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CHAPTER NINE**Development and Learning: Complementary or Conflicting
Aims in Humanities Education?**

Robert D. Narveson

When we in ADAPT let it be known that cognitive development as defined by Jean Piaget was a central concern of our program, we found to our puzzlement that both high school and university counselors started sending us all sorts of academic basket cases. It took us a long time to figure out why. In fact the explanation did not really register with me until a short time ago when I attended a conference on freshman composition. There I heard the term “developmental” used in a sense quite different from the one I had found in our reading of developmental psychology.

Perhaps I was the last person in American education to discover what I discovered at the conference on composition, which was that in current educational usage “developmental” has replaced “remedial” in describing programs for students with academic deficiencies. I quickly verified that this has become common usage by examining some of the catalogues recently sent out by textbook publishers. In the most recent McGraw-Hill catalogue of English texts, for example, a section on developmental English leads the list, segregated from the following sections on composition, literature, and language. Unquestionably publishers such as McGraw-Hill are attuned to the professions they serve, and have adapted their terminology accordingly.

A linguistic relativist, I bow to the majority and recognize this meaning of “developmental” as legitimate, much as I have had to accept that when most people say “disinterested” they mean “uninterested,” and not what I mean when I say “disinterested.” Still, I cannot resist musing over this strange shift of meaning. If developmental courses are for students who do not measure up to the norm of academic attainment, then the rest of the curriculum must be for those who do measure up. That is, it must be for the developed. We in ADAPT are not prepared to accept such a proposition. The findings of cognitive psychologists confirm the anecdotal experiences of most teachers that a large number of students in American colleges do not respond to problems demanding logical thinking in the ways that academic experience claims is necessary for academic success. Economics students often fail successfully to translate prices of goods in one currency into prices in another currency, or to understand supply-demand curves. In English classes students frequently seem not to understand that when the pronoun in a poem suddenly changes from “he” to “you”, one should suspect a change in the person being referred to. Examples from mathematics, logic, and the sciences are legion. The common lament of teachers is, “if only our students knew how to think!” Many students apparently, need “developmental” teaching. Whether very many of the instructional methods in common use in American college classrooms are actually effective in teaching how to think is a matter that Piagetian theory, as we understand it, calls into question.

Just how would teachers go about teaching students to improve their thinking? Some philosophy professors propose that all students should be required to take a course in logic-- under their tutelage. Others have tried and failed to teach logical thinking by the use of such

excellent texts as Monroe Beardsley's *Thinking Straight* (1975) maintain a more skeptical position. Somehow many students seem not to improve their thinking through the formal study of logic. Sad experience has even led some to question whether formal logic has much to do with intelligent thinking. There appears to be some evidence that even very young children use inferential thinking, a form of logical thought, in the context of their everyday lives (Donaldson, 1978); and that when adults respond in unexpected, apparently illogical ways to thought problems posed by academic researchers, it is because they conceptualize the demands of the problem differently, though not less logically, but of agreeing on the nature of the task. Olson (1977) cites research from which he infers that academic ways of thinking are often based upon a print culture whereas ordinary people may be responding in ways based upon their everyday experiences in an oral culture in which words do not signify meaning in the same way.

Questions have also been raised about an apparent overemphasis on a single kind of thinking. Some argue that we western intellectuals are in thrall to left-brain centered modes of discursive logical thought, neglecting the non-discursive symbolic, intuitive, gestalt-like activity of the right brain. Those in reaction against domination by scientific, rational thought argue that other kinds of thought are appropriate for artistic and religious thinking. This sort of argument is not new. It has never been stated more brilliantly than by the mathematician Pascal: "The heart has its reasons which the reason cannot know."

In the face of all such considerations, we in ADAPT find persuasive the case made by Piaget that there is a common thread in all human cognitive activity that can best be described as something very like logic. In dozens of books and hundreds of articles over the last half-century and more, Piaget has elaborated his theories about the nature of knowledge and formal properties of the mechanisms by which knowledge is acquired at different stages in human development. Two of the stages of cognitive development that he describes are of interest to us as teachers of college-aged students, the concrete operational stage and the formal operational stage. At each stage certain structures of intelligence enable their possessors to interact with their experience of the world in certain ways. The possibilities for constructing and testing meaning are more limited at the former stage than at the latter, which is why developmental to the latter stage must be considered desirable.

Piaget's description of the cognitive structures distinctive to formal operational thought is presented in elegant symbolic-logic notation (Inhelder and Piaget 1958). It is, however, no more than a highly abstract hypothetical model of thought structures. Though one may be tempted to take this model of thought structures to be a description of how human thinking actually gets thought, this would be an error. Thought is always a specific activity going on in an incredibly complex way, embedded in the total context of an ongoing reality. No successful description of thought processes has yet been formulated. Consider the failure of the information processing school of cognitive psychologists to construct computer programs to simulate the thought of humans engaged in a relatively simple activity such as chess. A prodigious effort has produced fine chess programs that can defeat all but a fraction of one percent of all the world's chess players. No mean accomplishment. Interestingly, however, these computer chess programs do not "think" like people. They play excellent chess, but they do not play chess the way that people play it. The knowledge that would enable programmers to simulate human chess thinking still

eludes them, with no breakthrough in sight. In the same fashion, metaphorical thinking, so important to model-making in science and to creativity in art, defies human understanding.

If no model, including Piaget's, adequately explains what going on in human thinking, is it because the common strand that Piaget proposes in all cognitive activity does not really exist? Shall we believe, rather, that highly general rules something like those Piaget describes operate to create the regularity we observe everywhere in human activity? As a student of literature, I am aware of W. H. Auden's warning, "Thou shalt not commit a social science." But we need all the help we can get, and if a psychologist and genetic epistemologist seems to offer assistance, I am for accepting it gratefully.

In a confusing world, folk wisdom has neatly summed up two partially valid but conflicting insights. One folk saying would have it that "one man's meat is another man's poison"; another tells us that "what's sauce for the goose is sauce for the gander." We in ADAPT have aligned ourselves with the "sauce for everybody" crowd. We are impressed by the accumulating evidence showing that perhaps fifty percent of American college freshmen do not characteristically perform at the formal operational level (for citations see J. L. Petr's Chapter 6). If we were taking the view of the "one man's meat" school, we might conclude that this does not matter, since those students may have talents in others directions. On the other hand, those of us in the "sauce for everybody" school wish to weight the consequences of the absence of formal operational thinking before acquiescing to that absence with equanimity. The topic is unfortunately too complex to explore in this context; the interested reader will find some of the issues discussed in Wayne Booth, *Modern Dogma and the Rhetoric of Assent* (1974). His general position, which I find persuasive, is that the consequence of denying the efficacy of reason in such non-scientific activities as the making of moral and aesthetic judgments is intellectual helplessness. It seems evident that the thinking involved in the sorts of judgments Booth describes is of the kind described by Piaget as formal operational thinking. In a democratic society in which it is assumed that all citizens should participate in determining the policies that affect their welfare, the desirability of all citizens exercising the most mature thought of which they are capable also seems evident.

Piaget's cognitive developmental theory serves as our guide in constructing an instructional program designed to encourage growth toward mature thought in all students. We accept as a working hypothesis Piaget's claim that self-regulating reversible cognitive structures are central to all mature thought (Piaget, 1970). That is Piaget's claim about the nature of knowing. A second claim we accept is that every individual in the course of growing up progresses through the same cognitive developmental stages in the same invariant sequence. I explore implications of these claims in the remainder of this essay.

It has been mentioned that according to Piaget a person at a lower stage of cognitive development is the master of less powerful structures of thinking than a person at a higher stage. It is for this reason that a person's stage of development acts as an upper limit on the person's ability to learn certain kinds of rules and strategies for ordering and testing experiences, that is, to understand. According to Piaget, developmental level explains why a person learns, or fails to learn. This view, to quote Piaget, "is contrary to the widely held opinion that development is a sum of discrete learning experiences" (Piaget, 1964, p. 176). For Piaget, development is a

process which concerns the totality of structures of knowledge. Factors that contribute to this developmental totality include biological maturation, experience of the physical world, interaction with other people (social transmission), and the active structuring that Piaget calls self-regulation. Learning, on the other hand, he defines as a response to a specific occasion. Development is spontaneous, an outcome of living. Learning, in contrast, is provoked -- by a teacher or by an experience. Intentional learning, and learning that results from intentional teaching, then, do contribute to development, but only in a limited way, whereas development has everything to say about what can be learned. If this Piagetian view is accepted, one must be very concerned about cognitive development, for development has a fundamental and crucial relation to learning.

In Piaget's view, then, both development and learning are the result of activity by the student, development a process concerned with total structures which are self-regulating and reversible, and learning a more isolated response to a specific situation. The self-regulation occurs as people mentally transform experience from one form to another and back again, seeking to build coherent mental structures. Our effort as teachers interested in development must be to challenge students constantly to transform the objects of their knowledge in various ways. A consequence is that we prefer classroom strategies calling for students to be active rather than passive. Students in ADAPT often complain that they do a lot of writing. They do write a lot. We try to convince them -- with what success you can imagine -- that it is the non-ADAPT students, who have fewer opportunities to write, who should complain. In journals and formal papers, students are asked to formulate and reformulate their ideas about the material under study. Most of the writing is read and commented on, but not graded, since the motive behind the assignments is to promote development, which is a spontaneous process, rather than learning, which is provoked. Development follows its own path according to the precise challenge to present cognitive structures that a given individual finds in a particular experience. Journal entries and spontaneous comments in class reveal strange twists and turns of student thinking that no teacher could have predicted but that are necessary to the student attempting to build coherent structures out of experience. We wish to reward students for their efforts to work out the problems of understanding that they themselves recognize and confront, for that is the path of development.

In thus being concerned with fostering development, we course do not dismiss the importance for students of working out the sort of problems conventionally posed by text or teacher--the path of learning. Our design in ADAPT is to strike a balance between activities designed to foster development and the imposed tasks intended to inculcate learning in the traditional sense.

There is no question that our interest in development has resulted in a reduction of the amount of material given the students to be learned, which in fact indicates in brief the answer to the question of my title: An emphasis on development must come at the price of a de-emphasis of traditional learning. Hence, from the traditional viewpoint, development and learning must be viewed as conflicting goals. From the Piagetian view, on the other hand, whatever developmental gains students make will remain with them after specific learning is forgotten and will furthermore permit qualitatively more advanced kinds of learning in the future. The sacrifice of some learning activity in favor of developmental activity is therefore for the Piagetian no

sacrifice at all, but the achievement of a desirable balance productive of long-term benefits. In this view development and learning will be complementary goals.

Besides suggesting strategies for encouraging development, Piagetian theory indicates to us that college students will successfully perform tasks which calls for concrete operational thinking. For example, in many standard composition texts, one finds a division into sections devoted to specific organizing strategies, one of which is usually comparison and contrast. Now comparison and contrast are essentially classifying activities, which Piagetian theory tells us that people acquire in the concrete operational stage, falling normally somewhere between the sixth and twelfth year. Thus, from the Piagetian point of view, it would be extremely odd if comparison and contrast should strike any college student as new and exciting possibilities. It seems in our view to make better sense not to pretend to teach students how to use comparison and contrast but rather to find situations in which the activity of classifying according to comparisons and contrasts will seem to them inevitably appropriate, and then to let them have at it. Such a situation arises in Hemingway's *Farewell to Arms* when Frederic Henry holds forth about abstract and concrete terms, saying that the former are "obscene" and that only the latter "have dignity." Students asked to pick words from the passage for someone to write on the board and then to suggest groupings for the words have never failed to group the words under the headings "abstract" and "concrete," or to list as alternative headings for the two columns "obscene words" and "words having dignity." These students are employing the concrete operational scheme of multiplicative classification, of which comparison and contrast of classes is an instance.

Most examples of situations calling for classification are less neat than the Hemingway one. Discourse ordinarily contains an abundance of cues indicating the organization of ideas. The classifying activity called for in understanding the order of a passage can be quite subtle and still be within the capacities of students. Students usually find it an interesting challenge to puzzle out the organization of a jumbled passage. One that has worked well is the "lunatic, lover, and poet" speech in *A Midsummer Night's Dream*. We break this speech down into phrasal units, print the units on three by five cards, jumble the order, and ask students to work in groups of five or so to put the speech back in order. The abundance of cues at first results in conflicting suggestions, but within about a half hour each group settles on a defensible order, and it will be a rare class in which at least one of the groups does not come up with the order Shakespeare used. During the remainder of the class period the groups compare versions and discuss the pros and cons of each. A consensus almost always develops in favor of the order of the original. We believe that Piaget's theory indicates this outcome.

We share with the conventional handbooks the goal of encouraging in our students the efficient, self-conscious employment of their organizational and presentational skills. Exercises of the sort described, in which students actively construct solutions according to abilities they already have, seem to us superior to the handbook way of working with the notions of comparison and contrast. By working with these exploratory exercises, students will, we believe, increase their control of a general strategy familiar to them from other contexts.

Besides suggesting to us exercises to cultivate strategies that concrete operational students should already possess, Piagetian theory suggests exercises calling for formal operational

strategies that many college students employ in rudimentary or incomplete fashion if at all. One example is the strategy of testing the truth of general propositions. Typical composition handbooks teach that every composition should have a clear thesis, which is usually explained to be a general proposition. By observing student strategies for deciding on the truth or propositions, Moshman and Thompson (1979) found evidence of developmental stages corresponding fairly closely to the Piagetian stages of concrete and formal operations. They presented a number of undergraduates with propositions such as "If a person uses fluoride toothpaste, she/he will have healthy teeth," and then asked them what they would conclude from various kinds of evidence. They found that many of the students in their sample conferred the same proof-status on confirming examples as on disconfirming ones. For example, when asked what they could conclude from a case of a person who used fluoride toothpaste and had cavities, these students replied that they wanted to see more cases before drawing a conclusion. If presented with a preponderance of confirming cases they regarded the evidence as tending to confirm the truth of the proposition. Thus, the authors point out, confirming cases were regarded as having equal weight with disconfirming cases.

These findings suggest a Piagetian explanation of the strategy one finds many students wedded to when asked to write a paper with a general proposition for a thesis. Most handbooks advise students against making absolute generalizations, indicating that a common propensity to do so is recognized, though not many college students, one hopes, would defend a proposition in the precise form "If a person uses fluoride toothpaste, she/he will have health teeth." But students do frequently in defending their general propositions use the tactic of presenting supporting evidence only. If questioned about this, I find that few students can think of any reason why they should want to bring up evidence calling their own proposition into question. Moshman and Thompson note that students who weigh confirming cases equally with disconfirming cases seem to assume a sort of democracy in the evidence, the majority rule determining truth. This is an indication of an immature or incomplete understanding of what makes propositions true or false.

Standard composition teaching normally fosters the strategy of defending propositions by advancing only supporting arguments. Whether intentionally or not, in encouraging such a view of rhetorical discourse such teaching caters to the established preference of concrete thinkers. Moshman and Thompson cite studies showing that science teaching also typically favors this same concrete operational way of thinking. We all probably recall from our days in science labs that the structure of the tasks given us encouraged us to report only the data that confirmed the scientific law we were studying. We tended either to disregard measurements that did not confirm the law, or to add in a fudge factor, Kelly's constant, or whatever it was called wherever you were a student, so that the figures came out "right."

Our strategy in ADAPT classes is to attempt to undermine this assumption by treating all general propositions that we raise for investigation as hypothetical. In ADAPT English we have adopted a rhetoric text more in keeping than most with Piagetian constructivist epistemology. This text, *Rhetoric: Discovery and Change* by Young, Becker and Pike (1970), introduces an explicit ethical bias toward the rhetorical stance of sharing in a common search for truth. Instead of a thesis to defend, it advocates locating a problem to explore. It speaks rather of hypotheses than of theses. It urges the student to seek for competing or alternative explanations of

experience. Such a stance appeals to students who have reached the appropriate developmental stage. A study by Britton and others (1978, p. 97) reports: "A new element enters writing when the writer begins to inspect his generalizations and to make them the very subject of his discourse...Here the writer begins to consider alternative possibilities and perhaps to weight them." A considerable portion of our students, however, approaching fifty percent, resist or fail to comprehend this stance -- as Piagetian theory predicts. Since students at the concrete operational level do not possess or have not mastered the strategy of systematically exploring all theoretically possible cases, for them to go on searching after having found a plausible position would be something of an unnatural act.

A low keyed but persistent questioning of the adequacy of their assumptions about truth-status of propositions may help students to move to the next developmental level. This hope is encouraged by work done at Harvard by William G. Perry, Jr., (1970) who on the basis of extensive interviews of the same students at different points in their university careers elaborated a scheme of stages of intellectual and ethical development during the college years. Perry found many entering college student who typically think dualistically; for them every question has unequivocal right and wrong answers. College experiences, mostly outside of the classroom, but sometimes in humanities classes, gradually persuade most of them that such a conception is too simplistic, and their thinking moves toward relativism, a position in which "everyone is entitled to his own opinion," and every answer is as good as any other. In later stages they develop criteria for deciding between better and worse propositions even when absolute judgment is untenable. Perry believes that in the most advanced stage, people accept the necessity of committing themselves to the best choice available; he names this "commitment within relativism." The congruence with Piaget's theories is evident.

In the discussion so far I have assumed with Piaget that the characteristics of the concrete and formal stages of cognitive development manifest themselves in every discipline and function everywhere as a factor limiting what in every disciplinary be effectively taught. This assumption affords the English teacher a useful strategy for responding to colleagues in other disciplines on those frequent occasions when the charge is leveled: "If you people in English would quit teaching literature to your students and teach composition instead, they wouldn't come out of your courses unable to write a decent sentence." It is true that ugly ducklings often come out of our courses without having undergone the transformation into swans, but there's a cognitive developmental explanation for this failing. It has long been claimed by serious students of the problem that good writing develops hand in hand with the general maturity of the individual (Kitzhaber, 1968). In Piagetian terms this is to say that a skill so intricate as the writing of good English prose may well require formal operational thought schemes. But it is necessary to translate this proposition into terms that science and math teachers can take to heart. We therefore ask our English students to perform a task involving proportional reasoning, which Piaget has identified as one of the schemes attained at the level of formal thought. The task we use in the Frog Puzzle devised by Robert Karplus at the University of California-Berkeley. This simple pencil and paper task takes only ten minutes or so of class time. The results in our freshman English classes, both in and out of the ADAPT program, have remained remarkably consistent over many years: only about one fourth of the students use proportional reasoning for the task. Most of the rest use additive reasoning, which Piaget describes as a concrete operational mode of thought, and some refuse to try at all, either on the grounds that the problem cannot be

solved or that they are simply no good at math. (Caution: a fair number of our colleagues and graduate students also fail to use proportional reasoning for this task. We do not therefore judge them to be concrete operational thinkers. More about that later.) Students at the University of Nebraska must have passed three years of high school mathematics to meet the entrance requirements. In those three years of math instruction they have unquestionably been taught proportional reasoning strategies time and time again. Yet many of them have failed to master this widely applicable math skill. Thus, we conclude, when our colleagues chide us for failing to teach writing skills, is it not a case of the pot calling the kettle black?

Through this gratifying counterattack we are able to make the serious point that neither English teacher nor math teacher is specifically to blame for student failings if those failing result from inadequate development of formal operational schemes.

Nevertheless it is only with extreme caution and with extensive reservations that one should venture upon this sort of explanation. Piaget's elegant description in *The Growth of Logical Thinking* of the concrete and formal stages of intellectual development invites the hope that by administering Piagetian tasks one may determine a global stage of development of individual students. Experience has dashed this hope - happily, we think. It turns out that people often think formally on some tasks and concretely on others, their performances being influenced, apparent, by such diverse factors as motivation, familiarity, and social conditioning (Piaget, 1972). Thus while a person maybe said to perform at a certain developmental level on a particular task, it is not possible to predict from that performance how the person will perform on other tasks, particularly when the tasks are in other disciplines.

It will be clear from these sketchy examples that working out some of the implications of Piagetian theory for an educational program such as ours offers us a continuing challenge. The theory perhaps does more to console us for some of our failures as teachers than to tell us how our failures may be overcome, for if the fault is in the developmental level that our students have attained, then the fault is not in us. Our teaching, Piaget tells us, can play a role in fostering development, but only a fairly limited role. On the other hand if we accept the challenge, we can be more than teachers; we can be the designers of activities that allow students to engage in the spontaneous transformations of objects in thought that are the very essence of knowledge.

Bibliography

- Beardsley, Monroe C. *Thinking Straight*. Englewood Cliffs; Prentice-Hall, Inc., 1975.
- Booth, Wayne, *Modern Dogma and the Rhetoric of Assent*. Chicago: University of Chicago Press, 1974.
- Britten, et. al. *The Development of Writing Abilities* (11-18), Schools Council Research Studies, NCTE, 1975.
- Donaldson, Margaret. *Children's Minds*. London: Fontana/Collins, 1978
- Inhelder, Barbel, and Jean Piaget. *The Growth of Logical Thinking from Childhood to Adolescence*. New York: Basic Books, Inc., 1958.
- Kitzhaber, Albert R. *Themes, Theories, and Therapy*. McGraw-Hill Book Co., 1963.
- Moshman, David, and Pat A. Thompson. "Hypothesis testing in student's sequences, stages, and instructional strategies." Unpublished paper. University of Nebraska-Lincoln, 1979.
- Olson, David R. "From Utterance to Text: The Bias of Language in Speech and Writing." *Harvard Educational Review*, Vol. 47, No. 3, (August, 1977), 257-281.
- Piaget, Jean. "Cognitive Development in Children: Development and Learning." *Journal of Research in Science Teaching*, Vol. 2. (1964) 176-186.
- _____. *Genetic Epistemology*. New York: W. W. Norton & Co., 1970.
- Piaget, Jean. "Intellectual Evolution from Adolescence to Adulthood." *Human Development*, 15 (1972), 1.
- Young, Becker, and Pike. *Rhetoric: Discovery and Change*. Harcourt, Brace, and World, 1970.,