

Integration Without Confusion

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FASHIONABLE RESTAURANTS serve dishes that integrate several types of diversity. First, there is the diversity of ingredients, which presumably have been chosen for variety of flavors, textures, and colors. Then, there is the effort to integrate nutritional quality, flavors and visual elegance into *an* experience for the sophisticated *bon vivant*. If successful, the chef achieves integration without confusion. This occurs if each type of unity is grounded in some principle that justifies the chef's choices. The principle may not be explicitly formulated, but good chefs will not hesitate to defend their decisions by an appeal to principles that underlie the skill. Perhaps the most difficult decisions to explain are those made for aesthetic reasons, albeit centuries of cogitations by aestheticians, art historians and critics have been invested in trying to discover the principles of what Immanuel Kant dubbed "the beautiful and the sublime." If such diversity of theory creates confusion, it is not mindless confusion.

By contrast, Aunt Fannie's Wednesday evening's hash has provided gustatory delight to generations of diners without formal recourse to logical, aesthetic or even culinary principles — she uses leftovers and whatever she can find in the kitchen garden or the refrigerator. This is integration without resort to logical or even nutritive principles; it could be dubbed integration by informal confusion. Nevertheless, Aunt Fannie knows what is right and wrong in matters of cooking procedures, and she doesn't confuse boiling with frying, etc.

Scholars interested in integrative studies probably do not dwell on aesthetic integration, albeit some objects may achieve something that merits the

characterization “beautiful.” More commonly, the goal is logical integration of concepts or classes of concepts: to devise a rational schema that subsumes the concepts of a number of apparently diverse domains. Of course, deconstructionists deny ultimate truth to rational schemes, but persist in claiming truth for the denial.

Aesthetic variety, nevertheless, may be more important for the integrative enterprise than academic searchers may realize. It occurs whenever thought and action present a sensory portrait of feeling and therewith of significance. A thunderclap illuminated by a streak of lightning combines awe, expectation and foreboding that no scientific explanation can fully achieve, nor completely overcome.

The unspoken yearning for life to make aesthetic sense is a demand for existential integration of action and feeling, of deeds and consequences. The achievement of such unity by science or art understandably becomes a milestone in the human enterprise. The uneasy status of the humanities and especially of the arts in general education is witness to the need for images that make sensory as well as logical sense.

It is commonplace, therefore, to characterize the intellectual enterprise as a pendulum moving to and from analysis to integration. Failure can take the form of making distinctions without a difference or overlooking important differences. Perhaps the most familiar defense of confusion is the iteration that life is a seamless unity which analysis destroys. Yet where does one find phenomena that do not have parts with more or less distinctive functions? And do not these parts yield to further and further analysis, until the limits of intellect, patience, or instrumentation are reached? Conversely, the more refined the analysis, the more urgent does the search for unity become, lest the inquiry degenerate into hairsplitting and nitpicking.

Integration and Education

Nowhere is the search for integration without confusion more persistent than in education. The study of separate subjects contends with the unity of the student’s life. The search for an integrated curriculum without confusion is the story of formal education. The search for the integrated life without confusion is the story of mankind itself.

With this as background, I venture to discuss an example of an attempt to design a curriculum for secondary education based in part on a very complex schema for integrating the panoply of achieved and achievable knowledge.

It will be recalled that among the consequences of Sputnik was a wave of attempts to reform secondary school curricula in mathematics and the scien-

ces. In many quarters it was argued that the structure of knowledge was the key to a genuinely integrative curriculum. It was not surprising, therefore, that the Fifth Annual Phi Delta Kappa Symposium on Education Research was entitled “Education and the Structure of Knowledge.”¹ Among the papers invited for the occasion was one entitled “Zetetics and the Structure of Knowledge” by Professor Joseph T. Tykociner of the University of Illinois Department of Electrical Engineering.²

According to Tykociner, the sciences, humanities, and engineering were being regarded as separate islands, each with its own cadre of scholars, researchers, teachers, and practitioners. It is the role of zetetics, the science of research and artistic activity, to study human knowledge as a whole: its origins, growth, and transitions. Especially important for the enterprise was to discover the bridges between disciplines that seem to be unconnected.

To carry out this ambitious program, Tykociner developed an extensive schema featuring such terms as zetesis, texilology, problematology, exiligmology, etc. as well as a detailed map of the several areas of knowledge, their functions, and their interconnections (see Figure I). This work was published under the title *Research as a Science — Zetetics* in 1959 and a somewhat revised and expanded version appeared as *The Outline of Zetetics* in 1966. Both were published by the Electrical Engineering Department of the University of Illinois in typewritten form.

The active career of Professor Tykociner as engineer and scientist spanned more than 70 years. The first 50 years were spent mainly in the physical sciences, beginning as a pioneer in the field of radio. He is probably best known for his invention of sound-on-film, successfully demonstrated at the University of Illinois in 1922. The last score of years were devoted to the study and teaching of zetetics. His dream of integrating all research and knowledge in the sciences and humanities led to his establishment of the Tykociner Memorial Lectures series at the University of Illinois.⁴

When my colleagues, the late B. Othanel Smith, Joe R. Burnett, and I set out to do a book on the curriculum in the early 60s, we were confronted with the perduring and obstinate problem of how the school can produce excellence without snobs and equality without slobs. Then, as now, a clamor arose for excellence in the schools, a curriculum that would challenge the gifted to lead the nation into the scientificotechnico future, albeit at that time the Japanese had not yet demonstrated how it was to be done. Clearly, the school had to develop a curriculum that within the constraints of resources and time could combine the insights of the humanities as well as of the sciences. It occurred to us that the Tykociner map provided a useful guide to the construction of a curriculum that could make strong claim to being the same for all

yet would provide clues to method of teaching that would take into account individual differences.

A glance at the design of this curriculum shows the influence of Tykociner classification (see Figure 2). We decided that the general education requirements would include Symbolics of Information, viz., language and mathematics, to which would be added the symbolic skills of aesthetic perception: basic concepts from biology, chemistry, and physics; developmental studies of the cosmos, institutions, and culture: value exemplars from art, literature, philosophy and religion; and social problems consisting of exercises on molar personal and social problems.⁵ We did not copy the Tykociner classification or attempt to incorporate all its sophisticated theoretical constructs, but they provided us with a highly rational and sophisticated store of resources for making educational decisions — in short, integration without confusion.

The specification of the three developments strands came pretty much from the Tykociner map. It served not only as a source of nomenclature, but more importantly as a check on completeness and logical cogency. It helped us distinguish between the various disciplines as subjects of direct instruction and the activities wherein the students used the resources of the disciplines to perfect their skills in problem solving, especially of what we dubbed “molar” problems.

Understandably, the elimination of formal study of history, geography, civics and foreign languages as such from the general curriculum was not received with unqualified enthusiasm, for these subjects are established components of school instruction. However, one might legitimately ask whether these subjects were essential to general education or should more properly and logically be included under requirements for various strands of vocational and prevocational training. Which foreign language, for example, should be required by all? And do all courses required for entrance into college automatically qualify as general education? These questions plunge the curriculum designer into problems that professionally occupy the attention of philosophers of education, who, in turn, must master the structure of disciplines that are relevant to them. The analysis and synthesis of the good life in a culture that is regulated by good institutions may not always ingress the curriculum explicitly, but they hover over every curriculum decision.

This strategy, however, entailed a careful conversion of formal historical resources and the concepts of a whole array of what Tykociner lists as “sociological sciences, sciences related to sustaining life, regulative and disseminative sciences.” The process of selection and their embodiment in a curriculum is a challenge to the whole structure of research on curriculum

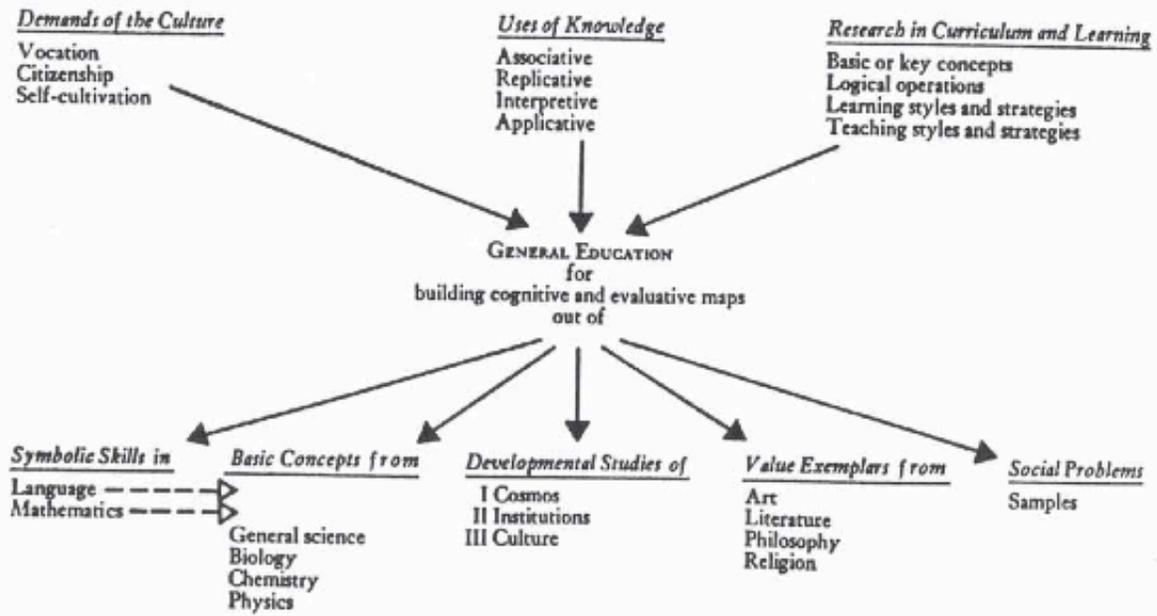


FIGURE 2. Design for Common Curriculum in General Education (Grades 7-12).

design, school administration, learning theory, and evaluation, let alone textbook publication and adoption.

We can think, therefore, of a field called “educational zetetics” that studies systematically the translation of human experience into teachable programs under the fiscal, social and political constraints of a culture. That we are far from having such a science, despite the volume of educational research, may perhaps serve as an incentive to develop one. In the table of contents Tykociner promises that Chapter VIII, “Environmental Conditions and Incentives” and Chapter X on “Recent Centers” would “be added in a later addition.”

The arts are not neglected in the zetetic map of human activity. The citations in the index include: art criticism, artistic creation, arts as communication, as basic sciences, functions, growth prospects, links with other areas, place in knowledge systems and the uniqueness of works of art. Related to the arts are what Tykociner called the “aspirational sciences,” which include a wide range of ideological patterns and all the theologies (p. 63). Aspirational sciences belong to the larger group of integrative sciences.

At no time has the study of research into the nature of knowledge, its character and uses, been more functional than it will be in the coming decade and the century that it will introduce. The speed with which abstract knowledge is transformed into technological instruments and political policy is as impressive as it is frightening. It is, in short, a propitious time to examine once more the insights of zetetics.

It is also time to return to the theme of this talk, viz., integration with or without confusion. Does the zetetic principle as worked out by Tykociner exemplify clarification or confusion? The use my colleagues and I tried to make of it provides a tentative answer. Clearly we believed that our schema for the curriculum clarified the muddled situation of the secondary school, a muddle which has not noticeably been reduced by the diverse pressures constantly impinging on that institution. Every change in the economic picture, every new evil discovered in the social structure issues in a demand that the school do something about it. The pressures do not decrease in intensity, albeit the targets differ with the state of the economy and with the ideological fashions of the day.

We believe, for example, that reorganizing a whole array of possible studies under the schema of the three developmental strands reduces the confusions about the curriculum that are plaguing the schools. And there is little doubt that the field of academic inquiry needs schema that make more sense than establishing a new department to carry on research about every

divagation in the culture. There comes a time when overspecialization confuses rather than clarifies.

Yet the very scope and wealth of detail of the zetetic map at first sight seems to confuse rather than clarify. Are these distinctions all as necessary and inevitable as they seem to be? Illuminating as they are, do they not invite confusion? What would a curriculum that tried to devise courses for the diversity of subjects, areas, and sub-areas look like in a college catalogue? In short, the zetetic map provides a critical test for the testing of the enterprise of integration without confusion.

Biographical Note: Dr. Broudy is Emeritus Professor of Philosophy of Education at the University of Illinois at Urbana-Champaign. In recent years, he has been devoting much time to the problems of higher education, including various projects on interdisciplinary thinking. He has also recently served as Coordinator of the Committee for Interdisciplinary Studies for the Council of Deans and Academic Directors. Among Dr. Broudy's major concerns has been the formulation of a rationale for liberal education in terms of interpretive uses of knowledge. For several years, he served as Staff Director for the Chancellor's Commission on the Reform of Undergraduate Learning and Living. He is also Senior Faculty Member for J. Paul Getty Institute for Education in the Visual Arts.

Dr. Broudy is a distinguished teacher, scholar, and lecturer. In addition to the Ph.D. in philosophy which he earned at Harvard University, he has been the recipient of several honorary doctorates. His major publications include *Building a Philosophy of Education, Democracy and Excellence in American Education* written with B. O. Smith, *Enlightened Cherishing: An Essay on Aesthetic Education, Truth and Credibility: The Citizens Dilemma, The Role of Imagery in Learning*, and *The Uses of Schooling*.

Endnotes

1. *Education and the Structure of Knowledge*, Stanley Elam, Editor (Chicago: RandMcNally, 1964).
2. *Opus. cit.* pp. 120-147.
3. Professor Tykociner, for many years, taught the course "Research as a Science" in the Electrical Engineering Department.
4. The first lecture was given by Dennis Gabor, "The Scientist in the New Society," 1972; the second, "The Divorce Between the Sciences and the Humanities," by Sir Isaiah Berlin, 1974; the third by Leon N. Cooper, "Science and Human Experience," 1976; the fourth by Sol Spiegelman, "The I and We of Science," 1978; the fifth by Freeman J. Dyson, "Quick is Beautiful," 1981; the sixth by Sir Zelman Cowan, "Contemporary Tasks for the Law," 1983; and the seventh by Richard Rorty, "The Contingency of Selfhood," 1986.
5. *Democracy and Excellence in American Secondary Education* (Chicago: Rand McNally, 1976), p. 160.