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ABSTRACT

This document presents a concern in relation to the NCHEMS Information Exchange Procedures Implementation Project--the absence of black-box analysis. The nexus between the Outcome of Post-Secondary Education Project and the Program Classification Structure is foucsed on black-box analysis to illustrate its importance through the area of the instruction/learning interface. (MJM)

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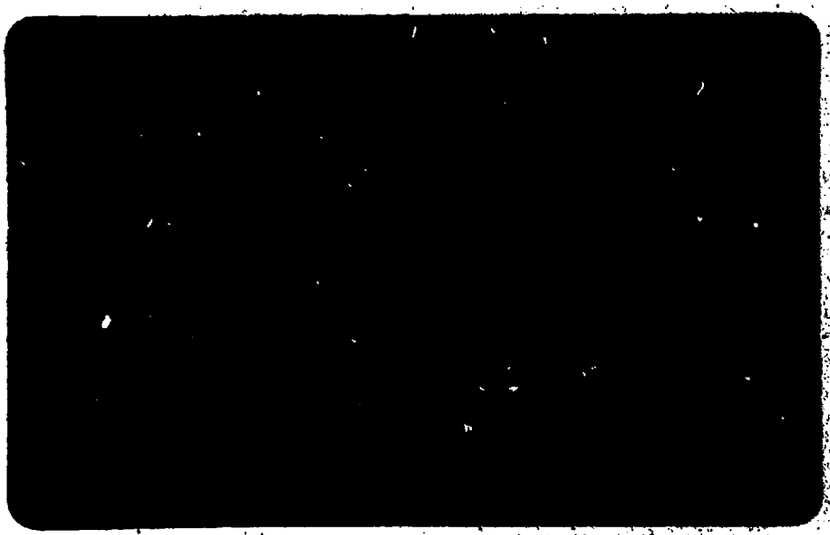

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WICHE/NCHEMS WORK AND THE NEED FOR BLACK BOX RESEARCH

by

James Steve Counelis

The process of reasoning, my friend, is neither contrary to the dogma of the Church nor alien to philosophy; but it is indeed the only means of finding that which we seek.

--- Michael Constantine Psellus, Letter to Ecumenical Patriarch John VIII Xiphilinos

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THE UNIVERSITY OF SAN FRANCISCO

Office of Institutional Studies and Management Information

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WICHE/NCHEMS Participants Advisory Assembly
St. Louis, Missouri
November 4-5, 1974

PREFACE

This paper was prepared in response to the program set for the 1974 WICHE/NCHEMS Participants Advisory Assembly and, in particular, to the following NCHEMS products: (1) Information Exchange Procedures; (2) Program Classification Structure; (3) Outcome of Post-Secondary Education Project.

Though brief, this paper expresses a concern which is in part a function of the state of our art in understanding educational enterprises. Hopefully, this paper will provide a useful stimulus and vector for future WICHE/NCHEMS labors.

I express my thanks to the Reverend William C. McInnes, S.J., President of the University of San Francisco, for designating me as the university's designated liaison officer. Also, I am most appreciative of Mrs. Fran Nishiguchi, my secretary, for her excellent work in making this paper possible. Of course, all opinions and errors are the responsibility of this writer, as they should be.

JSC

San Francisco, California
October 26, 1974

WICHE/NCHEMS WORK AND THE NEED FOR BLACK BOX RESEARCH

by

James Steve Counelis[+]

The leading and creative work of the WICHE/NCHEMS group in rationalizing the many disparate and inchoate elements, structures and factors of American higher education has been remarkable. Federal funding of this WICHE/NCHEMS structure is paying off now with larger dividends anticipated in the future.

The enlargement of the scope of WICHE/NCHEMS work through the structural meaning of the term "post-secondary education" is an important fact complicating the workiife of this group. However, the experience in this enlarged field is stimulating and productive, both intellectually and pragmatically.

In this brief paper, permit me to raise a concern I have in relation to the NCHEMS Information Exchange Procedures Implementation Project. But I will use the nexus between the Outcome of Post-Secondary Education Project and the Program Classification Structure to focus on my specific concern. That concern is the absence of black box analysis. Though I am not prepared with a full general systems theory analysis of the total NCHEMS structure, I hope to illustrate the importance of black box analysis through the area of the instruction/learning interface.

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The WICHE/NCHEMS Data Element Distionary (November 1973) contains Element No. 1107, titled "Method of Instruction." See Appendix for a copy of this element. The reader will note that seven methods of instruction as coded and described, these being: (1) lecture; (2) laboratory; (3) recitation/discussion; (4) seminar; (5) independent study; (6) tutorial; (7) programmed instruction.

Upon the reader's careful reviewing of this datal element, he will find the following comments pertinent. Firstly, the methods of instruction reflect only the higher education bias of previous policy and needs revision in terms of generic instructional formats in post-secondary education usage. Secondly, the descriptions of the methods of instruction are not explicitly descriptive of the morphology of the instructional methods indicated. Thirdly, there is no stated relation between instructional methods and learning outcomes. The second and third problems arise out of the absence of analysis of the black box called instruction/learning, even in the face of some science in the field. And it is at this point that the Outcomes of Post-Secondary Education Project and the Program Classification System fit together. Unlike the lack of recognition of the instruction/learning interface in Element 1107, Micek and Walhaus give in their report, An Introduction to the Identification and Uses of Higher Education Information (1973), Figure 1 (p. 8) in which an unanalyzed black box is noted, viz., "Institutional Environment." If I assay the current status of the whole WICHE/NCHEMS management systems structures, I see that the formal and substantive elements are already in place; and that the outcomes or "telic" aspect of the post-secondary education

system is being constructed now. But this outcomes segment appears to be developing in a disengaged manner, one ignoring the internal character and content of the educational and other processes of the post-secondary education system at the institutional level. What I see is, to use Aristotle's term, the absence of the principles of internal motion that makes education a vital process productive of specific and non-specific edu onal outcomes.

In a 1972 paper, this writer suggested in a fairly limited fashion for tuition-pricing purposes a chart which listed side-by-side a generic but undefined instructional format and a briefly stated "primary educational goals" pertaining to a given instructional format (Counelis, 1972). Following this lead and for the Program Classification System, this writer would like to see the datal element "Method of Instruction" converted to "Instruction/Learning Interface." Each instructional format would be generic in kind and described in terms of the observable morphology of that instructional format. And each generic instructional format would have a generically described learning outcome. Chart No. 1 presents one such analysis of the black box called "instruction/learning interface" which takes a mastery viewpoint on eight generic learning outcomes. Reference is made to Baker and Schutz (1971), Bloom (1956, 1971), Gage (1963), Gagne (1965), Harrow (1972), Havighurst (1952), Krathwohl (1956), Nuthall and Snook (1973), Sahakian (1970), Simpson (1966), Travers (1973), and Tyler (1950).

[Insert Chart No. 1 here]

The larger intersects of the modules given in the Information Exchange Procedures Implementation Project require sophisticated research

into the black boxes so as to eliminate them one by one. There are a few studies that can become beginnings in this area, several of which are those by Arrow (1965), Baumol and Marcus (1973), Bottomley (1972), Bowen and Douglas (1971), Counelis (1974), Fox (1972), Kuhn (1974), Maynard (1971), National Science Board (1969), Psacharopoulos (1973), Simpson (1972) and Solmon and Taubman (1973).

This writer believes that the WICHE/NCHEMS group must spearhead early research into such recognized black boxes as "institutional environment," "the utility structure of a four-year institution," or "the accreditation processed self-study understandings of an institution's educational outputs. Further, this writer believes that the distinctions would disappear between "the Operational Data Philosophy" and "the Program Analysis Philosophy" as given in Collier and Young's Revision of Program Classification Structures (September 1974) because the intersects among the datal elements would be more thoroughly mapped into specific calculi as a result of science and experience.

As this observer views it, the general problem for the whole of the WICHE/NCHEMS structure is the absence of documented causal links between means and ends in explicitly viable ways grounded in theory and empirical science. In regard to means/ends analysis, this writer presented a formal paradigm on means/ends analysis for policy and administrative practice in a 1967 paper (Counelis, 1967).

It is this writer's hope that his concern was well illustrated by one solution to the black box of instruction and learning outcomes as presented in Chart No. 1. The elimination of such black boxes is the next task for the WICHE/NCHEMS group, particularly in

terms of its current project relative to the outcomes of post-secondary education. Institutional and professional accountability demands this thrust in research. Can WICHE/NCHEMS move in this direction? Hopefully, yes!

CHART NO. 1: POST-SECONDARY GENERIC INSTRUCTIONAL FORMATS AND THEIR GENERIC LEARNING OUTCOMES

CODE	GENERIC INSTRUCTIONAL FORMAT	GENERIC DESCRIPTION OF INSTRUCTIONAL FORM AT	GENERIC LEARNING OUTCOMES RELATED TO SPECIFIC INSTRUCTIONAL FORMAT	GROUP SIZE
A	Lecture	Formal oral presentation of information: Primarily one-way communication	Student acquisition of cognitive and affective types of knowledge	25+
B	Discussion/Recitation Group	Organized small group format built upon reciprocal sharing of information	Student acquisition of cognitive and affective skills linked to a general level of encyclopaedic knowledge	15-24
C	Seminar or Tutorial	Organized small group format built upon reciprocal instruction in higher levels of cognitive and affective skills	Student acquisition of higher levels of cognitive and affective skills linked to particular discipline	5-14
D	Tutoring and Independent Study	One-to-one instructional intensive relationship with student educational goals setting directions	Student cultivation of student-specified educational goal, be it cognitive, affective or psychmotor, through supervised study	1
E	Laboratory/Demonstration/Workshop Activity	Organized task-oriented instructional format linking cognitive and affective knowledge to psychomotor development	Student integration of cognitive and affective learnings with psychomotor skill development	Equal to number of stations
F	Internship	On-the-job task-oriented instructional format integrating theory and practice under supervision	Student integration of theory and practice in real life situations	1
G	Counseling and Social/Psychological Skills Laboratory Group Format	One-to-one or small group format for affective goals in psycho-social skills, attitude modification or value development	Student acquisition of psycho-social skills, attitude change processes, or value development achievement	1-15

CHART NO. 1 (Cont'd)

CODE	GENERIC INSTRUCTIONAL FORMAT	GENERIC DESCRIPTION OF INSTRUCTIONAL FORM AT	GENERIC LEARNING OUTCOMES RELATED TO SPECIFIC INSTRUCTIONAL FORMAT	GROUP SIZE
H	Programmed Instruction	Highy patterned instructional format for particularized cognitive knowledges and skills	Student acquisition of particularized cognitive knowledges and skills	1

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APPENDIX

National Center for Higher Education Management Systems

1107
ELEMENT NUMBER

DATA ELEMENT DICTIONARY
Course Related Data Elements

ELEMENT TITLE: Method of Instruction

DEFINITION:

The categorization of the methods by which organized instruction is conducted, reflecting educational technology and the use of the facilities, materials, and equipment.

CODES, CATEGORIES, AND COMMENTS:

The following categories and definitions have been pilot tested by the Faculty Activity Analysis project and are recommended.

Code	Category	Description
A	Lecture	Formal presentation - primarily one-way communication.
B	Laboratory	Instructing, preparing, and supervising student investigations.
C	Recitation/ Discussion	Two-way communication of course materials.
D	Seminar	Students carry the major responsibility for preparation.
E	Independent Study	Student(s) works independently with only minimal faculty direction.
F	Tutorial	Students work one-to-one with the instructor.
G	Programmed Instruction	Course contents presented through programmed materials.

USES: RRPM, FAA, SAM, PM, HEFM, SWM

DATE ISSUED: November 1973