



Teaching Skills in the Styles of Human Knowledge*

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Every experienced artisan, be he a carpenter or a printer, knows what a skillful performance looks like in his particular trade. When we in the educational professions begin to talk about strategies for *teaching* a skill, however, a babel of languages generally ensues. *Skill*, it turns out, means a number of different things to different people.

The following is an attempt to sharpen and expand our vocabulary about *skills* as they relate to educational objectives and evaluation. In order to accomplish this I propose to use a general (and idealized) framework which treats a student's acquisition of mastery in a skillful performance as a continual to and fro shifting of attention between his *focal* awareness of, *instrumental* strategies and tactics and his *subsidiary* awareness of these particulars as he attends to the *context* and *purpose* of the act. Too

much attention to the particulars often leads to clumsy, what we call self-conscious performances; too much attention to the context and purpose may lead to inaccurate approximations of the desired performance. A master teacher's diagnosis of a student's reading problem is an *artful* performance which is difficult to communicate or transmit to others for it requires a capacity to detect symptoms in terms of a knowledge of the student's *whole* performance. On the other hand, practical action cannot be taken until the teacher develops and tests strategies for remedying the underlying cause. This requires that the teacher raise his awareness from a tacit to an articulate level, specify probable causes, and form suitable plans of attack on the particulars, again, *with a knowledge of what the whole performance should look like when completed*. This knowledge has been acquired, for the most part, from the teacher's apprenticeship to a community of persons who have developed a particular interest, theory, and style of getting knowledge in reading.

Performance Capability

To begin, let me suggest the following definition of skill: the schooled capacity to perform (in some degree) as a seasoned practitioner. The practitioner would be a member of a particular community of artisans, scientists, or other self-styled group of persons who band together to do the work of this world.

To attempt to define performance capability is in essence to attempt to define human behavior, for behavior culminates sooner or later in visible acts or products, and these acts or products are believed by most psychologists to be the consequences of cognitive, affective, and psychomotor operations. These operations are often lumped under the term of "skills." King and Brownell point out, however, that through broad use the term has become virtually meaningless. They urge in its stead the term "performance capability" to comprehend both the *replicative* and the *cognitive* aspects of "skill." (pp. 78-79). But an act is an act is an act is an act. Whatever prompted and

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evolved the act must remain speculation, for the human mind is not open to direct observation. A theory-model for motives and the processes leading to acts, however, may be designed to try to parallel those inner-events which are believed to have transpired. The model is not to be a description of the motive and processes themselves; it is merely an hypothetical construct which must stand or fall according to that ultimate assay — the evidence of data.

It should be further recalled that . . . the model is a visual aid holding details in focus, fixing assumptions, and serving all interested parties as a mnemonic device . . . it is necessary to recognize the model's limitations and at the same time treat it temporarily as though it were the 'real world.' (Meals, pp. 200-1)

What follows here, then, is a definition of a *model* of performance capability in its two aspects, competence and performance. While Noam Chomsky deserves credit for the use of these terms (pp. 4, 8, 10-11), I am not insisting on *competence* as an innate human capacity. Such a model proceeds from a rigorously deductive system or organismic view of human behavior. It is rigorous in the sense that it constitutes a well-defined problem which is the prime concern of the disciplined inquiry of developmental and cognitive psychologists. A problem is further considered well-defined if a satisfactory test exists (Miller, p. 170). The test in this case would be to attempt to account for individual (not statistical) human acts and products through the hypothesis by observing individual behavior over long periods of time, relying on our intuition of the "rightness" of the model as a parsimonious yet elegant

solution to the problem, and ultimately applying it to predicting, *not* specific acts, for the contexts and alternative responses would be infinite, but general tendencies in individual behavior over a long span of time (Snygg and Combs, p. 340). Accordingly, such a view is seen to differ from a Baconian view in that the former insists on viewing human growth and behavior in terms of the individual rather than the group, and longitudinally and relativistically rather than at a given instant in time or place.

Robert W. White, describing certain aspects of such a view writes:

Angyal defines life as 'a process of self expansion'; the living system 'expands at the expense of its surroundings,' assimilating parts of the environment and transforming them into functioning parts of itself. . . . The living system expands, assimilates more of the environment, transforms its surroundings so as to bring them under greater control. 'We may say,' Angyal writes, 'that the general dynamic trend of the organism is toward an increase of autonomy . . . the human being has a characteristic tendency toward self-determination, that is, a tendency to resist external influences and to subordinate the heteronomous forces of the physical and social environment to its own sphere of influence.' What has been learned (by the human organism) is not a fixed connection but a flexible relationship between stimulus fields and the effects that can be produced in them by various kinds of action. (pp. 324-5)

Despite the skepticism with which White's *Competence Motive* appears to have been received, there is one

non-controversial inference which may be drawn from the above, and one upon which this discussion of competence and performance depends, is that human learning is fundamentally learning to anticipate consequences, to avoid them, to reduce their effects, or to cause them to materialize.

If human actions are seen as occurring within organically functioning environments — the immediate social, cultural, and intellectual communities — which are in turn within more comprehensive "systems" such as regional, national, and international communities, and these actions are seen as transactional (wherein both the individual and the community are to a degree affected and changed by the encounter), then human actions, in order to assure their own tendency toward self-determination, must also be seen as governed through time by the need to enhance the system which makes the activity possible in the first place. This view posits the synergism of behavior. Synergism, or mutually cooperative activity, supports the development of the individual's capacity toward self-determination while at the same time reducing the disruptive and deterministic character of the environment. A.N. Whitehead's notions of freedom and discipline are a recognition, in philosophical terms, of this phenomenon. The self becomes defined and capable of effective action only as the environment is defined and precisely controlled and used. (pp. 39 ff.) Hence, as Gerald Dykstra of the University of Hawaii Graduate Speech Department has said, "A skill is whatever enables you to do what you want to do."

In actuality, the individual's observable operations appear to flow in a steady, albeit winding, stream from some process we call thought.

In the theory-model, the individual's operations are described as flowing from an "Image" (a world-view or cognitive map and value complex) in a hierarchical organization of processes, several of which may be proceeding simultaneously at various degrees of complexity, into "Plans" — usually heuristic search paths and alternative modes of ordering data which control the sequences of operations to be effected. The "Image" orients the "Plan" toward some value or goal, hence, together, they constitute both the intent or motivation as well as the control of all subsequent operations. There may be "Plans for Plans," depending on the complexity of the task. A series of test and operate feedback loops exists to judge the suitability of the operations. At the molar level, then, "Plans" give way to "Strategies"; at the molecular level, to "Tactics" for the execution of the "Plan." The execution culminates in an act or product, either of which has been constituted by molecular performances. (Miller, Ch.1) For purposes of this discussion, the term *competence* will be applied to that area of *performance capability* Miller has called "Images" and "Plans," while *performance* will refer to "Strategies" and "Tactics."

Competence

The concept of competence includes the two notions that it is either innate or a *learned* (culturally and experientially) *capability for effective action*. In practice, however, the capability cannot be divorced from the effective action, for as much as the capability provides a suitable channel for volition, so also does the act fulfill the potential for action prescribed by the capable will. Thus, for my purposes here, the *innate* vs. *nurture* distinction is not one which is helpful to pursue at this

time. It is interesting to note, however, that Bruner's often-quoted hypothesis that, "intellectual activity is everywhere the same, whether at the frontiers of knowledge or in the third-grade classroom," appears to assume the existence of a basic, innate competence. Guilford's description of the structure of the intellect characterizes as effectively as any scheme now available the substance, quality, and manner of procedure of the intellectual aspect of capability. The contents are labeled *figural, symbolic, semantic* and *behavioral*, the operations, *cognition, memory, divergent production, convergent production, and evaluation*, and the products are *units, classes, relations, systems, transformations, and implications* (Guilford p. 469). Contents, operations, and products are so interrelated as to form a functional system which, given a motive and a medium of expression, appear to account adequately for cognitive behavior.

It is also much in this sense that a "grammar" of the kind described by transformational linguists may be regarded as the competence of the individual, for such a theory model appears to account for his linguistic productions. The motive to speak or write is not specifiable in a particular situation nor is it accessible in disparate utterances; in general, however, it would appear that it would be a motive similar to that which underlies all behavior: to explore the environment, define it, control it, assert oneself, etc. The medium of expression, in this case, is culturally learned and is intrinsic to the grammar, for that, too, is culturally learned.

In psychological terms, *competence* is the capability of developing plans and strategies for translating culturally learned, individually adapted *meanings* into ef-

fective acts in the process of self-determination. A "Plan" subsumes strategies for receiving data from the environment as well as those for producing effects on it. Among *receptive strategies* are those of classification (grouping by form or function), categorization (grouping by aspect or property), and concept attainment. To over-simplify somewhat, these are decision-making strategies of the kind that shape the individual's cognitive maps and value complexes. Among the *productive strategies* are those which lead one to "know how to," "to become willing to," "to translate," and "to routinize." These strategies generally give shape to the execution of the act itself, manifesting themselves as molecular performances or "Tactics." The next logical stage, the translation of receptive and productive strategies into actual deeds or works, brings together all the necessary conceptual, affective, and motor performances into a controlled and smoothly executed act. Such *overt acts*, however, will be discussed in greater detail under a section entitled *performance*.

Competence, then, includes the processes of searching, decision-making, and formulating or conceptualizing. These processes are aspects in the forming of heuristic or discovered plans which an individual will use for generating proposed solutions that are worth testing (Miller, pp. 167). It is problem-solving in the sense that it is a simultaneous, non-sequential yet non-random search through a large set of alternative possibilities until one is found that appears to solve the problem. The concept of competence, moreover, includes the repertoire of culturally and experientially learned alternative "hypotheses" or "sets" which individuals have of what the solution might look like, where it



A practitioner models the desired performance for his students.



The student replicates the performance and begins his apprenticeship.

might be found, and how. Competence culminates in the making of a plan, in devising strategies for executing and correcting it, and moving to performances which will execute it.

To summarize, competence includes the knowledge which an individual already has, the gathering of further knowledge, and *covert performances* aimed at concept attainment (Bruner, Ch. 3) for the purpose of devising plans for overt performances. Concept attainment includes what Guilford has termed the products of the intellect: units, classes, relations, systems, transformations, and evaluations. These "products" are implied in Miller's term "Plans."

Performance

The concept of performance refers to the execution of the cognitive plan. It may be represented in psychological terms as a "Tactic" when the performance is overt; as a "Strategy" when the performance is covert. In the instance of the "Tactic" we have an arrangement or order of minute performances all brought together in a synergetic

operation to accomplish the act prescribed by the plan. To phrase it another way, a "Tactic" is the regular, methodical, and logical application of a "Plan" and its "Strategies." It is an artful or skillful management of certain elements, be they words, gestures, postures, paints, or pieces of steel, issuing in a complete work or deed. It is difficult to indicate when a work or deed is perfected; an author's total output, for instance, may be the attempt to fulfill a single driving purpose. All we may specify is that the act or product to be considered in the attempt to arrive at a given person's intent should be the largest possible unit which the person himself would accept as a unit — an existentially meaningful entity.

It was noted earlier that only overt performances were observable; furthermore, it was stipulated in the hypothesis that all behaviors were purposive. As a consequence, we are led to infer that overt performances, viewed longitudinally, are not random yet not necessarily systematic, either. Then they must be heuristic, motivated generally toward greater

acquaintance with, and increasing discrimination and control of, the environment. It thus becomes possible to infer that the "Tactics" underlying overt performances proceed in an orderly, efficient, consistent, and persistent manner. In short, performances are *rule-governed*. While we may not be able to induce these rules or principles (or intents) from the end-product, we may deduce certain hypotheses, *with* (not *from* in a causal sense) observations of the product and both our explicit and tacit knowledge of human character in general, by which we may test "grammars," principles of behavior, or intents.

Overt performances further occur within a context of human relevance (else they would be classed as meaningless) which means that the processes from which they spring must be synergetic (or "responsible"). Such processes must also be warranted (or "truthful") in the sense that they bear some degree of correspondence with their referents in the "real world" (viewed longitudinally) and that they are in some degree replicable. Each performance system, then, tests each

product of the system for its meaning, responsibility, and warranting. It is for this reason that an adequate hypothesis for human behavior must include a feedback loop or "Test-Operate-Test-Exit" mechanism by which the living organism is apprised of its degree of success or failure in meeting the criteria of the performance system. An overt performance, consequently, is the tested, "best" approximation of an individual's intended behavior as he is able to command at a given moment. Ultimately, he must rely on the intelligence of the interpreter for the "correct" understanding of his behavior, for his own knowledge of the motives for his acts is mostly tacit (Polanyi, pp. 88-95).

Overt performances, it appears, may take two fundamental forms: those which are operations within a fixed framework of knowledge, and those which are innovative, just as there are two primary kinds of intelligence: the routine applications of established knowledge, and the heuristic acts which are concerned with objects of their own creation (pure mathematics, logic, the arts, the deductive sciences) and make *additions* to knowledge (Polanyi, pp. 76-77). These correspond generally to what Guilford has termed, respectively, "convergent" productions and "divergent" productions or thinking.

Apprenticeship

It may be that we will never be able to specify in detail just what sorts of competence or performance underly a given behavior, hence an art such as reading or writing or a connoisseurship such a literary appreciation, cannot be transmitted by prescription since no prescription for it would exist. "It can be passed only by example from master to apprentice." (Polanyi, p. 53) The apprentice, to operate effectively, would

need only to be *focally* aware of the *whole* act (which includes perceiving its existential meaning). Focal attention to the whole would restrict his attention to a *subsidiary* awareness of the parts of the act. When an individual is focally aware of parts of acts, he becomes inhibited, self-conscious, and "destroys (his) sense of the context which alone can smoothly evoke the proper sequence of words, notes, or gestures." (Polanyi, p. 56) A performance then is logically unspecifiable. "All particulars become meaningless as we lose sight of the pattern which they jointly constitute." (Polanyi, p. 57) And to perform requires that one know what one is performing — the whole performance must be available in the mind as the *meaning* of the act (or as the expectation of the consequence of the act). *Meaning* here may be read as the discovery of a context in which the act makes sense, i.e. is effective for a desired purpose. The instruments or particulars of the performance, then, cannot be regarded by the performer as tools existing outside the performance, for to grant that he has a use for these tools is to grant that he knows, *focally*, their use and purpose, and only *subsidiarily*, their substance and properties. The individual's knowledge of his own competence is subsumed in and subsidiary to his knowledge of his performance.

Problem-solving as Replicating a Style of Human Knowing

King and Brownell note,

Performance when separated from thought is trivial and limited. It cannot be used with insight, discrimination, and creativity. Reading, for example, comes into its true perspective when it is seen in the context of man's most

sophisticated knowledge of language, history, and other styles of human knowing. (pp. 148-9)

Just as performance and competence are in actuality inseparable, so are the knower and the known. King and Brownell underline the fact that the distinction between the student and the discipline is artificial, even confusing, for to come to know something is to take part in the processes of coming to know in one of several styles of human knowing. Scholars and neophytes alike gain knowledge by more or less sophisticated levels of inquiry into an area of knowledge. A discipline is constituted by the persons, the processes, and the products of inquiry into a domain. *Competence* in a discipline is simply an intellectual, conceptual performance in the manner of the practitioners in the discipline. *Mastery* of a performance implies a judgement about the level of sophistication with which the neophyte performs, including his degree of control, efficiency, and the scope over which his control is exerted (Broudy, p. 84). It also implies distinguishing between *replicative* and *innovative* performances and judging the suitability of each to a particular kind of problem. Performances, be they data-gathering, searching, hypothesizing, bicycle-riding, or sculpturing, are essentially different in degree and aspect of competence rather than different in kind. They are, again, the logical outgrowth of a responsible purpose directed toward some meaningful goal chosen on some warrantable grounds.

The above conceptions strongly suggest that schooling should emphasize performances, conceptual and manipulative, rather than the divulgation of information, for as

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