

CHAPTER 8

EDUCOLOGY: THE SCIENCE OF EFFECTIVE EDUCATION

John B. Biggs

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TRANSITION: Professor Brezinka, in Chapter 1, traced the European origins of the debate over which kind of knowledge about education ought to be developed -- normative philosophical educology, scientific educology, or praxiological educology. In that chapter, 'educology' was conceived as sets of true statements about education. Professor Maccia, in Chapter 2, identified the linkages between several different conceptions of the term 'education' and the kinds of inquiry that resulted from those different conceptions. Professor Steiner, in Chapters 4 and 5, conceived of 'education' as the teaching-studenting process in any setting (e.g., within and outside of institutions). In terms of Professor Maccia's analysis, then, Steiner's conception of 'education' makes possible the distinction between inquiry about education and inquiry about other human phenomena, e.g., inquiry about socialization, enculturation, or psychical development. In terms of Professor Brezinka's analysis, Professor Steiner extends the conception of 'knowledge about education' from 'true statements about education' to 'adequate representations of educational states of affairs'. This conception makes possible the distinctions of quantitative, qualitative, and performative educology. Quantitative educology, in Steiner's analysis, includes the categories which Brezinka distinguished viz. normative philosophical, scientific, and praxiological educology. The categories of qualitative and performative knowledge about education extend beyond Brezinka's analysis. In Chapter 6, the narrower conception of 'knowledge about education' as true statements about education (vs. knowledge as representations) was used to relate educology to several concepts, including those of funds of knowledge, objects of knowledge, disciplines of knowledge, psychology of education, sociology of education, and anthropology of education. Also, three kinds of educology (analytic, normative, empirical) were related to the categories of analytic philosophical educology, historical educology, jurisprudential educology, normative philosophical educology, scientific educology, and praxiological educology. Thus, the analysis in Chapter 6 extended Steiner's distinction of quantitative educology to include historical, analytic philosophical, and jurisprudential educology. But the analysis did not allow the distinctions of qualitative and performative educology.

In the context of Professor Brezinka's historical analysis, Chapter 6 relates most closely to the position argued initially by Otto Willmann, Emile Durkheim, and Rudolf Lochner: A distinction between knowledge about existing states of affairs in education and knowledge about effective performances in education is possible and desirable.

Professor Monshower, in Chapters 3 and 7, examines the basis for a

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science of education. He lays out five criteria necessary for an adequate conception of science and derives from them a strict definition of 'science', designated as S_1 . He relates S_1 to the science of education by defining education as a process of intentional intervention to change social and psychical dispositions. The science of education (S_1 of education) is the form of knowledge about that process that meets the five criteria of strict scientific knowledge (i.e., logical consistency, empirical reference, explanation, exactitude or measurability, absence of value judgements). Monshower finds that structurally and pragmatically the science of education is not distinct from the psychology and sociology of education. (And he does not distinguish two senses of 'sociology of education', in contrast to the analysis done in Chapter 6.) There is the possibility, he argues, however, of developing a relatively distinct science of education by conceiving of it as a social technology -- a science of applying, in contrast to an applied science. This technology of education, in Monshower's analysis, has a scientific structure. It consists of problematically true generalizations about educational means (techniques) which are effective for any selected educational end, or goal. Technology, he maintains, is distinct from technics, which is the process of (1) selecting worthwhile goals and (2) choosing and using techniques that (a) have the highest probability of achieving the goals and (b) are consistent with ethical conduct. As for the concept of 'praxiology of education', Monshower equates it with a kind of bridging language which could make operationally comprehensible for practitioners (e.g., teachers, counselors, school administrators, social workers) the specialized, technical language of educational philosophy and science. He maintains that it should function reciprocally, i.e., that praxiology of education, as a bridging language, should translate the needs and concerns of educational practitioners into the more precise language forms that are required by educational scientists and philosophers for the conduct of their research and inquiry. Thus, Monshower's conception of 'praxiology of education' contrasts markedly with that of Steiner's. What he maintains could be a distinct science of education (i.e., a social technology of education) relates most strongly to Steiner's conception of praxiology of education. Her distinction between science of education and praxiology of education is made with respect to the object of knowledge -- that which is described and characterized by the knowledge. In her conception, science of education characterizes existing educational relations, and praxiology of education characterizes effective educational praxis.

Professor Biggs, in Chapter 8, maintains that a need exists for the development of concepts and inquiry that can be used to establish systems of true statements about effective educational practices. Thus, in the context of Steiner's analysis, the use of 'educology' in Chapter 8 is in the sense of 'praxiology of education' or 'praxiological educology'. In the context of Monshower's analysis, Biggs' use of 'educology' relates most closely in meaning to Monshower's use of 'science of education' and 'social technology of education'.

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INTRODUCTION

While most contributors to this volume are concerned with the meta-question of the structure of educational studies, I am concerned with a lower-order issue: conceptualizing effective teaching and learning in the context of school. What sort of things about the educational process does the teacher need to know in order to be a better, or more self-aware, teacher? What does he need to know in order to generate more effective ways of presenting scientific concepts to junior high school students; social science concepts to disadvantaged tenth graders? Such questions are not philosophical ones: I would call them educological.

In an earlier paper,¹ I argued that, questions of content or subject matter apart, the conceptual structure within which such questions should be construed was related to but not identical with psychology. It is both more and less than what has become known as educational psychology, and so I suggested what I then thought was a neologism to describe this structure: educology, a contraction of 'educational psychology', meaning the *logos*, or set of principles, that gives educational practices their validity.²

An important distinction needs to be made between an explicit theory underlying educational practice, and the effective practice that takes place anyway, on the basis of tradition, wisdom and individual intuition. Argyris makes a somewhat similar distinction between espoused theories and in-use.³ The former is crucial to the *profession* of education; the latter to the *craft* of education. As Hunt says:

Practitioners carry out their work whether informed by psychological theory or not, and psychologists should attempt to understand this activity as well as how practitioners conceptualise it.⁴

As far as possible, the espoused theory of the practitioner should coincide with his theory-in-use, so that what he actually does is theoretically explicit and coherent. Suppes, in discussing the place of theory in education,⁵ remarks that while psychology, economics, anthropology and so on, may have their effects on education, education needs to develop its own "deeply structured theories . . . that drastically reduce, if not eliminate, the need for wisdom."

In this chapter, I wish to discuss some aspects of such a theoretical venture; to look at its relationship to source disciplines, and to psychology in particular; and to illustrate with some recent examples of what I would call educological theory.

FROM THEORY TO PRACTICE

How does theory effect practice? Most academic psychologists would argue that the link is hierarchical: the practitioner deduces (or has

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someone, probably an academic psychologist, do the deducing for him) from first principles what needs doing in the particular case. In other words, effective practice requires that one needs to be a psychologist first and a practitioner second.

Apart from the breathtaking arrogance of such assumptions, they are assuredly wrong. First, there is the assumption that thought leads directly to action. Unfortunately, psychologists and academics generally assume, with Plato, that their words will change the practitioner's actions; "If right words are used, the desired action will follow."⁶

Even within the domain of psychology itself, this does not follow. As Bannister wittily puts it, if Christopher Columbus had possessed the mind of a modern psychologist, he would not have discovered America. It is even doubtful that he would have sailed, there being nothing in the literature to suggest anything else other than the edge of the world would have awaited him. But even if he had sailed, he would have done so on the hypothesis that he was travelling to India. When this hypothesis would have been irrefutably disconfirmed, he would have sailed back declaring the experiment a failure. Bannister concludes that the hierarchical model is simply inappropriate: fruitful first order statements are not impeccably deduced from theoretical principles, and indeed, in arriving at experimental ideas one needs to think "as loosely as a drunken Welsh poet."⁷

Apart, then, from *hawl* and alcohol, where do practitioners get their ideas? I would suggest four sources:

1. *LIFE EXPERIENCE*. These constitute a complex of things including personal upbringing and values, personal and collective wisdom, tradition, group mores, etc. These experiences and resulting values are learned informally; they occur before and on the job independently of formal professional training.

2. *LIBERAL ARTS*. The target here is the value system of the professional person. Specifically, liberal arts studies are undertaken with a view to creating values that tend to make the individual operate ethically, compassionately, and with lack of prejudice; to make him concerned to act professionally rather than industrially; to help him recognize the contribution that can come about (see below) from other subjects and disciplines; to predispose him to be open to, and cautiously critical of, innovation; and so on. Perhaps in particular he is to develop a "Model of Man;" i.e., basic, deeply felt and frequently unspoken assumptions about what Man might be. Such a model might be global and unsophisticated, such as McGregor's dichotomy between Type X and Type Y,⁸ to rather more articulated, multi-dimensional models. Most professionals, and particularly educators given that the fundamental medium of their profession is human interaction, have some sort of Model of Man. It is this that is the target of the "liberal arts" component of teacher education.

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3. *CONTENT DISCIPLINES*. These are the *what* of education, and it is a truism that teachers need to know their subjects well in order to teach them effectively. There is a great deal of controversy about how well this might be, particularly at high school level. Traditionalists (with one Model of Man) place this level of content much higher than humanists (with a different Model of Man). In either event, content studies form an essential part of teacher education.

4. *SOURCE DISCIPLINES*. A variety of disciplines give theoretical coherence to educational practice. Traditionally, these disciplines have been referred to as Foundations of Education. Three main groups of source or foundation disciplines have particular relevance to educational contexts: psychology (student learning, motivation, individual -- the general educational psychology area) to the *individual* context of education; sociology, administration, history and economics to the *social* context; and philosophy and ethics to the *value* context. Of these, the subject matter within the individual context is probably the most well articu-

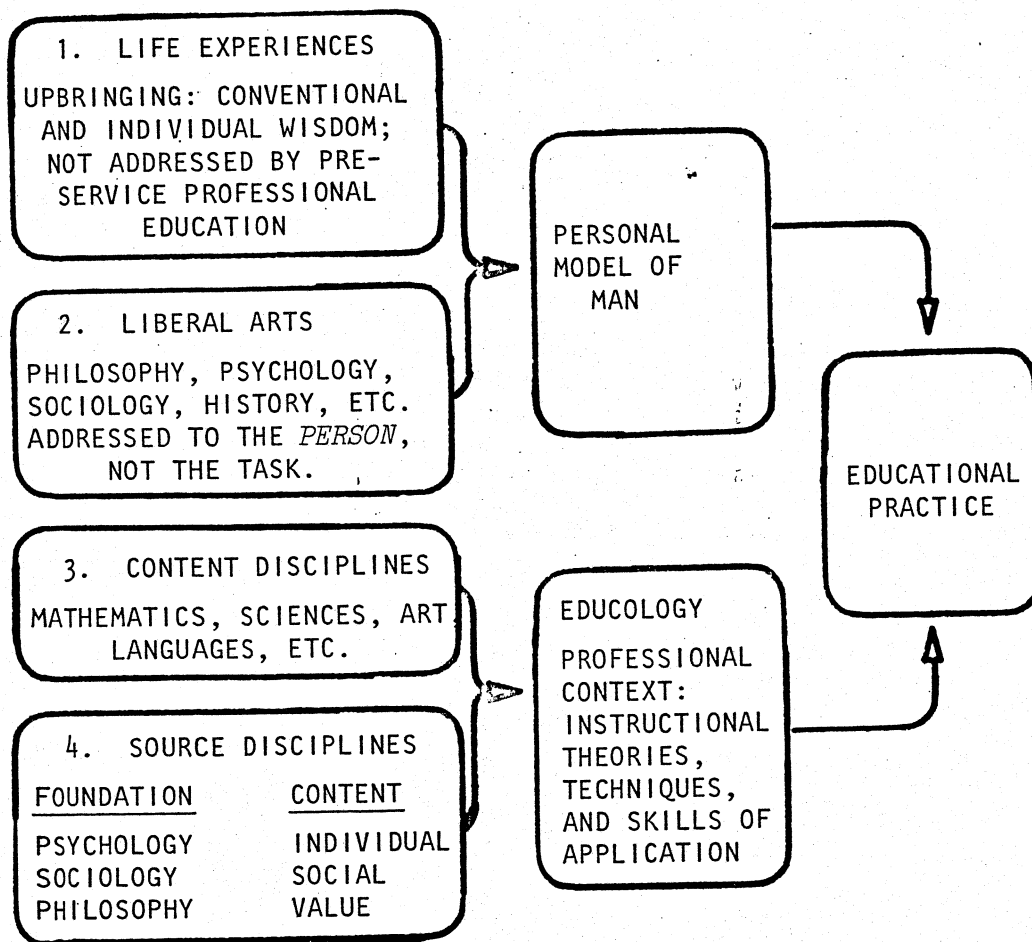


FIGURE 8.1
From Theory to Practice

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lated, and because this is my own area of expertise, will receive most attention in this chapter. The social context consists of a variety of subjects, mostly quite relatively new, and consequently there is lacking here both a stabilizing history within subjects, and the various interdisciplinary links between subjects. The general relationship among these components is outlined in Figure 8.1, and before discussing educology itself, which is the main focus of this chapter, it would be appropriate to look at the total picture of which education is a part.

Educational practice -- what a teacher does in the here-and-now of an educational episode -- is broadly a function of two things. First, and probably foremost, what the teacher does depends upon what sort of a person he is, what his values are, what he believes children are like; in short, upon his Model of Man and his theory-in-use generally. Two main sources are suggested to interact to produce this theory: the teacher's basic life experiences, which have little to do with formal education; and those aspects of his education that, while not directly related to his profession, *do something to him* in the sense implied by the study of, particularly but not exclusively, the humanities.

Second, what the teacher does depends upon his particular technical and professional know-how. He must know his subject; he must also know how to teach it. Content knowledge and some knowledge of some disciplines interact to produce principles of curriculum design, evaluation, instructional design, and a host of particular skills and techniques related to the teaching of particular subjects, using particular media. It is this amalgamation of content and source disciplines that I call educology.

Of course there are also interactions between all four components. For instance, one's upbringing might have a crucial effect upon choice of subject specialization; while the study of a particular subject in depth is likely to affect one's values.⁹ But possibly the greatest source of confusion, particularly in the context of teacher education, is between Components 2 and 4. Psychology is placed in teacher education programs in the belief that such study will facilitate, if not directly generate, instructional procedures. This is of course the hierarchical assumption, and it is almost entirely inappropriate, as argued above.

There are many psychological topics that a teacher should study, not because he will thereby, after taking thought, increase his armory of tactics, but because his own value systems will be the more enriched by studying the proper study of Mankind. In ways that are hard precisely to articulate, I find it desirable that any children of mine will be taught by someone who has interacted richly with studies in the humanities, and particularly psychology (given too that he knows his subject and teaches it). Hence there is a worthy place for psychology in Component 2 -- but not to fulfill the role expected of it in Component 4. It is precisely because the role of Component 2 has been confused with Component 4 that has led to the cry that psychology is irrelevant to educational practice. It is true that there are indeed few educational practices that can be said to be directly related to deductions from theory.¹⁰ But that does

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not mean psychology does not have a different, *analogical*, role in Component 4. For example, let us take the Swiss psychologist Piaget, who after many years of neglect by educators, is now their darling. Few courses in teacher education would not refer at length to the Piagetian theory of cognitive development. Piaget was basically concerned with explaining the genesis of knowing, which he construed as an empirical as much as an epistemological question. He thus made an intensive study of the way in which certain critical concepts (e.g., space, time, number, reality, etc.) develop in children (and particularly his own children). At first sight, such an activity seems to be very closely related to educational concerns, but as I have argued elsewhere,¹¹ the relationship is illusory. It might help a teacher articulate his value system (Component 2 above) to know that "the young child is quite different from the adult . . . in methods of approaching reality, in the ensuing views of the world, and in the uses of language"¹² but it is most unlikely to help him decide in what way he should change his teaching itself.

It is noteworthy that Piaget himself made it quite clear that he did not consider psychology as the direct progenitor of educational practice. In discussing this issue,¹³ he refers to Claparede's term "experimental pedagogy" as the study of teaching methods and states. He maintained that this is "the study of programs and not a branch of psychology -- which does not mean that psychology does not constitute a necessary reference point but that the problems posed are different from those of psychology." The relation to psychology is as medicine is to biochemistry, engineering to physics: it is the systematic development of a testable theory about what happens in the classrooms.

Glaser¹⁴ refers to virtually the same area as the psychology of instruction, which has the status of the "linking science" advocated by Dewey in 1900,¹⁵ to mediate between theory and practice. Glaser has overemphasized the role of psychology in this linking science -- possibly because of his particular concern with individual student learning -- but the general notion is the same as that advocated here.

Finally, a brief word on terminology. As explained elsewhere,¹⁶ "experimental pedagogy" is not really satisfactory; Glaser's "psychology of instruction" is too limiting, although psychology's role as a foundation discipline is crucial; "praxiology" as defined by Steiner overlaps the present area to some extent, but this term contains no reference to education as such. 'Educology' captures the underlay of educational psychology while at the same time expressing the autonomy and direction of the discipline underlying educational decision-making. Some other contributors to this volume, on the other hand, use 'educology' to mean a meta-discipline, which might be mapped onto Figure 8.1 as a third dimension, orthogonal to the present plane of the Figure.

Having made it clear at least what I mean by educology, I would next like to discuss the nature of this body of theory, with particular reference to the points of departure from the various source disciplines.

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THE NATURE OF EDUCOLOGY

1. *THE SOURCE OF CONTENT.* If the propositions that form the content of educology are not derived directly from parent disciplines (see above), from whence do they derive? I would like to follow James¹⁷ and suggest that they arise in interaction between "an inventive mind" and his work context; the nature of the inventiveness deriving partly from the categories of thinking bestowed by the study of psychology and other disciplines. Such inventiveness may not reasonably be expected of every teacher: this is in fact one role of the educologist. To put matters more simply, psychology (and following Suppes,¹⁸ economics, anthropology, and many other disciplines too) should suggest by analogy or by metaphor that certain things might be fruitfully done in the classroom; these suggestions are then to be followed up by appropriate research, development and application.

An example would be the branch of classroom engineering called behavior modification. Behavior modification did not arise as a direct application of operant conditioning, but simply from the idea that the condition of immediately reinforcing a desired response, which worked well with laboratory animals, might work with humans too. In order to implement this idea, the technology of behavior modification was born, which draws no conceptual sustenance from operant conditioning beyond the original metaphoric leap that got it going.¹⁹

I have been referring largely to psychology so far. Of course there are several disciplines that can be the source of such metaphoric stimulation: sociology, anthropology, economics, to name but a few. Further, different disciplines will find their metaphoric relevance in different aspects of educational application: economics in administration, psychology in learning and instruction, sociology in group structures. and so on.

Finally, a word is perhaps necessary about such metaphoric stimulation. This is not as likely to occur in the mind of the brilliant academic in his discipline (although it may, and Skinner is an example of such a one), as to the person who is practically involved in the area as researcher or practitioner, and who has a deep understanding of the discipline. In other words, the *context* of the application is as vital as the foundation content as such; and this brings me to the second point.

2. *EDUCOLOGY DEALS IN FIRST ORDER CONCEPTS.* This point is made by Collis,²⁰ who points out that whereas other sciences are concerned with pure research that elucidates relationships between concepts alone, educational research elucidates relationships between concepts and conditions in the real world. For example, the word 'intelligence' to a psychologist revives associations with the nature-nuture controversy, with interpretations of factor loadings of tests, with brain structure, and so on, but to the teacher the word 'intelligence' relates to performance in particular school subjects, or to the likelihood that a particular child in the absence of specific teaching will work towards an examination with every

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likelihood of success.

Hardie²¹ takes a more radical view; he states that educational research might more appropriately be regarded as operations research, the aims of which are not to acquire knowledge by means of which we can explain or predict events, but simply to enable more rational decisions to be made, in particular those that provide better cost benefits from available resources. To Hardie, a theory of education is not a deductive pattern correlating different laws, but a collection of sentences: analytic definition, empirical generalizations, and prescriptions for practice.

3. *EDUCOLOGY IS CONCERNED WITH SPECIFIC PRESCRIPTIONS, NOT GENERAL LAWS.* Following from 2 above, educology must deal with contexts as they arise in educational practice. For example, Snow²² refers to the complications of *ATI* (aptitude-treatment interaction) research. This research starts from the apparently reasonable assumption (derived from psychological constructs) that individuals with certain personological characteristics (aptitudes) will perform maximally under teaching methods (treatments) that "fit" those characteristics, but poorly under different treatments. Thus, experimental studies that show no difference between different methods of teaching need to take into account individual differences in the learners. Bracht²³ in a comprehensive survey of *ATI* studies showed, however, that such interactions did not occur at beyond chance level. Snow explains this by saying that the aptitudes, or individual difference variables, taken into account in classical *ATI* studies were derived from general theories. If education is situationally bound, then there is no reason to suppose that an *ATI* found, say, with convergent/divergent students in the teaching of math in a Midwest grade 10 classroom will replicate in, say, social science taught in Australian grade 8 classrooms with teachers working under different industrial conditions. This is not to deny that aptitude-treatment interactions exist, but that they are contextually bound, and it is the job of instructional theory (educology) to determine what is likely to be the case in a particular instructional setting.

Part, but only part, of the problem here is that educational researchers have been using inappropriate models of research, derived largely from agricultural research. As Snow says elsewhere,²⁴ educational research should adopt research designs that emulate the natural context rather than systematically control it: most educational experiments are not, in his view, *ecologically valid*.

Lundgren²⁵ makes a very similar point: educational research to him is not philosophical or psychological as such, but *hermeneutic*, which involves placing positivistic explanations of actions into individual and social contexts. Thus, teacher effectiveness is not a matter of possessing certain characteristics, but of understanding how teachers, in a certain context, with certain pupils, with certain goals and intentions, and with a certain amount of time at their disposal, do their work. The starting point in such an understanding is the *system*, not the psycholo-