

Paradigms and Empirical Theory Construction

Elizabeth Steiner Maccia  
The Ohio State University  
May, 1964

BUREAU OF EDUCATIONAL RESEARCH AND SERVICE / THE OHIO STATE UNIVERSITY



## Paradigms and Empirical Theory Construction

Elizabeth Steiner Maccia  
The Ohio State University  
May, 1964

### The Nature of a Paradigm

A paradigm is a preliminary representation of something serving as a pattern from which the final representation is to be developed. Since the representation is preliminary, it is schematic, i.e. in outline form. There is a presentation of main elements and their main relations. This presentation, when it is not an object but a characterization, may take, and often does, a graphic form. Lines, usually along with terms, are utilized, and so a diagram emerges.

### Paradigms, Models, and Empirical Theory

Consider a paradigm which is a preliminary presentation of the variates and their relations in order to specify aspects of reality (phenomena) and their relations. Such a paradigm patently is empirical theory. To be sure, it is only preliminary empirical theory or the outlines of the empirical theory. If empirical theory is thought of as a model of (representation of) reality, then a paradigm which is a preliminary empirical theory may be thought of also as a preliminary model of.

Consider a paradigm which is a preliminary presentation of other empirical theory or formal theory from which the empirical theory is to be devised or to be explicated. Such a paradigm is not the empirical theory to be devised or to be explicated, rather it is a preliminary model for constructing the theory, a theory model

To summarize, with respect to the empirical theory being constructed, a paradigm may or may not be the same as the theory. If it



is a preliminary presentation of the theory, it is. If it is a preliminary presentation of a model for the theory, it is not.

### Illustrations of Paradigms

The diagram and the table on the following pages<sup>1</sup> is an illustration of a paradigm which is a preliminary presentation of an empirical theory. In Figure 2, which is a diagrammatic outline, the main variates--the school with its units (administrating, facilitating, inquiring, and teaching) and the environment with its dimensions (physical, biological, psychological, and social) are presented. Furthermore, the main relations between the environment, school, and the units of the school are presented in terms of flow into (input) and flow out of (output). In Table 1, which is a non-diagrammatic outline, what is presented in Figure 2 is repeated and also the variates of the inputs and outputs are presented.

The Figure below<sup>2</sup> illustrates the paradigm from which the preliminary empirical theory was devised.

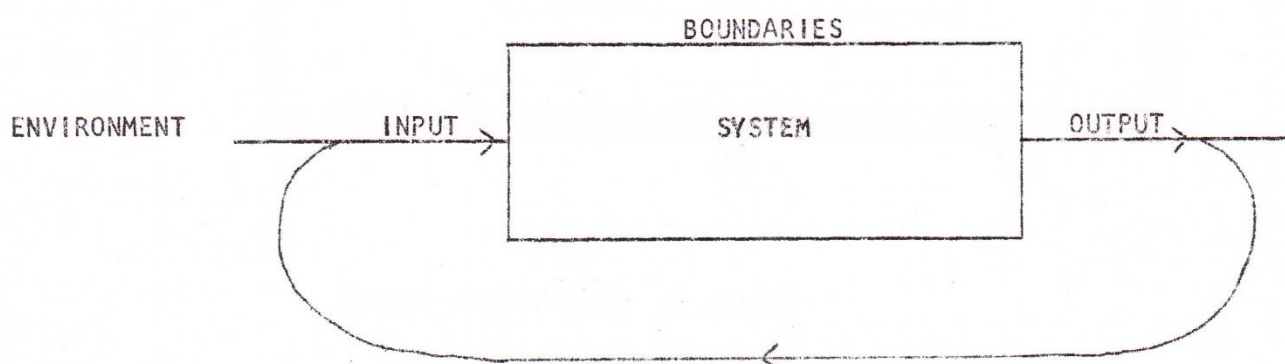


FIGURE 1: THE MODEL

<sup>1</sup>Reproduced from George S. Maccia, "An Educational Theory Model: General Systems Theory," in Construction of Educational Theory Models, Cooperative Research Project No. 1632, The Ohio State University Research Foundation, 1963, pp. 146-147.

<sup>2</sup>Ibid., p. 145.

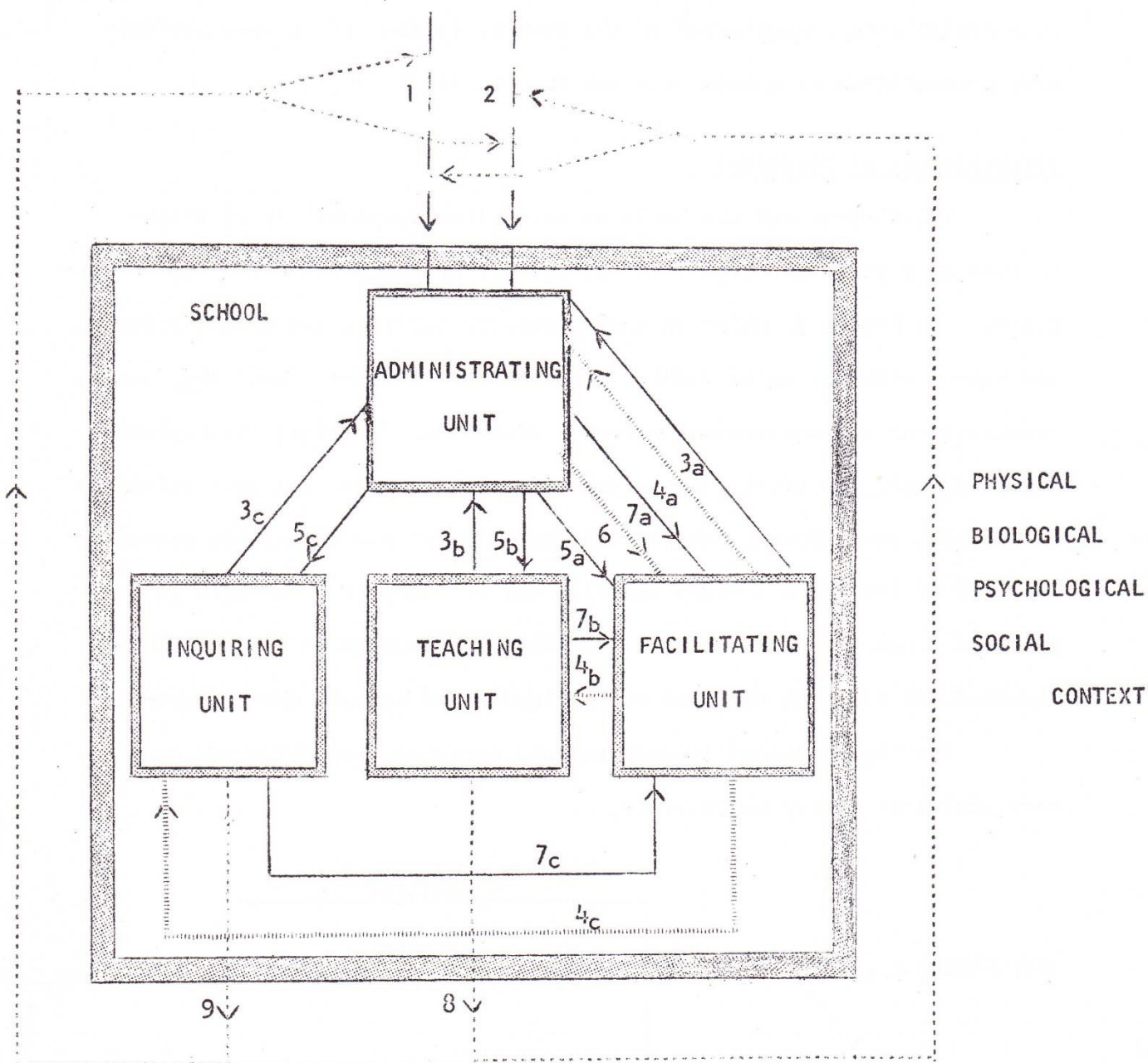


FIGURE 2: EDUCATIONAL THEORY

- '

Denotation of numbers is presented in Table 1 on the following page.



SYSTEM	INPUT		OUTPUT
	DEMANDS	RESOURCES	
School	1. Wanted Personalities, Wanted Role Takers, Wanted Structured Information, and Wanted Commodities	2. Persons, Information, Things, and Income	8. Personalities and Role Takers 9. Structured Information and Commodities
SUBSYSTEMS			
Administering Unit	1. As above		
	3. As Output from Other Subsystems	2. As above 4a. Persons, Information, Things, and Income as Output from Facilitating Unit	5. Policies as Input into Other Subsystems 6. Resources as Input into Facilitating Unit 7a. Resource Demands as Input into Facilitating Unit
	7. Wanted Resources as Output from Other Subsystems 5a. Policies as Output from Administering Unit	6. Persons, Information, Things, and Income as Output from Administering Unit	4. Persons, Information, Things, and Income as Input into Other Subsystems 3a. Policy Demands as Input to Administering Unit
Teaching Unit	5b. Policies as Output from Administering Unit	4b. Persons, Information, Things, and Income as Output from Facilitating Unit	8. Personalities and Role Takers 3b. Policy Demands as Input to Administering Unit 7b. Resource Demands as Input to Facilitating Unit
Inquiring Unit	5c. Policies as Output from Administering Unit	4c. Persons, Information, Things, and Income as Output from Facilitating Unit	9. Structured Information and Commodities 3c. Policy Demands as Input to Administering Unit 7c. Resource Demands as Input to Facilitating Unit

TABLE 1: INPUT AND OUTPUT IN FIGURE 2

Another illustration of a paradigm which is not a preliminary theory, but is a preliminary model for such theory is adapted from Horwitz<sup>3</sup>.

		Effects of variables in the:		
Upon variables in the:		Individual system A	Group system B	Institutional system C
Individual system	A'			
Group system	B'			
Institutional system	C'			

This paradigm is largely formal being a matrix which gives a pattern for devising or explicating relations between variates. For example, cell A-B' would contain variates of the smaller system A contained in the larger system B' affecting variates of B'.

#### Development of Paradigms

Paradigms which are models for empirical theory can be discovered or developed by intellectually roaming disciplines other than the one in which empirical theory is being constructed. Through retroduction, one or more of these paradigms, then, can be utilized to devise a paradigm which is the preliminary empirical theory. In constructing paradigms, it is important to note that

1. graphic presentation (drawing) may be psychologically but not logically satisfying, and

---

<sup>3</sup>M. Horwitz, "The Conceptual Status of Group Dynamics," in Review of Educational Research, 1953, 23, p. 310.

2. paradigms are preliminary not final endeavors in either theory or theory model construction.

With respect to the last cautionary note, a way of moving beyond the preliminary empirical theory is to move beyond the preliminary theory model.