THE PERCEPTION OF CHANGE IN UNIVERSITY DEPARTMENTS

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The purpose of this study is to identify perceptual differences between hierarchical levels in organizations in general and in university departments in particular, and to analyze their consequences on the relationships between the need for change, the implementation of change, and the assessment of the success of change.

Three different models are developed and tested. The first model examines the amount of change in the various aspects of change at different types of departments. The second model examines the factor structure of the various actors in the system. The third model tests separately for each perceiver the magnitude of relationship between the different aspects of change and the success of change.

The implications of the models and their empirical tests to future studies of organizational change are discussed and elaborated.

Key words: organizational change; university department; perception

THE PERCEPTION OF CHANGE IN ORGANIZATIONS

Many studies use only one source of information per organization. This information is usually taken from the head of the organization or from heads of certain units within the organization. The assumptions behind the structural analysis of organizations are that the interviewed sources have the necessary information, and all other actors in the system share the same information (or perceptions) and behave accordingly. These assumptions lead to global theories of rational organizational change (Downs, 1967; Hage & Aiken, 1970; March & Simon, 1958). These theories emphasize three elements: determining the need for change, the process of change and its implementation, and the assessment of change and its routinization. The model developed by these studies includes three steps. First, the need for change is deter-

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mined by a gap between desired and actual performance. Second, the initiation and implementation of various aspects of change are influenced by the need for change; the higher the need, the higher the probability of initiation and implementation. Third, the assessment of change and its routinization are determined by successful initiation and implementation of the various aspects of the desired change.

The major failure of the rational model is its assumption that all actors in the organization perceive change similarly. Under this assumption, the perception of change and its processes remained a relatively understudied area. Wieland and Ullrich (1976) argue that the perception of change received generally little attention from behavioral scientists. Both macro- and micro-research has stressed objective change and has failed to identify the criteria that people use for making subjective estimates of the necessity of change, the process of change, and the assessment of change (successful or unsuccessful).

The analysis of the perception of change is important for at least two reasons. First, organizational decision-making regarding the need for change, its initiation, and its implementation are dependent on the accuracy of perception of the situation by the various actors in the system. Differences in perception may result in adopting the wrong courses of action and create untoward consequences. Second, research on the perception of change can assess the cognitive relevance of objective change by comparing factors which affect the process of change by various actors in the system.

The purpose of this study is to identify perceptual differences between two hierarchical levels in university departments and to analyze their consequences on the relationships between the need for change, the implementation of change, and the assessment of the success of change.

TOWARD MODELS OF CHANGE PERCEPTION IN UNIVERSITY DEPARTMENTS

The major variables in our models are:

1. the paradigmatic development of the field
2. the perceivers of change
3. need for change
4. aspects of change
5. success of change

Several studies indicate that the physical and social sciences differ in their paradigmatic development and that these distinctions account for different functioning patterns (Lodahl & Gordon, 1972, 1973; Neumann,

1977a, 1977b; Pfeffer, et. al., 1976, 1977). Therefore, paradigm development must be included in the model as a control variable.

Lodahl and Gordon (1973) identify various power holders in university departments: individual faculty members, a faculty group, a chairperson, and central administration. Since these hierarichical levels control different kinds of information, our hypothesis is that they differ substantially in their perception of change and its consequences. Therefore, these actors share the roles of the perceivers of change in our model.

Lodahl (1973) defined seven aspects of organizational change in university departments. These aspects are: teaching load, research money, research facilities, quality of graduate students, quality of faculty, "red tape", and staff size.

Three different models are developed and tested. The first model examines the amount of change in the various aspects of change at departments with different needs for change at the various paradigm states (social and physical sciences). This model is tested separately for each change perceiver.

The model is expressed by the following mapping sentence[1]

Perceiver

The perception of	Individual faculty member A faculty group Chairperson Central Administration	of the amount of change in

Aspects of Change

Teaching load Money for research Facilities for research Students' quality Faculty quality Administrative "red tape" Staff size	that has occurred in	*Departments with a Given Need for change* Departments with low need for change Departments with high need for change

Sciences

at the	Physical sciences Social sciences	in a given period of time

Is ----------→ | Very Low ⋮ Very High |

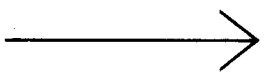
The second model examines the factor structure of the various aspects of change as perceived by the various actors in the system. If there are no perceptual differences, the same factor structure should characterize all perceivers. But if, on the other hand, substantial perceptual differences do occur and the factor structure is not the same for all perceivers, a one-actor based analysis may create a significant bias. The second model can be formally expressed as follows:

Perceiver

The perception of | Individual Faculty
A Faculty Group
Chairperson
Central Administration | is that the dimensionality

Aspects of Change

of the | Teaching load
Research money
Research facilities
Student quality
Faculty quality
Administrative "red tape"
Staff size | can be expressed by



One factor structure
⋮
Several factor structure

The third model tests the magnitude of relationships between the different aspects of change and the success of change separately for each actor (perceiver) in the system. This model can be expressed by the following mapping sentence:

Perceiver

The perception of | Individual faculty member
A faculty group
Chairperson
Central administration | is that the degree of

Aspects of Change

relationships between each of the | Teaching load
Student quality
Research money
Faculty quality
Research facilities
"Red tape"
Staff size | and success

These three models deal with different components of theories of change. The first model examines the relationship between change and need for change controlling for discipline and perceivers. The second model deals with the process of change and its dimensionality controlling for the various perceivers. The third model examines the relationships between each aspect of change and success of change.

The present study tests the three models for two perceivers: faculty members and chairpersons. The choice of the perceivers was determined by the availability of data, and a complete test must involve all perceivers. However, we feel that the comparison between two sets of perceivers can result in meaningful findings about the role of the perceptions of change.

METHODOLOGY

Sample

The data used in this study are the same that Lodahl and Gordon used in their 1972 study. A stratified random sample of 80 university departments, 20 each in physics, chemistry, sociology, and political science, was surveyed by means of a questionnaire. Cartter's (1966) Survey was used as a sampling frame. Thus, five departments in each of the four fields were drawn at random within each of the four quality levels used by Cartter (distinguished, strong, good, adequate plus). Within departments, the chairperson and all faculty members holding a title of assistant, associate, or full professor were included. A total of 1,161 faculty members and 49 chairpersons responded to the questionnaire, yielding a return of 51 percent and 61 percent respectively.

Measures

Both faculty members and chairpersons were asked the same items regarding change within the department. The text of the questionnaire was as follows (Lodahl, 1973, Appendix): "How much have things changed in your department in the last five years? For instance, what has happened in the following areas?" The change aspects, listed below, were rated on a nine-point scale:

a. decreasing teaching load (1 = large increase; 5 = midpoint; 9 = large decrease)

b. increasing amount of money available for research purposed from all sources, (1 = large decrease; 5 = midpoint; 9 = large increase)
c. increasing resources (equipment) (the same categories as in b)
d. increasing quality of graduate students (the same categories as in b)
e. increasing quality of faculty (the same categories as in b)
f. increasing administrative "red tape" (the same categories as in b)
g. increasing staff size (the same categories as in b)

In 1966, Cartter assessed the quality of graduate departments. He rated most of the graduate programs according to four categories: distinguished, strong, good, and adequate plus. His ratings are used as an objective base of classifying the need for change. Those departments which were ranked at the bottom of his scale were classified as having a high need for change; those departments which were ranked at the top of his scale were classified as having a low need for change. Data for this study were collected in 1968; Cartter collected his in 1964. Therefore, the measure of change that has occurred in the last five years includes the period after Cartter's data were collected and published.

The success of change was measured by the following question (Lodahl, 1973: Appendix): "On the balance, how do you feel about these changes and change aspects?" A nine-point scale was then constructed ranging from 1 (things are much worse than five years ago) to 9 (things are much better than five years ago). The midpoint (5) represents a case in which things are about what they were five years ago. (The original scale ranged from –4 to 4, where 0 is the midpoint).

Analysis

A 2 × 2 × 2 design is applied for the first model. This design included the major independent variables; field of science (social or physical sciences), the need for change (high or low) and the perceivers (faculty members and chairpersons). Four *t* tests were performed for each aspect of change and each perceiver of change. The first test examines the differences between perceivers (faculty members or chairpersons) in prestigious (low need for change) physical science departments and perceivers in social science departments (PH/SH).[2] The second test examines differences between perceivers in less prestigious (high need for change) physical science departments and perceivers in less prestigious social science departments (PL/SL). The third test examines differences between perceivers in prestigious physical science departments and perceivers in less prestigious physical science departments (PH/PL). The fourth test examines differences between perceiv-

ers in prestigious social science departments and perceivers in less prestigious social science departments (SH/SL).

In addition, a 2 × 2 × 2 factorial design, repeated measurement analysis of variance, was performed to test the effects of the main independent variables and their interactions on each of the seven dependent variables. In order to save the report of seven tables, the results of the analysis are presented, whenever appropriate, in the text.

The second model is tested by principal component analysis, performed separately for each group of perceivers. The decision criteria for determining the number of factors are: (a) all factors whose eigenvalue was greater than or equal to 1 were rotated. (b) All variables with a loading of .5 or greater on any factor were considered to have a significant loading on that factor.

The third model is tested by regression analysis performed separately for faculty members and chairpersons. The standardized regression coefficients and the correlation coefficient are the criteria used for determining the relative salience of the various change variables in predicting success of change.

RESULTS

Tables 1–3 present the tests of the first model. The results of the second model are presented in Table 4 , and Table 5 presents the test of the third model.

Model 1

Table 1 examines faculty perception of change in university departments. Differences between the physical and social sciences were observed in nine cases; in five of these cases, the social science faculty members perceive more change in their departments than the physical science faculty members, whereas in four cases an opposite phenomenon was observed. A more careful examination of the results indicates that a higher level of change in social science departments and a lower level of change in the physical science departments were mainly found in less prestigious departments. Thus, it is the level of prestige which determines whether a given type of science is characterized by a higher or lower level of change. In more prestigious departments, the social sciences implemented more change than the physical sciences, whereas the opposite occurred in less prestigious departments.

In most of the cases, faculty members perceived more change in less prestigious departments (a high need for change) than in more presti-

TABLE 1. Change in University Departments—Mean Faculty Perception
(N = 923–1,020)

Aspect of Change	Physical Science		Social Science					
	More Prestigious	Less Prestigious	More Prestigious	Less Prestigious	PH/SH	PL/SL	PH/PL	SH/SL
Teaching load	4.61	5.29	5.16	5.28	$P < .01$	N.S	$P < .01$	N.S
Research money	5.55	6.52	6.26	5.86	$P < .01$	$P < .01$	$P < .01$	$P < .01$
Research resources	6.67	6.74	6.30	6.08	$P < .01$	$P < .01$	N.S	N.S
Student quality	5.76	5.83	6.37	6.33	$P < .01$	$P < .01$	N.S	N.S
Faculty quality	6.06	6.86	6.27	6.79	N.S	N.S	$P < .01$	$P < .01$
"Red tape"	5.82	5.68	5.71	5.87	N.S	N.S	N.S	N.S
Staff size	6.65	7.26	7.02	6.96	$P < .01$	$P < .01$	$P < .01$	$P < .01$

Summary of Results

$S > P$[3]		$P > S$[3]		$H > L$[3]		$L > H$[3]	
Teaching load	(1 case: H)	Research money	(1 case: L)	Research money	(1 case: S)	Teaching load	(1 case: P)
Research money	(1 case: H)	Research resources	(2 cases)			Research money	(1 case: P)
Student quality	(2 cases)	Staff size	(1 case: L)			Faculty quality	(2 cases)
Staff size	(1 case: H)					Staff size	(1 case: P)
Total	(5 cases)	Total	(4 cases)	Total	(1 case)	Total	(5 cases)

Note: S > P presents all the cases in which the social sciences have more power than the physical sciences: P > S is the opposite. H > L presents all the cases in which more prestigious departments have more power than less prestigious departments, where L > H is the opposite.

gious departments (a low need for change). These phenomena were observed mainly in the physical sciences. Thus, according to faculty perception, a high need for change was related to initiating and implementing change in the physical sciences and did not have the same effects on social sciences. (This statement is also supported by the Analysis of Variance test).

Table 2 presents the results of chairperson perception. No differences were found in change implementation between chairpersons in the physical sciences and chairpersons in the social sciences. This does not confirm the results derived from faculty perception. Chairpersons did observe differences between less prestigious departments and more prestigious departments regarding change, but those differences occurred in the social sciences. (This was also supported by the Analysis of Variance test). Therefore, less prestigious departments (high need for change) are characterized by a higher level of change than more prestigious departments (low need for change).

Table 3 presents the comparison between the conclusions derived by the two sets of perceivers.

It can easily be seen that totally different conclusions can be arrived at depending on which set of perceivers one relies upon. In the physical sciences, the mean level of perceived change among faculty was higher for low prestige rather than for higher prestige departments. This was the case in the social sciences for chairpersons. Faculty members perceive significant differences between fields in adopting change at the various quality levels, while there are no perceived differences between physical and social science chairpersons. It seems that there are differences between the parties who perceive the change processes. (All the differences between faculty members and chairpersons are also supported by significant interaction tests in the $2 \times 2 \times 2$ analysis of variance).

Model 2

Table 4 presents the results of the factor analysis of the aspects of change. Differences were found between the two perceivers regarding the factor structure of the change items. Faculty members clearly perceive a two-factor structure. The first represents the intended consequences of effective change, i.e., increasing research money, research facilities, student quality, faculty quality, and staff size. The second factor includes the unintended consequences of effective changes such as "red tape."

Chairpersons perceive a one-factor structure where all the aspects of the change process are highly undifferentiable. Increasing "red tape"

TABLE 2. Change in University Departments—Mean Chairperson Perception ($n = 49$)

Aspect of Change	Physical Science		Social Science					
	More Prestigious	Less Prestigious	More Prestigious	Less Prestigious	PH/SH	PL/SL	PH/PL	SH/SL
Teaching load	5.09	5.70	4.82	5.80	N.S	N.S	N.S	$P < .05$
Research money	6.36	7.00	6.36	7.27	N.S	N.S	N.S	$P < .05$
Research resources	7.27	6.90	6.27	7.60	N.S	N.S	N.S	$P < .01$
Student quality	6.55	5.70	6.00	7.14	N.S	N.S	N.S	$P < .05$
Faculty quality	6.18	6.70	7.09	7.07	N.S	N.S	N.S	N.S
"Red tape"	5.55	6.30	5.82	5.73	N.S	N.S	N.S	N.S
Staff size	6.46	7.00	7.20	7.20	N.S	N.S	N.S	N.S

Summary of Results

S > P	P > S	H > L	L > H	
			Teaching load	(1 case: S)
			Research money	(1 case: S)
			Research resources	(1 case: S)
			Student quality	(1 case: S)
			Total	4 cases: S
no case	no case	no case		

TABLE 3. Comparison Between the Two Sets of Perceivers

Conclusions	Perceivers	Restrictions
A. Social science dep'ts have a higher rate of change than physical science dep'ts.	Faculty members	More prestigious dep'ts
B. Physical science departments have a higher rate of change than social science dep'ts.	Faculty members	Less prestigious dep'ts
C. Less prestigious dep'ts have a higher rate of change than more prestigious dep'ts.	1. Faculty members 2. Chairpersons	Physical sciences Social sciences

Areas of Agreement - *None*

TABLE 4. Factors of Change in University Departments

Variable	Faculty Perceptions		Chairperson Perceptions
	Loading (Fl)	Loading (F2)	Loading (F1)
Teaching load	.521	−.341	.734
Research money	.680	.074	.809
Research resources	.541	.217	.724
Student quality	.649	.006	.671
Faculty quality	.730	−.023	.768
"Red tape"	.105	.894	.585
Staff size	.632	.343	.824
Eigenvalue	2.39(2.45)*	1.09(1.03)	3.78
Explained variance	34%(35%)	16%(15%)	54%
n	923–1,020		49

*The values in parentheses are the results before the varimax rotations.

has been perceived to be an inevitable by-product of increasing staff size, research money, and facilities.

Model 3

Table 5 examines the relationship between each of the aspects of change and the success of change. The *R*-squares for both sets of perceivers are quite similar (0.51 for faculty members and 0.46 for chairpersons), but the relative salience of the various aspects of change in predicting the success of change is different. Faculty members perceive one aspect to be the most important predictor of the success of change,

TABLE 5. Regression Results: Dependent Variable—Success of Change

Independent Variables	Faculty Perception		Chairperson Perception	
	β	r	β	r
Teaching load	.08*	.26**	−.06	.37*
Research money	.06	.32**	.08	.51**
Research resources	.14**	.31**	.24	.54**
Student quality	.11*	.43**	.20	.50**
Faculty quality	.53**	.66**	.16	.52**
"Red tape"	−.16**	−.07	.09	.33*
Staff size	.07	.35**	.18	.56**
R^2	.51		.46	
n	923–1,020		49	

*$P < .05$
**$P < .01$

namely, the increased quality of the faculty. This factor by itself accounts for 44 percent of the variance (compared to 51 percent attributed to all seven predictors together and 18 percent explained by the second important factor). Therefore, according to faculties, a necessary path to insure the success of change is to initiate and implement changes in the quality of faculty. Chairpersons, on the other hand, perceive that a successful change is determined by five factors of equal importance: increases in research money, research resources, student quality, faculty quality, and staff size. Each of these factors by itself explains from 25 percent to 31 percent of the variance of success. In terms of the standardized regression coefficients, the relative salience of these factors are ranked: research resources, student quality, staff size, faculty quality, and research money. Therefore, a successful change as perceived by chairpersons must involve the initiation and implementation of change in five different areas.

CONCLUSIONS AND IMPLICATIONS

All the models presented in this study confirm our assumptions regarding perceptual differences between the two actors. The policy implications are completely different, depending on what group one studies. The reliance on faculty perception reveals the following conclusions and implications:

(1) A significant relationship between the need for change and change implementation exists only in physical science departments (Model 1). Therefore a more careful planning of change is needed in the social sciences (Bennis, 1965).

(2) The aspects of change are divided into aspects with intended consequences and aspects with unintended consequences. An effective change system must focus on those aspects which have intended consequences (Model 2).

(3) A successful change is related to the quality of faculty. Therefore, the emphasis in a change process must involve recruiting new professors, whereas the other aspects of change are relatively unimportant (Model 3).

Reliance on chairperson perception reveals the following conclusions and implications:

(1) A significant and positive relationship between the need for change and change implementation exists only in the social sciences (Model 1). Therefore, a more careful planning of change is needed in the physical sciences.

(2) There is no distinction between the various aspects of change and each of them belongs to the same universe of content. Therefore, no differentiation is needed between aspects with intended consequences and aspects with unintended consequences (Model 2).

(3) A successful change is determined by five factors; each accounts for a substantial portion of the explained variance of the success of change. Therefore, a successful change must involve the increase of the following aspects (they are ranked in order of their salience from high to low): research resources, student quality, staff size, faculty quality, and research money (Model 3).

The comparison between the two sets of conclusions results in a complete lack of consensus. So, what really has happened in university departments? The answer must include some guidelines concerning the study of change. First, perception-based research on change that occurs over a period of time has a low generalizable validity. Moreover, one-actor-based policy implications may be considerably biased and dependent on the group questioned. Second, the process of change may be more validly measured using an experimental paradigm. Post hoc analysis of the perception of change is highly dependent on the amount of knowledge and the selective memory of the perceivers. An experiment-based assessment of the change process (need, initiation, implementation, and the assessment of success) together with a systematic collection of information will insure an adequate level of knowledge about the system. Third, the type of information gathered must include, as much as possible, objective criteria of the process of change. Such a recommendation does not imply that attitudinal and perceptual data are unimportant, but only that greater attention to the development of objective criteria is warranted. The mapping of sentences and the models developed in this paper can also be modified to include more experimentally oriented types of study.

FOOTNOTES

[1]The idea of a mapping sentence is derived from the work of Louis Guttman (Elizur & Guttman, 1976; Levy & Guttman, 1975).
[2]This is the symbol to be used in all tables.

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