considered more as a self-evident fact than as some kind of conjecture.

### Survey Three

Survey three was the final survey of the Delphi Technique. Once again, the Survey of Departmental Goals was used incorporating feedback from the results of survey two. Since the results of survey three were to be compared with the first survey, one additional response was required. The respondents were asked to indicate if they had completed any other forms of the Survey of Departmental Goals. This was needed in order to select respondents, on the third survey, to whom feedback would be meaningful. The total return of all instruments in all groups was 83 out of which 16 indicated they had completed previous forms of the instrument. Out of the 67 respondents having prior contact with the Survey of Departmental Goals, 43 were undergraduates. Within this group four were freshmen, 9 sophomores, 10 juniors and 20 were seniors.

Once again eight faculty members from the Industrial Education Department were asked to respond. Out of the eight faculty members surveyed, six responded giving a 75 percent return rate.

Administrators, too, were consistent with the previous surveys. Out of seven given, six were returned, however, one of the six was returned blank. The five usable returns represented 71.4 percent of the administrator population surveyed.

The 14 recent graduates were again mailed the third survey form. The 2 instruments returned by this group constituted 14.3 percent of the sample. These returns were considered insufficient to adequately represent the population, thus recent graduates were deleted from the remainder of this study.

### Summarizing Survey Three

The mean response of each group, to the various items on the survey form, are to be found in Tables 14 and 15. Table 14 is a presentation of responses to factual judgment items and Table 15 is devoted to value judgment items. A mean response for all groups combined was achieved by combining a random sample of undergraduate responses with the other two groups. Each group had about the same N and thus made an equal contribution (see Appendix G).

Table 14. Mean Response to Factual Judgment Items on Survey Three, For All Groups.

FACTUAL JUDGMENT ITEMS (is)																																	
Cognitive Domain (factor 2)											Affective Domain (factor 1)										Curriculum (factor 3)					Faculty (factor 4)							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
5.1																																	
4.8																																	
4.6																																	
4.4																																	
4.2																																	
4.0			A																														
3.8																																	
3.6				A																													
3.4									A																A								
3.2							A					A				A						A					A						
3.0	U	UA	F	UF	A	U			F	A	A						A	A		A	U		A					A	A	A			
2.8	A	F			U	U	U			U					FA	U								A				U	U				
2.6	F		U		F	F	F	UA	U	F	UF	U			U	U	UF			F		UF	U	F		U	U	U	F	F	U		
2.4													A			F					F												
2.2													U																				
2.0														U			F							U	FA						F		
1.8													F	F						A													
1.6																																	
1.4																																	
1.2																																	
1.0																																	
A - Administrators F - Faculty U - Undergraduate																																	

Table 15. Mean Response to Value Judgment Items on Survey Three, For All Groups.

VALUE JUDGMENT ITEMS (Should Be)																															
Cognitive Domain (factor 2)											Affective Domain (factor 1)										Curriculum (factor 3)					Faculty (factor 4)					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
5.0																															
4.8																															
4.6																															
4.4																															
4.4	A		A	F																											F
4.2	F	A	F	A	UA	F	F	A	UF	F					F							UA					A	A			A
4.0	U	U	U	U	F					UA	F	F			A		F				F	F				F	UF	F			F
3.8						UA	U	U			U																				
3.6																															
3.4																															
3.2																															
3.0																															
2.8																															
2.6																															
2.4																															
2.2																															
2.0																															
1.8																															
1.6																															
1.4																															
1.2																															
1.0																															
A - Administrators F - Faculty U - Undergraduate																															

### Factual Judgment Items Summarized

In summarizing the responses to factual judgment items there seem to be a few trends worthy of note. As in survey one, the responses of the group of administrators seem to be characteristically higher than the other groups. This is observable on nearly all items. Faculty, on the other hand, seem to respond somewhat low on nearly all items. However, it should be pointed out that the difference between the lowest group mean and the highest group mean, for a single item, was much less on the third survey than the first. This would indicate a tendency toward the groups reaching an agreement with one another concerning a particular goal. There were some exceptions to this, however, exemplified in item three. On item three administrators scored a mean of 4.0 while undergraduates scored a mean of 2.7. The disparity of these scores represents 1.3 points difference. The same item on survey one, however, held a low of 2.4 and a high of 4.0 (a difference of 1.6 points). This small amount of change is certainly not dramatic, however, it was tested for significance while investigating the Delphi Technique.

### Value Judgment Items Summarized

Table 15 presents the mean response to value judgment items for each item on the third survey. It would appear that the faculty

group and the administrator group seemed to agree somewhat better on their value judgments than their factual judgments, as indicated by their proximity to one another on most items in Table 15.

The greatest disparity was to be found in item 12, with one full point between highest and lowest group means. The lowest group mean was 2.86 on item 14 having to do with enrollment of minority groups. This low mean was that of the undergraduate group.

With the lowest mean at 2.86 it would appear that each item in the Survey of Departmental Goals should be a goal of the Industrial Education Department. Moreover, all of these goals should be of medium importance or greater. This study, however, does not define medium importance.

### Investigating the Delphi Technique

In order to evaluate the effectiveness of the feedback process, incorporated in the Delphi Technique, convergence of opinion was tested. Convergence of opinion was demonstrated by a reduction in variance of response to items on the Survey of Departmental Goals. Since each item on the Survey of Departmental Goals contained value judgment and factual judgment, these two aspects were considered separately when testing for convergence of opinion. Once convergence was investigated a test was made for significant change in mean response to both value judgment and factual judgment items.

### Testing Convergence of Opinion

This test concerned itself with testing the results of the first survey as compared with the results of the last survey. The test referred to is a simplified form of Bartlett's F-test for homogeneity of variance (Edwards, 1961). The formula is:

$$F = \frac{S_1^2}{S_2^2} \text{ or } \frac{S_2^2}{S_1^2}$$

In this formula the variance of survey one and the variance of survey three were divided into one another. In keeping with the above formula, the largest variance was placed in the numerator. Thus:

$$\text{When } S_1^2 > S_2^2 \text{ Then } F = \frac{S_1^2}{S_2^2}$$

$$\text{and When } S_1^2 < S_2^2 \text{ Then } F = \frac{S_2^2}{S_1^2}$$

After computations were made, the value of F was compared to the standard F-test tables to determine significance. If the F-score was not significant the difference in variance between survey one and survey three was not significant and vice versa.



### Testing for a Shift in Central Tendency

This study was concerned not only with changes in variance, it was also concerned with the effect of feedback on central tendency. The measure of central tendency used by this study was the mean response to items on the SDG. The object of this investigation was to determine if feedback produced a significant shift in mean response when the first survey is compared with the last survey. Since the number of respondents in survey one did not equal the number in survey three, a method of analysis was needed that could handle unequal groups. A t-test for difference between means was used. The t-test is a method of analysis that is not sensitive to unequal groups yet is considered a robust test (Edwards, 1961). The formula for the t-test is found below:

$$t = \frac{\text{Difference Between Means}}{\text{Standard Error of the Difference}}$$

or

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_d \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

The t-value from the above test was compared to a standard t distribution in order to determine the significance of change occurring between survey one and survey three. Since the direction of change (higher mean or lower mean) could not be predicted, without the

evidence of survey three, a two tailed test was used at the 0.01 significance level. Tables 16 through 18 present the findings of the F-test and the t-test for each remaining group.

### F-Test of Undergraduate Response

Testing the response of the undergraduate group revealed a significant change in variance in 19 of the 30 factual judgment items and 16 of the value judgment items. In all cases the variance was less for survey three than for survey one, thus, a convergence. Out of the 19 significant factual judgment items, however, only ten were significant at the .01 level. Likewise, out of the 16 value judgment items 11 were significant at the .01 level.

The null hypothesis stating there was no significant difference in variance between survey one and survey three, with regard to factual judgment, was rejected by items 9, 17, 18, 19, 20, 24, 27, 28, 29 and 30. However, the remaining twenty items tended to invoke the null hypothesis.

The null hypothesis dealing with variance and value judgment was rejected by items 3, 8, 11, 16, 17, 19, 22, 23, 25, 26 and 28. The remaining 19 items invoked the null hypothesis.

In both cases (factual judgment and value judgment) approximately  $2/3$  of the items invoked the null hypothesis. Moreover, the items that did reject the null hypothesis for one kind of judgment often

invoked the null hypothesis for the other kind of judgment. For example--items 17, 19 and 28 were the only items rejecting the null hypothesis for both types of judgment (see Table 16).

#### t -Test of Undergraduate Response

The t-test was used to test the change in central tendency between survey one and survey three. This test revealed only two items demonstrating a significant change in mean (at the .01 level). These two items encountered this change with both types of judgment. It is clear that the vast majority of both kind of judgment items invoked the null hypothesis stating no significant difference between the mean of survey one and survey three (see Table 16). The null hypothesis was rejected by items 22 and 30.

#### F-Test of Faculty Response

The test of faculty response to factual judgment items indicated no significant difference between survey one and three, at the .01 level. Furthermore, the test of value judgment items indicated only two items made a significant change in variance between survey one and survey three. The null hypothesis was invoked for all of the factual judgment items and nearly all of the value judgment items (see Table 17).

Table 16. Undergraduate Response to Survey One Compared With Undergraduate Response to Survey Three (Including F-Test Values, T-Test Values and Level of Significance).

Item	Factual Judgment (is)		Value Judgment (should be)	
	t-test value	F-test value	t-test value	F-test value
1	2.10 (.05)	1.62	-1.47	1.40
2	-0.88	1.66	0.43	2.16 (.05)
3	1.23	1.47	-0.31	2.60 (.01)
4	-0.98	1.80 (.05)	-1.49	1.74 (.05)
5	0.10	1.87 (.05)	0.25	1.54
6	2.10 (.05)	1.39	0.91	1.16
7	-0.30	1.90 (.05)	-0.82	1.68
8	0.75	1.16	1.12	3.10 (.01)
9	-1.62	2.23 (.01)	-0.21	1.95 (.05)
10	-0.00	1.24	0.24	1.89 (.05)
11	1.73	2.18 (.05)	0.88	2.60 (.01)
12	0.19	1.70	-1.35	1.03
13	-0.52	1.84 (.05)	1.50	1.43
14	-0.86	1.49	-0.90	1.31
15	1.16	1.54	0.90	1.00
16	0.95	1.18	-0.30	3.07 (.01)
17	-0.62	2.35 (.01)	0.40	2.92 (.01)
18	-1.08	2.34 (.01)	0.71	1.02
19	-1.97	2.45 (.01)	-0.46	2.30 (.01)
20	1.49	2.42 (.01)	0.19	1.31
21	0.82	1.93 (.05)	1.98 (.05)	1.66
22	-3.38 (.01)	2.08 (.05)	3.46 (.01)	3.18 (.01)
23	1.94	2.17 (.05)	2.07 (.05)	2.77 (.01)
24	-1.52	3.10 (.01)	-2.06 (.05)	1.17
25	0.67	1.46	-0.99	2.29 (.01)
26	-0.37	1.96 (.05)	0.49	2.32 (.01)
27	0.19	3.37 (.01)	1.66	1.51
28	-0.71	3.05 (.01)	-1.33	2.74 (.01)
29	0.74	2.29 (.01)	-1.30	2.05 (.05)
30	-5.61 (.01)	2.31 (.01)	-8.41 (.01)	1.65

Note: Parentheses enclose the level of significance for the test value  
df = 87

Table 17. Faculty Response to Survey One Compared With Faculty Response to Survey Three (Including F-Test Values, T-Test Values and Level of Significance).

Item	Factual Judgment (is)		Value Judgment (should be)	
	t-test value	F-test value	t-test value	F-test value
1	1.24	1.60	0.00	1.00
2	1.10	6.40 (.05)	3.81 (.01)	3.40
3	-0.30	3.41	2.15	3.41
4	0.00	3.40	1.76	2.41
5	0.31	1.45	2.12	1.00
6	1.19	1.80	2.90 (.05)	2.22
7	0.30	1.52	3.50 (.01)	1.75
8	0.00	1.57	4.38 (.01)	4.20
9	-1.00	1.50	2.73 (.05)	1.00
10	-0.83	1.12	3.61 (.01)	1.87
11	0.25	2.66	2.90 (.05)	1.23
12	0.78	1.28	1.58	2.03
13	0.41	4.80 (.05)	1.97	8.20 (.05)
14	-0.62	1.60	2.15	9.60 (.01)
15	-0.36	6.40 (.05)	1.83	6.40 (.05)
16	-1.10	1.17	0.51	2.80
17	0.75	2.29	4.24 (.01)	1.23
18	0.00	1.00	1.02	2.80
19	-0.87	4.20	5.72 (.01)	3.40
20	-0.63	1.38	2.15	1.52
21	-0.67	1.20	1.86	1.60
22	-0.41	2.62	-3.79 (.05)	1.12
23	0.22	3.80	1.38	2.09
24	0.00	1.00	5.47 (.01)	1.00
25	0.27	2.09	2.66 (.05)	1.71
26	0.00	2.14	2.15	1.52
27	-0.34	4.12	4.02 (.01)	2.12
28	0.30	1.52	-0.30	1.52
29	0.27	2.09	2.90 (.05)	1.23
30	2.23 (.05)	1.88	-3.07 (.05)	8.50 (.01)

Note: Parentheses enclose the level of significance for the test value  
df = 10

### t -Test of Faculty Response

Submitting the factual judgment items to the t-test revealed only one significant item. Its level of significance, however, was .05 and thus too low to reject the null hypothesis. The null hypothesis stating no significant difference between survey one and survey three on factual judgment items, was invoked by all items.

In direct contrast, 15 value judgment items indicated a significant change. Out of these 15 items, however, only eight proved to be significant at the .01 level. Thus, eight items rejected the null hypothesis and 22 invoked it. The items to reject the null hypothesis are: 2, 7, 8, 10, 17, 19, 24 and 27.

### F-Test of Administrators Response

The F-testing of administrator response to factual and value judgment revealed one condition not encountered previously in this study. There were several items to which all administrators responded identically, thus, the variance was zero for those items. When the zero variance was introduced into the formula for the F-test, zero became the denominator since any positive number was larger, and the variance was always positive. When this condition existed zero was divided into the positive, real number and produced  $\infty$  (infinity). Thus, several items produced F-test values of  $\infty$

regardless of the difference between variances. A hypothetical example would be:

$$F = \frac{.00000001}{0} = \infty$$

Since, however, the purpose of this test was to determine if there had been sufficient reduction in variance to identify a consensus of opinion, an F-test value of  $\infty$  was considered significant, though not reliable. Therefore, items with this value were neither able to reject or invoke the null hypothesis.

Of the unusual items just described 12 occurred in factual judgment items and four occurred in value judgment items. The factual judgment items were 2, 3, 8, 15, 17, 18, 20, 23, 28, 29, and 30. The value judgment items were 1, 8, 10 and 27.

Out of all remaining items only one was significant at the .01 level. Item 20 dealing with value judgment achieved an F-test value high enough to reject the null hypothesis. Seventeen factual judgment items invoked the null hypothesis and 25 value judgment items invoked the null hypothesis (see Table 18).

### Confidence Limits of the Mean

Since the three groups responding to the third survey were samples of a larger population, confidence limits were established for each score. The limits exist between one standard error below

Table 18. Administrators Response to Survey One Compared With Administrators Response to Survey Three (Including F-Test Values, T-Test Values and Level of Significance).

Item	Factual Judgment (is)		Value Judgment (should be)	
	t-test value	F-test value	t-test value	F-test value
1	1.47	1.66	-0.75	$\infty$ (.01)
2	1.36	$\infty$ (.01)	0.36	1.66
3	0.0	$\infty$ (.01)	-0.16	1.11
4	0.58	1.25	-0.40	5.00 (.05)
5	1.36	$\infty$ (.01)	1.29	1.66
6	0.16	1.11	0.76	3.60
7	1.16	5.00 (.05)	0.36	1.66
8	1.22	$\infty$ (.01)	-1.22	$\infty$ (.01)
9	1.59	2.40	0.36	1.66
10	1.36	1.50	1.36	$\infty$ (.01)
11	0.68	1.50	0.74	2.10
12	0.36	1.66	-0.45	2.40
13	0.65	1.11	-0.19	3.60
14	0.36	1.66	2.29	1.11
15	0.75	$\infty$ (.01)	-0.68	1.50
16	1.29	1.66	0.96	2.10
17	-1.36	$\infty$ (.01)	0.36	1.66
18	2.76 (.05)	$\infty$ (.01)	0.40	5.00 (.05)
19	1.60	5.00 (.05)	-0.11	2.40
20	2.37	$\infty$ (.01)	-0.19	11.66 (.01)
21	-0.24	6.66 (.05)	-1.60	5.00 (.05)
22	-2.40 (.05)	1.66	-0.40	5.00 (.05)
23	-1.36	$\infty$ (.01)	0.00	2.00
24	1.36	$\infty$ (.01)	0.00	2.00
25	0.88	1.25	-2.29	2.00
26	2.40 (.05)	1.66	-0.75	1.11
27	1.29	1.66	-0.75	$\infty$ (.01)
28	1.36 (.01)	$\infty$ (.01)	-0.75	3.33
29	2.73 (.05)	$\infty$ (.01)	-0.13	1.60
30	-1.36	$\infty$ (.01)	-0.01	1.66

Note: Parentheses enclose the level of significance for the test value  
df = 8



and one standard error above the sample mean. The standard error of the mean was computed using the following formula:

$$S_{\bar{x}} = \frac{S}{\sqrt{n}}$$

The confidence limits for the three groups may be seen in Table 19.

### Chapter Summary

The Survey of Departmental Goals was used in collecting data from five separate groups. Three of the five groups were located on the Oregon State University campus. These groups were administered the survey instrument in person. The remaining two groups consisted of individuals located at various locations throughout the state of Oregon. The instrument was mailed to them. Both of these off campus groups, however, eliminated themselves from the study by failing to respond to the recurring surveys of the Delphi Technique.

The first survey provided data for feedback in the second survey. Likewise, the second survey provided data for feedback in the last survey. The first and last surveys also provided data for testing the effects of the Delphi Technique.

The effects of the Delphi Technique were tested using an unpaired t-test for equality of means between survey one and three. Additionally, an F-test for equality of variance was used with the same surveys. The data generated by the third survey was also assigned confidence limits through the use of the standard error of the mean.

Table 19. Confidence Limits of the Means Produced in Survey Three.

Item	Undergraduates		Faculty		Administrators	
	Factual Judgment	Value Judgment	Factual Judgment	Value Judgment	Factual Judgment	Value Judgment
1	3.02 $\pm$ .10	4.02 $\pm$ .08	2.66 $\pm$ .33	4.16 $\pm$ .16	2.80 $\pm$ .20	4.40 $\pm$ .40
2	2.97 $\pm$ .10	4.02 $\pm$ .08	2.83 $\pm$ .16	4.33 $\pm$ .21	3.00 $\pm$ 0	4.20 $\pm$ .20
3	2.70 $\pm$ .13	4.02 $\pm$ .09	3.00 $\pm$ .25	4.33 $\pm$ .21	4.00 $\pm$ 0	4.40 $\pm$ .24
4	3.10 $\pm$ .12	4.15 $\pm$ .08	3.16 $\pm$ .30	4.50 $\pm$ .22	3.60 $\pm$ .40	4.20 $\pm$ .20
5	2.92 $\pm$ .10	4.20 $\pm$ .08	2.66 $\pm$ .33	4.16 $\pm$ .16	3.00 $\pm$ 0	4.20 $\pm$ .20
6	2.89 $\pm$ .09	3.82 $\pm$ .12	2.50 $\pm$ .22	4.33 $\pm$ .21	2.60 $\pm$ .24	3.80 $\pm$ .48
7	2.81 $\pm$ .09	3.87 $\pm$ .08	2.50 $\pm$ .34	4.33 $\pm$ .21	3.20 $\pm$ .20	4.20 $\pm$ .20
8	2.66 $\pm$ .11	3.86 $\pm$ .06	2.50 $\pm$ .34	4.33 $\pm$ .21	2.60 $\pm$ .24	4.40 $\pm$ .24
9	2.76 $\pm$ .10	4.34 $\pm$ .08	3.00 $\pm$ .25	4.33 $\pm$ .21	3.40 $\pm$ .40	4.20 $\pm$ .20
10	2.84 $\pm$ .12	4.07 $\pm$ .09	2.66 $\pm$ .21	4.33 $\pm$ .21	3.00 $\pm$ .31	4.00 $\pm$ 0
11	2.52 $\pm$ .11	3.70 $\pm$ .12	2.50 $\pm$ .34	4.00 $\pm$ .25	3.00 $\pm$ .31	4.20 $\pm$ .37
12	2.74 $\pm$ .12	3.65 $\pm$ .13	2.66 $\pm$ .42	4.16 $\pm$ .30	3.20 $\pm$ .20	4.60 $\pm$ .40
13	2.20 $\pm$ .12	3.26 $\pm$ .14	1.83 $\pm$ .16	3.83 $\pm$ .30	2.40 $\pm$ .24	3.80 $\pm$ .48
14	2.10 $\pm$ .12	2.86 $\pm$ .14	1.83 $\pm$ .16	3.50 $\pm$ .34	2.20 $\pm$ .20	3.40 $\pm$ .24
15	2.76 $\pm$ .11	3.68 $\pm$ .14	2.83 $\pm$ .16	4.33 $\pm$ .21	2.80 $\pm$ .20	4.00 $\pm$ .31
16	2.68 $\pm$ .13	3.53 $\pm$ .09	2.33 $\pm$ .33	3.83 $\pm$ .30	3.20 $\pm$ .20	3.80 $\pm$ .37
17	2.71 $\pm$ .10	3.97 $\pm$ .09	2.16 $\pm$ .30	4.16 $\pm$ .16	3.00 $\pm$ 0	4.20 $\pm$ .20
18	2.65 $\pm$ .08	3.63 $\pm$ .13	2.66 $\pm$ .33	4.00 $\pm$ .25	3.00 $\pm$ 0	3.80 $\pm$ .20
19	1.97 $\pm$ .09	3.02 $\pm$ .13	1.83 $\pm$ .16	3.66 $\pm$ .83	2.20 $\pm$ .20	3.40 $\pm$ .40
20	2.86 $\pm$ .12	3.51 $\pm$ .15	2.50 $\pm$ .34	4.00 $\pm$ .25	3.00 $\pm$ 0	3.80 $\pm$ .20
21	2.70 $\pm$ .12	3.97 $\pm$ .12	2.33 $\pm$ .33	4.16 $\pm$ .16	2.80 $\pm$ .20	3.80 $\pm$ .20
22	2.68 $\pm$ .11	4.24 $\pm$ .09	2.66 $\pm$ .21	4.16 $\pm$ .16	3.20 $\pm$ .20	4.20 $\pm$ .20
23	2.71 $\pm$ .09	3.72 $\pm$ .10	2.50 $\pm$ .34	3.83 $\pm$ .30	3.00 $\pm$ 0	4.00 $\pm$ 0
24	2.28 $\pm$ .08	3.42 $\pm$ .13	2.00 $\pm$ .25	3.33 $\pm$ .55	2.00 $\pm$ 0	3.00 $\pm$ .31
25	2.73 $\pm$ .12	4.05 $\pm$ .10	2.50 $\pm$ .34	4.16 $\pm$ .16	3.40 $\pm$ .40	4.60 $\pm$ .24
26	2.71 $\pm$ .11	4.05 $\pm$ .07	2.50 $\pm$ .34	4.16 $\pm$ .16	2.80 $\pm$ .20	4.20 $\pm$ .20
27	2.68 $\pm$ .09	4.23 $\pm$ .08	2.66 $\pm$ .21	4.16 $\pm$ .16	3.20 $\pm$ .20	4.20 $\pm$ .20
28	2.89 $\pm$ .11	2.86 $\pm$ .16	2.50 $\pm$ .34	3.50 $\pm$ .22	3.00 $\pm$ 0	3.40 $\pm$ .24
29	2.89 $\pm$ .11	3.78 $\pm$ .16	2.50 $\pm$ .34	4.16 $\pm$ .16	3.00 $\pm$ 0	3.60 $\pm$ .40
30	2.63 $\pm$ .10	2.13 $\pm$ .14	2.16 $\pm$ .30	4.50 $\pm$ .22	3.00 $\pm$ 0	4.20 $\pm$ .20

## V. SUMMARY, CONCLUSIONS, RECOMMENDATIONS

### Summary

The Delphi Technique is a method of reaching a consensus of opinion among small groups of experts. The method was developed by the Rand Corporation and includes a sequence of surveys and feedback. This process, however, has been altered by researchers in education by using random samples of a population. Rather than use one small group of experts the trend with educators has been to use several groups of randomly selected subjects. These several groups undertake the same task and a consensus of opinion is sought.

The intent of this study was to test the Delphi Technique as it has been used by educators. In order to make this test a Delphi survey was performed on the Oregon State University Campus, modeled after several studies done in the recent past. Five groups of participants were identified as appropriate. They were: undergraduates from the Industrial Education Department, faculty of the Industrial Education Department, administrators of the School of Education, recent graduates of the Industrial Education Department and finally employers of the graduates. These five groups were each asked to rate the importance of 30 goals of the Industrial Education Department. The 30 goals were contained in an instrument developed by the investigator and tested in a separate pilot study. The pilot study factor analyzed

the items and identified four factors. They were goal statements relating to: 1) student development in the affective domain, 2) student development in the cognitive domain, 3) curriculum flexibility, and 4) student oriented faculty. The participants in the Delphi Technique were asked to give their opinions about the importance of these goals in two different manners. They were asked to rate the importance of the goal at present and rate how important the goal should be. These were defined by the study as factual judgment and value judgment types of opinion.

#### Mechanics of the Delphi Technique

The mechanics of the Delphi Technique were such that the investigator was forced to maintain a crash schedule from the beginning of the data collection to the end. The factors contributing to the crash schedule seem inherent in the design of the Delphi Technique. Some of those factors were:

1. Once the first survey was administered the second survey had to be prepared in order to give the respondents feedback while they still had some memory of their response.

2. In order to provide feedback for the second survey, the results of the first survey had to be statistically analyzed by sub-groups and the scores combined into an overall average response to each item on the instrument.

3. Before the second survey could be taken a new survey instrument had to be printed so as to include the feedback from the first survey. This could not be done until the results of the first survey were analyzed.

4. Once the second survey was administered the third survey had to be prepared in order to provide the respondents with feedback while they still had some memory of their response to survey two.

5. The statistical analysis and printing of the instrument had to be done, again, before the third survey could be taken.

6. While the foregoing factors are critical aspects of the Delphi Technique, the investigator had to insure that standard survey practice was adhered to. Thus, instrument distribution and collection (or compilation), became another factor of the crash schedule.

The repeated surveys of the Delphi Technique seemed to alienate the participants. This is exemplified by the fact that responses fell off in two groups to the point where they were omitted from the research. The remaining three groups, however, contributed data for the investigation of the technique.

The investigation phase of the study dealt with comparing the results of survey one with the results of survey three to ascertain if a significant change had taken place due to feedback. Difference between means was tested for both types of judgment and difference between variance of response was tested for both types of judgment.

Since the investigator felt the ratings of the goals might be used by future researchers, confidence limits were set for the mean responses to survey three. This was done for all groups completing survey three.

### Conclusions

The conclusions appropriate to this study fall into two categories. The first category deals with conclusions that are substantiated by the statistical treatment of the data. The second category deals with observations made by the investigator and speculations based upon those observations.

#### Substantiated Conclusions

The substantiated conclusions deal with the hypothesis testing. Since tests were made for each item on the instrument the conclusions must be in the form of generalizations or implications. Four such generalizations will follow.

Investigation of undergraduate, faculty and administrator groups for a significant alteration in mean response to factual judgment items indicates that there is no significant difference for most of the items. This leads to the conclusion that the Delphi Technique generally did not effect a change in mean response to factual judgments, regardless of the size of the group responding.

In testing the three groups for a significant change in mean response to value judgment, no significant difference was found on most of the items. The conclusion, then states, that the Delphi Technique generally did not effect a change in mean response to value judgment items.

The testing of the three groups for a significant change in variance of response to factual judgment items was different for each group. Even when the level of confidence was reduced to the .05 level there was still inconsistency between groups. There also was inconsistency between groups of nearly the same number of respondents. Therefore, the Delphi Technique had an inconsistent effect in altering the variance of group response concerning factual judgments.

The variance of response to value judgment items was also different for each group, however, the difference was not as great as factual judgment. Even with the inconsistency most of the items produced no significant difference. Therefore, the Delphi Technique did not significantly alter the variance of response to value judgment items.

A general conclusion about the Delphi Technique would indicate that the process produced no significant change in response of opinion nature. However, since there was significant alteration to many items there seem to be other aspects of the Delphi Technique worthy of exploration.

## Observations

The multiple phases of this study afforded the investigator many opportunities to make observations. Some of the observations deal directly with the mechanics of the Delphi Technique. Probably the most outstanding observation of this nature dealt with the way people reacted to the consecutive surveys. The general reaction of the more vocal participants was reluctance to fill out the survey form a second and third time. This was, perhaps, the reason why the two groups which were mailed the instrument refused to respond adequately in the second and third surveys. Even one member of an on-campus group mailed a blank survey form back to the investigator on the last survey. This investigator concluded that the Delphi Technique tends to reduce the number of respondents in a given sample. An offshoot of this conclusion was the speculation that the attitude of the more tenacious respondents may be questionable. They may either have a vested interest (an ax to grind) or they may complete the last survey just to get it done, without due consideration of the questions being asked. If this speculation is tenable then the accuracy of this Delphi Technique must be questioned. Furthermore, while using the Delphi Technique to identify institutional goals, Uhl (1971) provided a ten dollar honorarium to each member in one group of respondents for completing the three surveys. Even with the honorarium the responses of this



group fell from 60 percent on survey one to 43 percent on survey three.

With regard to reaching a consensus of opinion, this study tested the difference in variance. Even though the difference was generally not significant, a convergence of opinion was observed to occur most of the time. This was demonstrated in a non-significant reduction in group variance. This investigator, then, holds the opinion that a distinction must be made between convergence and consensus. Both terms are currently in need of definition if the Delphi Technique is to be investigated further.

The three groups responding to the surveys appear to have decidedly different characteristics, as indicated by their pattern of response. The administrators, for example, gave identical responses to many items on the survey instrument. They were the only group to behave this way. The administrators also appeared to place more importance on the goals than the other groups. Perhaps, because of their position, administrators tend to perceive most things, connected with their school, as quite important. This may be a quality of the group rather than the process.

### Conclusions Itemized

The findings of this study provide the following itemized list of conclusions:

1. The Delphi Technique did not promote a change in mean response to factual judgment items.
2. The Delphi Technique did not promote a change in mean response to value judgment items.
3. The Delphi Technique did not produce a consistent change in variance of response to factual judgment items.
4. The Delphi Technique did not produce a change in variance of response to value judgment items.
5. The Delphi Technique caused a reduction in the number of responses to the last survey in the process.

### Recommendations

Based upon the procedures described, conclusions provided, and observations offered, the following recommendations are made:

1. Since consensus occurred on some items and not on others, the Delphi Technique should be investigated further to determine the variables that promote convergence of opinion.
2. Since the response was more consistent in the cognitive domain, the Delphi Technique should be investigated further to determine in what areas, issues and objectives the process is effective.
3. Since the various groups of respondents demonstrated different response patterns, population characteristics should be studied to determine the effectiveness of the Delphi Technique with

various population types.

4a. In order to distinguish the difference between significant and non-significant changes in variance, convergence of opinion should be considered a statistically significant reduction in group variance.

4b. In order to further distinguish this difference, consensus of opinion should be considered a reduction of variance so that the scores fall within some internal limits of the first survey (such as interquartile range).

5. Since the nature of the Delphi Technique is such that the investigator was continually on a crash schedule, the Delphi Technique should not be undertaken by only one investigator unless the time available for the procedure is ample.

6. Since both of the off-campus groups in this study were eliminated due to lack of response, studies using the Delphi Technique should provide for easy contact between investigator and respondent. Mailed surveys should be avoided.

7. Since the study was not designed to test for accuracy of response, the accuracy of the Delphi Technique should be tested using a large sample containing sub-groups.

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## APPENDICES



This questionnaire is completely confidential. No one will see your responses except professional staff working on this project. All results will be summarized by groups; individual results will not be released. However, for the purpose of monitoring the returns of this survey we need to know your position. Please check the appropriate space below. (X)

- |   |                          |
|---|--------------------------|
| I. Undergraduate Student <u>NOT</u> an Industrial Education Major | <input type="checkbox"/> |
| II. Undergraduate Industrial Education Majors check status:       |                          |
| Freshman  | <input type="checkbox"/> |
| Sophomore   | <input type="checkbox"/> |
| Junior  | <input type="checkbox"/> |
| Senior  | <input type="checkbox"/> |
| III. Industrial Education Faculty Member                          | <input type="checkbox"/> |
| IV. Administrator from the School of Education                    | <input type="checkbox"/> |
| V. Graduate from the Industrial Education Department              | <input type="checkbox"/> |
| VI. Employer of an Industrial Education Graduate                  | <input type="checkbox"/> |



# I N S T R U C T I O N S

On the following pages there are listed many of the more commonly mentioned goals of a college or university department. We are interested in your opinion about the importance of these goals.

Each goal statement is listed only once, but you will be asked to react in two different ways:

First — How important is the goal in this department at the present time? (consider the department as a whole in making your judgment)

Then — In your judgment, how important should the goal be in this department?

## E X A M P L E

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
To assist students to prepare for graduate school	is	1	<input checked="" type="checkbox"/>	3	4	5
	should be	1	2	3	<input checked="" type="checkbox"/>	5

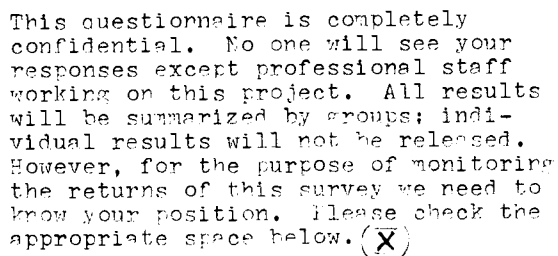
Above the respondent indicates that he believes that the goal is presently of low importance but that he feels it should be of high importance.

IMPORTANT -- PLEASE RESPOND TO ALL ITEMS ON THE FOLLOWING TWO PAGES. ACCURATE STATISTICAL ANALYSIS OF THIS SURVEY DEPENDS ON HAVING A RESPONSE TO ALL ITEMS.

NOTE -- This form may be completed in pencil or ink.

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
1. To help students develop the capacity to assume leadership	is	1	2	3	4	5
	should be	1	2	3	4	5
2. To help students develop the ability to synthesize knowledge from different sources	is	1	2	3	4	5
	should be	1	2	3	4	5
3. To help students acquire depth in at least one area of knowledge	is	1	2	3	4	5
	should be	1	2	3	4	5
4. To attract faculty who are technically well qualified	is	1	2	3	4	5
	should be	1	2	3	4	5
5. To help students acquire the ability to adapt to new occupational requirements as technology and society change	is	1	2	3	4	5
	should be	1	2	3	4	5
6. To help students develop the ability to apply critical thought to all areas of life	is	1	2	3	4	5
	should be	1	2	3	4	5
7. To provide a continuing plan of curricular and instructional evaluation	is	1	2	3	4	5
	should be	1	2	3	4	5
8. To help students develop the ability to speak and write effectively	is	1	2	3	4	5
	should be	1	2	3	4	5
9. To help students develop their technical skills	is	1	2	3	4	5
	should be	1	2	3	4	5
10. To help students develop a respect for their own abilities and an understanding of their limitations	is	1	2	3	4	5
	should be	1	2	3	4	5
11. To encourage students to view members of religious groups, minority groups, etc., as individuals rather than as members of a particular group	is	1	2	3	4	5
	should be	1	2	3	4	5
12. To promote concern in students for the well being of others	is	1	2	3	4	5
	should be	1	2	3	4	5
13. To help students learn how to change society	is	1	2	3	4	5
	should be	1	2	3	4	5
14. To allocate percentages of the total enrollment for minority groups or groups having low socioeconomic status	is	1	2	3	4	5
	should be	1	2	3	4	5
15. To enable students to develop a set of principles to guide their behavior	is	1	2	3	4	5
	should be	1	2	3	4	5

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
16. To provide some form of education for any student, regardless of his academic ability	is	1	2	3	4	5
	should be	1	2	3	4	5
17. To provide a supportive environment for highly creative individuals	is	1	2	3	4	5
	should be	1	2	3	4	5
18. To prepare students for the duties and responsibilities of citizenship	is	1	2	3	4	5
	should be	1	2	3	4	5
19. To ensure the right of students to engage in off-campus political activities and social actions without fear of reprisal from the department	is	1	2	3	4	5
	should be	1	2	3	4	5
20. To protect a faculty member against intimidation by those who do not approve of ideas he may present in the classroom	is	1	2	3	4	5
	should be	1	2	3	4	5
21. To provide educational opportunities for adults in the local area	is	1	2	3	4	5
	should be	1	2	3	4	5
22. To clearly define the purposes which the department will serve, according to a long-range plan	is	5	4	3	2	1
	should be	5	4	3	2	1
23. To innovate in developing educational programs for special categories of students; e.g. disadvantaged students, very bright students, foreign students, etc.	is	1	2	3	4	5
	should be	1	2	3	4	5
24. To help students develop competency as an industrial manager or supervisor	is	1	2	3	4	5
	should be	1	2	3	4	5
25. To ensure that students will be well qualified for a vocation	is	1	2	3	4	5
	should be	1	2	3	4	5
26. To permit an undergraduate student wide latitude in selecting the courses he will take toward his degree	is	1	2	3	4	5
	should be	1	2	3	4	5
27. To help students in the choice of a personally satisfying vocation	is	1	2	3	4	5
	should be	1	2	3	4	5
28. To attract faculty who have distinguished themselves through research and scholarly contributions	is	5	4	3	2	1
	should be	5	4	3	2	1
29. To base faculty promotion and tenure more on an estimate of teaching effectiveness than on the value of scholarly research	is	1	2	3	4	5
	should be	1	2	3	4	5
30. To maintain an atmosphere of intellectual excitement among faculty, students, and administrators	is	5	4	3	2	1
	should be	5	4	3	2	1



- |      |  |   |
|------|--|---|
| 1.   | Undergraduate Student <u>NOT</u> an Industrial Education Major | 0 |
| 11.  | Undergraduate Industrial Education Majors check status:        |   |
|      | Freshman   | 1 |
|      | Sophomore  | 2 |
|      | Junior   | 3 |
|      | Senior   | 4 |
| 111. | Industrial Education Faculty Member                            | 5 |
| IV.  | Administrator from the School of Education                     | 6 |
| V.   | Graduate from the Industrial Education Department              | 7 |
| VI.  | Employer of an Industrial Education Graduate                   | 8 |

# I N S T R U C T I O N S

On the following pages there are listed many of the more commonly mentioned goals of a college or university department. We are interested in your opinion about the importance of these goals.

Each goal statement is listed only once, but you will be asked to react in two different ways:

First — How important is the goal in this department at the present time? (consider the department as a whole in making your judgment)

Then — In your judgment, how important should the goal be in this department?

## E X A M P L E

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
To assist students to prepare for graduate school.	is	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	should be	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Above the respondent indicates that he believes that the goal is presently of low importance but that he feels it should be of high importance.

IMPORTANT: The ☒ mark indicates that the average response to the question occurred at this point, in the previous survey. You may wish to consider this when you respond to this survey.

# GOALS

## IMPORTANCE

89

		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
1. To help students develop the capacity to assume leadership	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
2. To help students develop the ability to synthesize knowledge from different sources	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
3. To help students acquire depth in at least one area of knowledge	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
4. To attract faculty who are technically well qualified	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
5. To help students acquire the ability to adapt to new occupational requirements as technology and society change	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
6. To help students develop the ability to apply critical thought to all areas of life	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
7. To provide a continuing plan of curricular and instructional evaluation	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
8. To help students develop the ability to speak and write effectively	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
9. To help students develop their technical skills	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
10. To help students develop a respect for their own abilities and an understanding of their limitations	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
11. To encourage students to view members of religious groups, minority groups, etc., as individuals rather than as members of a particular group	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
12. To promote concern in students for the well being of others	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
13. To help students learn how to change society	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
14. To allocate percentages of the total enrollment for minority groups or groups having low socioeconomic status	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
15. To enable students to develop a set of principles to guide their behavior	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
16. To provide some form of education for any student, regardless of his academic ability	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
17. To provide a supportive environment for highly creative individuals	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
18. To prepare students for the duties and responsibilities of citizenship	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
19. To ensure the right of students to engage in off-campus political activities and social actions without fear of reprisal from the department	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
20. To protect a faculty member against intimidation by those who do not approve of ideas he may present in the classroom	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
21. To provide educational opportunities for adults in the local area	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
22. To clearly define the purposes which the department will serve, according to a long-range plan	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
23. To innovate in developing educational programs for special categories of students; e.g. disadvantaged students, very bright students, foreign students, etc.	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
24. To help students develop competency as an industrial manager or supervisor	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
25. To ensure that students will be well qualified for a vocation	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
26. To permit an undergraduate student wide latitude in selecting the courses he will take toward his degree	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
27. To help students in the choice of a personally satisfying vocation	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
28. To attract faculty who have distinguished themselves through research and scholarly contributions	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
29. To base faculty promotion and tenure more on an estimate of teaching effectiveness than on the value of scholarly research	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
30. To maintain an atmosphere of intellectual excitement among faculty, students, and administrators	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>



This questionnaire is completely confidential. No one will see your responses except professional staff working on this project. All results will be summarized by groups; individual results will not be released. However, for the purpose of monitoring the returns of this survey we need to know your position. Please check the appropriate space below. (X)

- |      |  |   |
|------|--|---|
| I.   | Undergraduate Student <u>NOT</u> an Industrial Education Major | 0 |
| II.  | Undergraduate Industrial Education Majors check status:        |   |
|      | Freshman   | 1 |
|      | Sophomore  | 2 |
|      | Junior   | 3 |
|      | Senior   | 4 |
| III. | Industrial Education Faculty Member                            | 5 |
| IV.  | Administrator from the School of Education                     | 6 |
| V.   | Graduate from the Industrial Education Department              | 7 |
| VI.  | Employer of an Industrial Education Graduate                   | 8 |



I N S T R U C T I O N S

On the following pages there are listed many of the more commonly mentioned goals of a college or university department. We are interested in your opinion about the importance of these goals.

Each goal statement is listed only once, but you will be asked to react in two different ways:

First — How important is the goal in this department at the present time? (consider the department as a whole in making your judgment)

Then — In your judgment, how important should the goal be in this department?

E X A M P L E

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
To assist students to prepare for graduate school.	is	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	should be	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Above the respondent indicates that he believes that the goal is presently of low importance but that he feels it should be of high importance.

IMPORTANT: The ☒ mark indicates that the average response to the question occurred at this point, in the previous survey. You may wish to consider this when you respond to this survey.

THIS IS THE LAST DEPARTMENTAL GOALS SURVEY. HAVE YOU RESPONDED TO ANY OF THE PREVIOUS SURVEYS USING THIS FORM?

YES

☐

NO

☐

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
1. To help students develop the capacity to assume leadership	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
2. To help students develop the ability to synthesize knowledge from different sources	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
3. To help students acquire depth in at least one area of knowledge	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
4. To attract faculty who are technically well qualified	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
5. To help students acquire the ability to adapt to new occupational requirements as technology and society change	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
6. To help students develop the ability to apply critical thought to all areas of life	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
7. To provide a continuing plan of curricular and instructional evaluation	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
8. To help students develop the ability to speak and write effectively	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
9. To help students develop their technical skills	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
10. To help students develop a respect for their own abilities and an understanding of their limitations	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
11. To encourage students to view members of religious groups, minority groups, etc., as individuals rather than as members of a particular group	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
12. To promote concern in students for the well being of others	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
13. To help students learn how to change society	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
14. To allocate percentages of the total enrollment for minority groups or groups having low socioeconomic status	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
15. To enable students to develop a set of principles to guide their behavior	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

GOALS		IMPORTANCE				
		Of No Importance	Of Low Importance	Of Medium Importance	Of High Importance	Of Very Great Importance
16. To provide some form of education for any student, regardless of his academic ability	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
17. To provide a supportive environment for highly creative individuals	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
18. To prepare students for the duties and responsibilities of citizenship	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
19. To ensure the right of students to engage in off-campus political activities and social actions without fear of reprisal from the department	is should be	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
20. To protect a faculty member against intimidation by those who do not approve of ideas he may present in the classroom	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
21. To provide educational opportunities for adults in the local area	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
22. To clearly define the purposes which the department will serve, according to a long-range plan	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
23. To innovate in developing educational programs for special categories of students; e.g. disadvantaged students, very bright students, foreign students, etc.	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
24. To help students develop competency as an industrial manager or supervisor	is should be	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
25. To ensure that students will be well qualified for a vocation	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
26. To permit an undergraduate student wide latitude in selecting the courses he will take toward his degree	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
27. To help students in the choice of a personally satisfying vocation	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
28. To attract faculty who have distinguished themselves through research and scholarly contributions	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
29. To base faculty promotion and tenure more on an estimate of teaching effectiveness than on the value of scholarly research	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
30. To maintain an atmosphere of intellectual excitement among faculty, students, and administrators	is should be	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

## APPENDIX D

Table 1. Response of Undergraduates to the First Survey Using the Survey of Departmental Goals  
(N = 55).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	2.69	0.82	4.21	0.63
2	3.11	0.84	3.96	0.79
3	2.44	1.07	4.07	0.89
4	3.29	1.04	4.34	0.65
5	2.90	0.92	4.17	0.64
6	2.61	0.66	3.66	0.81
7	2.86	0.84	3.98	0.67
8	2.54	0.75	3.72	0.72
9	3.08	1.04	4.37	0.74
10	2.84	0.88	4.03	0.79
11	2.17	1.07	3.50	1.23
12	2.70	1.02	3.90	0.83
13	2.31	1.08	2.94	1.06
14	2.26	0.92	3.05	1.03
15	2.56	0.87	3.50	0.90
16	2.50	0.88	3.59	1.05
17	2.82	1.00	3.90	0.94
18	2.82	0.81	3.50	0.86
19	2.31	0.92	3.13	1.26
20	2.54	1.15	3.47	1.10
21	2.53	1.08	3.58	0.98
22	3.33	1.01	1.84	0.97
23	2.38	0.90	3.31	1.08
24	2.54	0.90	3.80	0.89
25	2.60	0.96	4.23	0.94
26	2.78	1.02	4.00	0.71
27	2.64	1.05	4.23	0.61
28	3.05	1.27	2.86	1.20
29	2.74	1.10	3.78	1.18
30	3.70	1.02	2.13	1.02

Table 2. Response of Faculty to the First Survey Using the Survey of Departmental Goals (N=6).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	3.33	1.03	4.16	0.40
2	3.33	1.03	4.16	0.75
3	2.83	1.16	4.16	1.16
4	3.16	0.40	4.16	1.16
5	2.83	0.98	3.66	0.81
6	2.83	0.40	3.66	0.81
7	2.66	1.03	4.00	0.63
8	2.50	1.04	4.16	0.40
9	2.66	0.51	4.00	0.63
10	2.40	0.54	4.00	0.70
11	2.66	1.36	3.83	0.75
12	3.16	1.16	3.83	1.47
13	2.00	0.89	2.83	1.16
14	1.66	0.51	3.00	1.26
15	2.66	1.03	3.66	1.03
16	1.83	0.75	2.66	1.36
17	2.60	1.14	4.20	0.83
18	2.66	0.81	3.33	1.36
19	1.50	0.83	3.83	0.75
20	2.16	0.98	3.66	1.03
21	2.00	0.89	3.33	1.03
22	2.50	0.83	1.50	0.54
23	2.66	1.63	3.33	1.21
24	2.00	0.63	4.00	0.63
25	2.33	1.21	4.00	1.09
26	2.50	1.22	3.66	1.03
27	2.50	1.04	4.16	0.75
28	2.66	1.03	3.33	1.03
29	2.66	1.21	3.83	0.75
30	3.33	1.03	2.33	1.50

Table 3. Response of Administrators to the First Survey Using the Survey of Departmental Goals  
(N = 5).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	3.33	0.57	4.00	0.00
2	3.33	0.57	4.33	0.57
3	4.00	1.00	4.33	0.57
4	4.00	1.00	4.00	1.00
5	3.66	1.15	4.66	0.57
6	2.66	0.57	4.33	0.57
7	4.00	1.00	4.33	0.57
8	3.00	0.00	4.00	0.00
9	4.33	0.57	4.33	0.57
10	3.66	0.57	4.33	0.57
11	3.33	0.57	4.33	0.57
12	3.33	0.57	4.33	0.57
13	2.66	0.57	3.66	0.57
14	2.33	0.57	4.33	0.57
15	3.00	0.00	3.66	0.57
16	3.66	0.57	4.33	0.57
17	2.66	0.57	4.33	0.57
18	3.66	0.57	4.00	1.00
19	3.00	1.00	3.33	0.57
20	4.00	1.00	3.66	1.52
21	2.66	1.15	3.00	1.00
22	2.33	0.57	2.00	1.00
23	2.66	0.57	4.00	0.00
24	2.33	0.57	3.00	1.00
25	4.00	1.00	3.66	0.57
26	2.33	0.57	4.00	0.00
27	3.66	0.57	4.00	0.00
28	3.33	0.57	3.00	1.00
29	3.66	0.57	3.50	0.70
30	2.66	0.57	1.66	0.57

Table 4. Response of Graduates to the First Survey Using the Survey of Departmental Goals (N = 5).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	2.50	0.54	4.33	0.51
2	3.33	0.81	4.33	0.51
3	3.16	0.75	3.83	0.75
4	3.16	1.16	4.66	0.51
5	2.66	0.81	4.66	0.51
6	2.83	0.98	4.33	0.81
7	2.60	0.54	4.16	0.75
8	3.00	0.89	4.16	0.40
9	3.16	0.75	4.16	0.40
10	2.83	0.98	4.16	0.40
11	2.40	1.14	3.00	1.26
12	3.40	1.14	4.00	0.63
13	2.33	0.51	3.00	0.63
14	1.83	0.76	2.50	1.22
15	2.83	0.98	4.00	1.09
16	2.50	1.04	3.00	1.67
17	2.66	0.81	4.33	0.51
18	3.00	0.89	4.33	0.51
19	2.83	1.16	2.83	1.60
20	2.40	0.54	3.33	0.81
21	2.80	0.83	3.33	0.98
22	3.33	0.51	3.16	0.63
23	2.33	0.81	3.50	1.22
24	2.66	0.81	4.16	0.40
25	2.50	0.54	3.66	1.21
26	2.66	1.03	3.33	1.21
27	2.50	0.83	3.33	1.21
28	2.83	0.75	2.50	0.54
29	2.66	0.81	4.50	0.83
30	3.66	0.51	2.33	1.03

Table 5. Response of Employers to the First Survey Using the Survey of Department Goals (N = 4).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	3.33	0.95	4.00	0.00
2	3.33	0.50	4.00	1.00
3	4.00	1.29	4.33	0.57
4	4.33	1.25	4.33	0.57
5	3.66	0.57	4.33	0.57
6	3.66	0.95	4.00	1.00
7	4.33	0.57	3.66	1.15
8	3.33	0.57	3.33	0.57
9	5.00	0.95	4.33	0.57
10	3.33	0.95	3.66	0.57
11	1.33	0.57	1.66	1.15
12	3.00	1.73	3.00	1.73
13	1.66	0.95	2.00	1.73
14	2.00	0.81	2.00	1.00
15	3.33	1.29	3.33	2.08
16	2.00	0.95	3.66	2.30
17	2.33	1.25	3.66	1.52
18	3.33	1.00	3.00	1.41
19	1.33	0.57	2.33	1.52
20	1.66	1.15	3.00	2.00
21	3.00	1.00	3.00	1.73
22	2.00	0.95	2.33	0.57
23	3.00	0.50	3.66	1.15
24	2.00	0.50	3.00	1.00
25	3.33	0.81	3.66	0.57
26	2.66	0.57	3.00	1.00
27	3.50	0.57	4.00	1.41
28	3.66	1.89	2.66	2.08
29	3.66	0.95	3.33	1.15
30	3.33	1.29	2.00	1.00



## APPENDIX E

Table 6. Response of Undergraduates to the Second Survey Using the Survey of Departmental Goals (N = 60).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	3.03	0.78	4.07	0.46
2	3.03	0.83	3.96	0.54
3	2.69	1.00	4.14	0.73
4	3.06	0.80	4.21	0.56
5	2.87	0.77	4.10	0.52
6	2.64	0.81	3.94	0.72
7	2.91	0.87	4.07	0.56
8	2.59	0.75	3.88	0.69
9	2.89	0.88	4.19	0.61
10	2.94	0.75	3.96	0.73
11	2.47	0.83	3.64	1.00
12	2.74	0.73	3.96	0.78
13	2.08	0.75	3.10	0.99
14	2.22	0.81	2.82	0.95
15	2.80	0.81	3.44	0.82
16	2.80	0.75	3.57	0.90
17	2.74	0.75	4.05	0.73
18	2.70	0.73	3.55	0.90
19	2.15	0.72	3.00	1.00
20	2.60	0.75	3.73	0.88
21	2.62	0.78	3.49	0.77
22	2.51	0.87	4.15	0.69
23	2.59	0.68	3.31	0.74
24	2.18	0.64	3.74	0.86
25	2.72	0.89	4.20	0.68
26	2.71	0.79	4.17	0.58
27	2.79	0.65	4.16	0.57
28	2.70	0.69	3.16	0.92
29	2.63	0.70	3.79	0.79
30	2.55	0.69	3.88	0.83

Table 7. Response of Faculty to the Second Survey Using the Survey of Departmental Goals (N = 6).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	3,25	0,50	4,25	0,50
2	3,25	0,50	4,75	0,50
3	2,75	0,50	4,50	0,57
4	3,00	0,00	4,75	0,50
5	3,00	0,00	4,75	0,50
6	2,50	0,17	4,50	0,57
7	2,50	1,00	4,75	0,50
8	2,50	0,57	4,50	0,57
9	3,00	0,00	4,25	0,50
10	3,00	0,81	4,75	0,50
11	2,25	0,95	4,25	0,50
12	2,50	1,00	4,50	0,57
13	2,00	0,81	3,75	0,95
14	2,00	0,81	3,75	0,95
15	2,75	0,50	4,25	0,95
16	2,25	0,95	3,50	1,00
17	2,75	1,25	4,75	0,50
18	3,00	0,00	4,50	0,57
19	2,00	0,81	4,00	0,81
20	3,25	0,50	4,00	0,81
21	2,75	1,25	4,50	0,57
22	3,00	0,00	4,50	0,57
23	2,50	1,00	4,25	0,50
24	2,00	0,81	4,00	0,81
25	3,00	0,00	4,75	0,50
26	2,75	0,50	4,00	0,81
27	2,75	0,50	4,50	0,57
28	2,75	0,50	3,75	0,50
29	2,50	1,00	3,50	0,57
30	2,25	0,95	4,50	0,57

Table 8. Response of Administrators to the Second Survey Using the Survey of Departmental Goals (N = 5).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	3,25	0,50	4,25	0,50
2	3,00	0,00	4,25	0,50
3	3,75	0,95	4,75	0,50
4	3,75	0,95	4,25	0,50
5	3,25	0,50	4,75	0,50
6	2,75	0,50	4,25	1,50
7	3,00	0,00	4,00	0,00
8	2,75	0,50	4,50	0,57
9	3,50	1,00	4,25	0,50
10	3,00	0,00	4,00	0,81
11	2,75	0,50	4,00	0,81
12	3,00	0,00	4,25	0,95
13	2,25	0,95	3,25	1,70
14	2,00	0,00	3,50	1,29
15	2,75	0,50	3,25	1,25
16	3,00	0,00	3,75	0,95
17	3,25	0,50	3,75	0,50
18	3,00	0,00	3,75	0,95
19	2,25	0,50	3,00	1,41
20	2,75	0,50	3,25	0,95
21	3,00	0,00	3,50	1,00
22	3,50	0,57	4,50	0,57
23	2,75	0,50	3,75	0,50
24	2,75	0,50	3,50	0,57
25	3,25	1,25	4,25	0,50
26	3,00	0,00	3,75	0,95
27	3,25	0,50	3,75	0,50
28	3,00	0,00	3,75	0,95
29	3,00	0,00	3,50	0,57
30	3,00	0,00	4,00	0,81

Table 9. Response of Graduates to the Second Survey Using the Survey of Departmental Goals  
(N = 3).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	2.66	1.00	4.00	0.57
2	2.50	1.00	3.00	0.70
3	2.00	1.15	3.66	1.00
4	2.00	0.57	3.33	1.00
5	2.33	0.57	4.33	0.57
6	2.66	0.57	3.66	0.57
7	2.33	0.00	3.00	1.15
8	2.33	0.57	3.66	0.57
9	2.33	1.00	4.00	0.57
10	2.66	1.00	4.00	0.57
11	2.66	1.15	3.66	0.57
12	2.33	0.57	4.33	0.57
13	2.33	1.52	3.66	0.57
14	2.33	1.00	3.00	0.57
15	2.66	0.57	4.33	0.57
16	3.00	0.57	2.33	1.00
17	2.33	0.57	3.66	0.57
18	2.33	0.57	4.66	0.57
19	2.33	0.00	2.00	0.57
20	2.00	0.00	2.00	0.00
21	2.66	1.15	3.33	0.57
22	2.00	1.00	4.00	0.00
23	2.33	1.00	3.00	1.15
24	1.66	0.57	2.33	0.57
25	2.66	0.00	3.00	0.57
26	2.33	1.15	3.33	0.57
27	2.00	0.57	4.66	1.00
28	2.33	1.15	2.66	0.57
29	1.66	0.57	4.66	1.15
30	3.00	0.57	4.33	1.00

## APPENDIX F

Table 10. Response of Undergraduates to the Third Survey Using the Survey of Departmental Goals (N = 43).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	3.02	0.65	4.02	0.53
2	2.97	0.65	4.02	0.53
3	2.70	0.88	4.02	0.55
4	3.10	0.77	4.15	0.49
5	2.92	0.67	4.20	0.52
6	2.89	0.55	3.82	0.75
7	2.81	0.60	3.87	0.52
8	2.66	0.70	3.86	0.41
9	2.76	0.67	4.34	0.53
10	2.84	0.78	4.07	0.57
11	2.52	0.72	3.71	0.76
12	2.74	0.72	3.65	0.84
13	2.20	0.80	3.26	0.89
14	2.10	0.75	2.86	0.90
15	2.76	0.70	3.68	0.90
16	2.68	0.80	3.53	0.60
17	2.71	0.65	3.97	0.55
18	2.65	0.53	3.63	0.85
19	1.97	0.59	3.02	0.83
20	2.86	0.74	3.51	0.96
21	2.70	0.77	3.97	0.76
22	2.68	0.70	4.24	0.54
23	2.71	0.61	3.72	0.65
24	2.28	0.51	3.42	0.82
25	2.73	0.79	4.05	0.62
26	2.71	0.73	4.05	0.46
27	2.68	0.57	4.02	0.49
28	2.89	0.72	3.16	0.72
29	2.89	0.72	4.08	0.82
30	2.63	0.67	3.83	0.79

Table 11. Response of Faculty to the Third Survey Using the Survey of Departmental Goals (N = 6).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	2.66	0.81	4.16	0.40
2	2.83	0.40	4.33	0.51
3	3.00	0.63	4.33	0.51
4	3.16	0.75	4.50	0.54
5	2.66	0.81	4.16	0.40
6	2.50	0.54	4.33	0.51
7	2.50	0.83	4.33	0.51
8	2.50	0.83	4.33	0.51
9	3.00	0.63	4.33	0.51
10	2.66	0.51	4.33	0.51
11	2.50	0.83	4.00	0.63
12	2.66	1.03	4.16	0.75
13	1.83	0.40	3.83	0.75
14	1.83	0.40	3.50	0.83
15	2.83	0.40	4.33	0.51
16	2.33	0.81	3.83	0.75
17	2.16	0.75	4.16	0.40
18	2.66	0.81	4.00	0.63
19	1.83	0.40	3.66	0.81
20	2.50	0.83	4.00	0.63
21	2.33	0.81	4.16	0.40
22	2.66	0.51	4.16	0.40
23	2.50	0.83	3.83	0.75
24	2.00	0.63	3.33	1.36
25	2.50	0.83	4.16	0.40
26	2.50	0.83	4.00	0.00
27	2.66	0.51	4.16	0.40
28	2.50	0.83	3.50	0.54
29	2.50	0.83	4.16	0.40
30	2.16	0.75	4.50	0.54

Table 12. Response of Administrators to the Third Survey Using the Survey of Departmental Goals  
(N = 5).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	2.80	0.44	4.40	0.89
2	3.00	0.00	4.20	0.44
3	4.00	0.00	4.40	0.54
4	3.60	0.89	4.20	0.44
5	3.00	0.00	4.20	0.44
6	2.60	0.54	3.80	1.09
7	3.20	0.44	4.20	0.44
8	2.60	0.54	4.40	0.54
9	3.40	0.89	4.20	0.44
10	3.00	0.70	4.00	0.00
11	3.00	0.80	4.20	0.83
12	3.20	0.44	4.60	0.89
13	2.40	0.54	3.80	1.09
14	2.20	0.44	3.40	0.54
15	2.80	0.44	4.00	0.78
16	3.20	0.44	3.80	0.83
17	3.00	0.00	4.20	0.44
18	3.00	0.00	3.80	0.44
19	2.20	0.44	3.40	0.89
20	3.00	0.00	3.80	0.44
21	2.80	0.44	3.80	0.44
22	3.20	0.44	4.20	0.44
23	3.00	0.00	4.00	0.00
24	2.00	0.00	3.00	0.70
25	3.40	0.89	4.60	0.54
26	2.80	0.44	4.20	0.44
27	3.20	0.44	4.20	0.44
28	3.00	0.00	3.40	0.54
29	3.00	0.00	3.60	0.89
30	3.00	0.00	4.20	0.44

## APPENDIX G

Table 13. Response of All Groups Combined to the Third Survey Using the Survey of Departmental Goals (N = 18).

Item Number	Factual Judgment (is)		Value Judgment (should be)	
	Mean	Standard Deviation	Mean	Standard Deviation
1	2.77	0.64	4.27	0.57
2	2.94	0.41	4.22	0.42
3	3.11	0.83	4.22	0.42
4	3.38	0.69	4.33	0.48
5	3.00	0.59	4.22	0.42
6	2.72	0.57	4.05	0.72
7	2.83	0.61	4.16	0.38
8	2.55	0.61	4.16	0.50
9	3.00	0.68	4.33	0.48
10	2.77	0.54	4.22	0.42
11	2.66	0.76	4.00	0.68
12	2.94	0.72	4.22	0.64
13	2.00	0.59	3.66	0.76
14	2.00	0.59	3.16	0.78
15	2.77	0.54	4.16	0.51
16	2.77	0.80	3.61	0.69
17	2.72	0.66	4.11	0.47
18	2.83	0.51	3.94	0.41
19	1.88	0.47	3.16	0.92
20	2.83	0.51	3.44	0.78
21	2.58	0.71	4.05	0.53
22	2.77	0.64	4.27	0.46
23	2.77	0.54	3.88	0.47
24	2.00	0.34	3.11	0.96
25	3.05	0.87	4.22	0.54
26	2.72	0.66	4.05	0.23
27	2.83	0.51	4.16	0.51
28	2.83	0.61	3.33	0.48
29	2.77	0.54	3.94	0.53
30	2.72	0.66	4.16	0.51