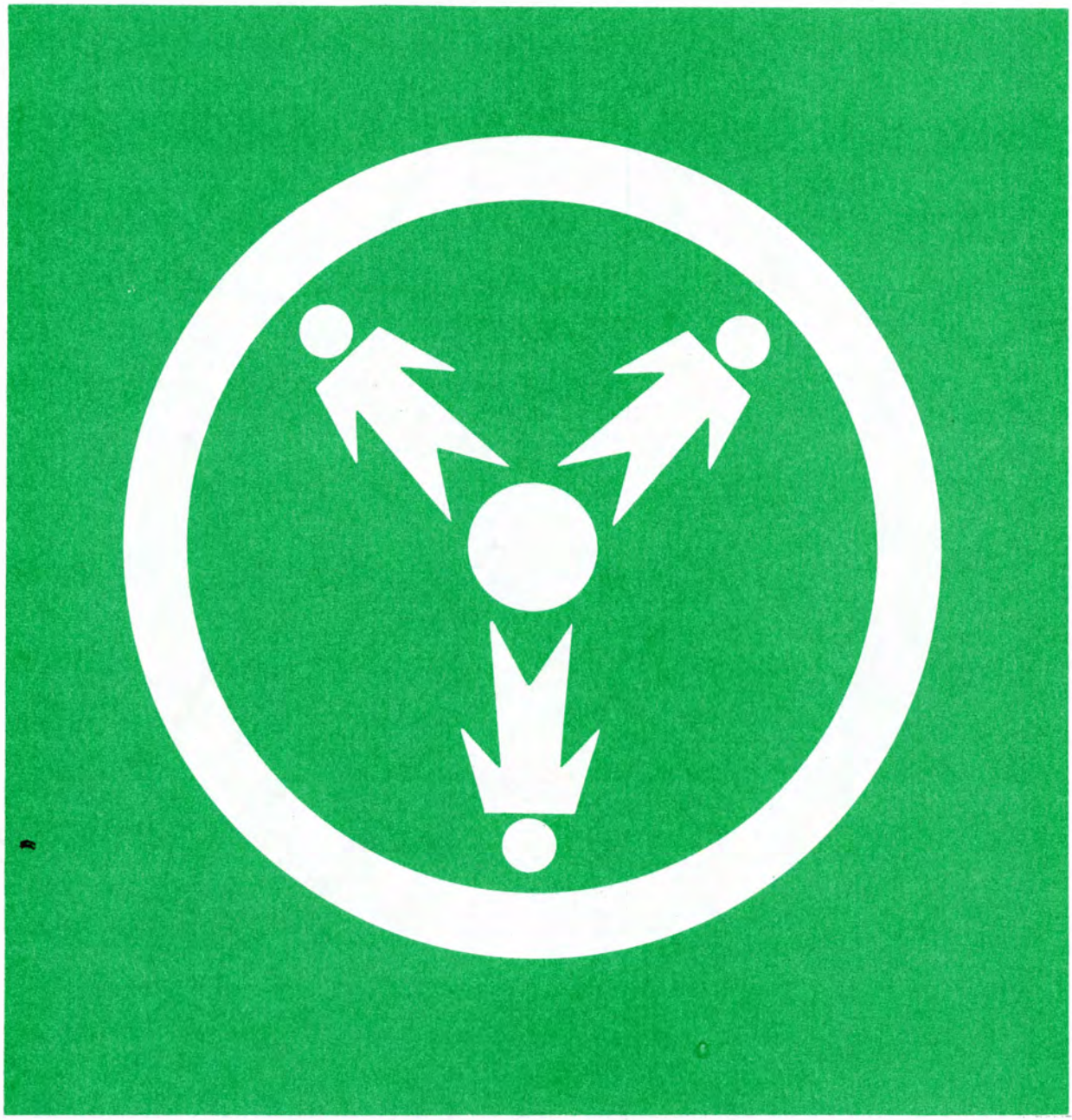

On Group Process in the Classroom

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The Christian Educators Journal Association, composed of several member or sponsoring organizations, publishes the *Journal* as a channel of communication for all educators committed to the idea of parentally controlled Christian schools, whether at the elementary, secondary, or college level. The general purpose of the *Journal* is to foster the continuing improvement of educational theory and practice in Christian schools. Therefore, its pages are an open forum for significant articles and studies by Christian educators on Christian teaching. Editorial policy favors those contributions that are normative and evaluative rather than merely descriptive of existing trends and practices in American education. All articles and editorials appearing in it are to be regarded as the expression of the viewpoint of the writers and not as the official position of the Christian Educators Journal Association or its member organizations.

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Guest Editorial:

Religion and the Schools—*AGAIN*

Nicholas Wolterstorff

In October 1973 there was filed in the US Court for the Western District of Pennsylvania another suit in the long history of "religion and the schools" cases in America. This particular litigation, however, introduces an important novelty into this history, and should attract the interest of all *Journal* readers.

Thus far all religion-and-school cases to reach the higher courts have been of one or the other of two sorts: suits aimed at removing some vestige of religious commitment from the public schools, or suits designed to prevent states from implementing legislation designed to benefit nonpublic religiously committed schools. With few exceptions these suits have all been decided in favor of the plaintiffs.

I have often argued in these pages that freedom and justice in a religiously pluralistic society demanded that most of these suits be decided as they were. To require all citizens to support a religiously committed public school system would be unjust to those whose religious commitment happened to differ from that of the school. In addition it would infringe on the free exercise of their religion, since to educate their children in accord with their religious or irreligious commitments would require private schooling. Likewise, laws designed to benefit nonpublic religiously committed schools quite obviously violate the constitutional rule that the state avoid doing anything whose aim is to benefit some religion or irreligion.

However, I have just as often argued that in our present system the parent whose religious commitment requires that his child be educated differently from the way of the public school has a powerful grievance. He is being treated unfairly. His religious freedom is being infringed on. For he either has to pay double, or act in violation of his religious commitment.

So our present system catches us in an inescapable dilemma. If the school system supported by public tax money is allowed to exhibit some religious or irreligious commitment, all those whose religious or irreligious convictions differ from that of the school are deprived of their rights. But conversely, if tax revenue goes only to "neutral" or "secularist" public schools, those parents who are religiously convinced that their children should not have neutral or secularist education are deprived of their rights. One way or the other, rights are trampled on.

It seems evident that there is only one solution. Abolish our system whereby only one educational institution in each district gets public tax funds. Allow all schools, no matter what their religious or irreligious commitment, to benefit from the funds paid by all. Make the state impartial, "religion blind."

A few states have passed laws the result of which would be (and perhaps the aim of which was) to

move towards such an arrangement. Some of these have been laws instituting voucher systems, others have been laws giving tax rebates to nonpublic school parents. It is still too early to know the courts' final judgment on these and other attempts at instituting such an arrangement. But so far, all such legislation which has come before the US Supreme Court has been struck down. For the Court does not read the Constitution as requiring that the state treat all religions and irreligions in society impartially. It rather reads it as requiring that benefits never go directly to nonpublic religiously committed schools.

This—to say it once again—wreaks an obvious injustice and infringement of freedom on those whose religious convictions are out of accord with the education offered by the public schools. What the cause of justice and freedom requires at this point is that some nonpublic school parents should say this. It requires that they should bring a suit in which they argue that *their* constitutional rights are being violated when, in order to carry out their religious commitments, they have to provide their children with private education while at the same time paying taxes for the public school system. This is exactly the structure of the suit to which I referred. It marks the first time, to my knowledge, that those opposed to "neutral" or "secularist" education for their children have asked that *their* constitutional rights be respected.

The suit was brought by five sets of parents who support two small Christian schools in western Pennsylvania—Allen, Cunningham, Moore, White, and Viss. The suit was brought against the Blackhawk School District, the Big Beaver Falls Area School District, and the Commonwealth of Pennsylvania. It was argued by attorney Rex Downie.

As a summary of the case which they presented to the judge they said this:

a. That your plaintiffs are deprived of the use of public welfare school tax funds for the education of their children by reason of discrimination based on their Christian faith.
b. That your plaintiffs are thereby forced to choose between either:
   1. Accepting "public" school education in order to avail themselves of said public welfare school tax funds, in violation of their religious convictions on the one hand, or:
   2. Maintaining their religious faith by foregoing their rightful share in said public tax monies and purchasing education at added cost while still paying public school tax on the other, in violation of the same religious convictions.
c. That your plaintiffs are being taxed to support the propagation of the faith of secular humanism which is repugnant and antithetical to them as Christians thus compelling them to support said religion of humanism contrary to their will or consent.
d. That the pattern of taxation of plaintiffs . . . therefore imposes an unconstitutional handicap, hinderance and economic condition upon the exercise of plaintiffs' Christian religious beliefs by impairing the freedom of your plaintiffs to exercise their religious freedom in the education of their children.

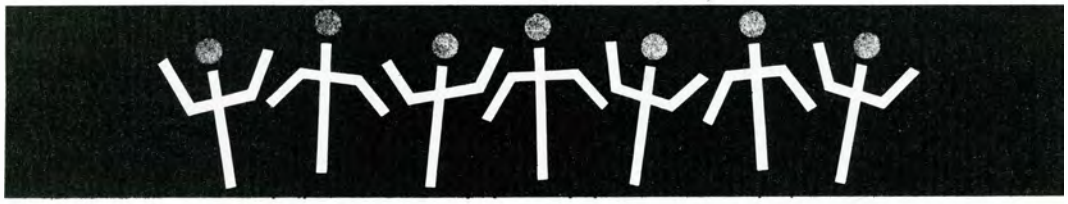
What the plaintiffs asked of the Court is that it declare the relevant parts of the school tax laws and of the Pennsylvania Constitution to be in violation of the US Constitution; that it require the Commonwealth of Pennsylvania to institute "an equitable and just distribution of public school tax funds on a per capita footing equal with all other students of the Commonwealth without reference to religion"; and that it enjoin all further taxation of the plaintiffs pending effectuation of the relief asked for.

* * *

The case has recently been decided. I greatly regret to say that the suit was dismissed. It was dismissed on the ground that the Eleventh Amendment of the US Constitution forbids citizens of a state from bringing suit against the state in federal courts. This actually constitutes a technical ground for dismissal; for the Eleventh Amendment is customarily circumvented in rights cases by lodging the suit against the officers of the state rather than against the state itself. So the case must be reframed and argued again.

In the meanwhile all Christians—indeed, all Americans—who care for justice and religious freedom should follow the case with interest and devoutly hope that it will ultimately be decided in favor of the plaintiffs. This may well be one of those cases which, from small beginnings, creates significant restructuring of our society. Too long Christian school supporters and all others opposed to "neutral" or "secularist" education have with patient silence suffered injustice and infringement of their freedom. It is long past time that their rights be granted, without infringing the rights of those who are irreligious. Until that day arrives, the words "with liberty and justice for all" will remain a taunting mockery.

Those who wish to express their support for the parties involved in the case can do so by contacting the attorney, Rex Downie, in Beaver Falls, Pennsylvania.



On Group Process in the Classroom

Marcia D. Zwier*

Group/Peer Learning: A Possibility

Group process and peer learning happen in every classroom, whether we know it or not. We notice, though within limits, informal communication and a flow of discussion. Group assignments and committee work are common. Learning groups in different subjects are clipped to the plan book on the desk. To be sure, the students do a considerable amount of seat work on their own, and the teacher makes every effort to assess their individual mastery of material and retain a commitment to the principle that everything possible be done to enhance the development of their unique personalities.

For several years I have been curious about the use of group process as a learning technique. What if every effort were made to capitalize on peer learning in a classroom? Before each new experience, the teacher would say, "If the students took this test in small groups rather than on their own or wrote this essay in teams, or mastered this new vocabulary list as peers, how would their learning proceed? How would they feel about it? Would they prefer it to working on their own?"

Group process is a fact of life, even if not acknowledged or understood or channeled. It is "an inevitable and omnipresent phenomenon" whether effective or not. On the basis of their extensive review of studies in this area, Kelley and Thibaut (H. H. Kelley and J. W. Thibaut, "Group Problem Solving." G. Lindsey and E. Aronson, ed. *The Handbook of Social Psychology*. Vol. IV. 2nd ed. Menlo Park, Calif. Addison-Wesley, 1968. 29-101.) admit that group process may increase the uniformity of opinion or initiate a "risky shift" among participants. Groups are slow because they are uncoordinated and need organization and time to develop. Being a group may adversely affect the motivation of members. On the other hand, however, groups may persevere on a task longer and render a more probable solution. They also may increase the understanding of a problem and commitment to its resolution.

Kelley and Thibaut also write that a great deal of what happens in a group depends on the nature of the problem and the standard of performance required. If a group is to compete with the most able person in it, it will tend to do better with a manageable number of decisions to be made on the problem and with a solution that can be checked for its correctness. A group will perform particularly well when the group members complement each other in their talents and deficiencies. Problems tend to arise when the problem is so complex it requires thinking through a long series of interrelated decisions, applying rules, and retaining previous decisions.

Procedure

To test out some of these working principles, I used a variety of students, settings, and tasks. I administered to 225 individual students and groups in eight sixth-grade classrooms in five locations tasks ranging from routine grammar tests to essays. They all performed three tasks, once as an individual student and once in a group. I expected the groups would be most proficient on the multi-item, easily checked grammar test, moderately more proficient on the comprehension test, and least proficient on the literary production. I had to consider the intellectual talents the students had as well as their sex and socio-economic background. The specific question I posed was: does it make a difference in group process what kind of task it is, not do students of a particular sex, from a particular socio-economic background or below a certain level of intelligence or achievement perform best with one task or another? It was necessary, then, that each three-person group be composed of

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a high, average, and low achiever, both sexes, and students from different schools. In a preliminary study of personality and group process ("Psychological Factors in Communication among Elementary School Children." unpublished doctoral dissertation. University of Illinois. 1964), I had found that voluntary groups in grades three and five tended to be made up of persons with comparable rather than with non-comparable personalities. As they grew older, however, they tended to communicate more with persons less like themselves.

I assigned three tasks, at random, selecting them from currently used academic achievement tests, all in the area of language. (Permission was obtained from the publishers, Harcourt, Brace, and World, Inc. and Educational Testing Service, to reproduce the items.) None of them was being used as part of the testing program in any of the five schools. The tasks were as follows:

Task X

The language subtest of the Stanford Achievement Test, 1964 Edition, Forms X and W, was selected as one of the tasks. A total of 166 items including grammatical usage, punctuation, capitalization, sentence sense, and spelling were reproduced in mimeographed form. Each of the seventy-five subjects randomly selected to work on this task was given a copy of the test and instructed to find the correct answer for each item. The score was the number correct on the 166 items.

Task Y

Another group, seventy-five again, from the general pool of subjects in each classroom was assigned fifty items from the writing tests of the Sequential Tests of Educational Progress (STEP), Forms 4A and 4B, as a task. These items are designed to measure comprehension of reading material of high interest to students at this level. The score was the number correct of the fifty multiple choice questions.

Task Z

Still others from the total sample of subjects, seventy-five again, worked as individual students and teams on one of the topics from the Essay test of the STEP, Form 3B. The instructions with the alternate form were:

> If you knew you were going to go blind (deaf) 24 hours from now and that nothing could prevent it, what would you do with the time between now and the moment this time tomorrow, when you could see (hear) no more? Where would you go? What and whom would you try to see (hear)?
>
> Write an account of what you would do from the time you leave this room until your blindness (deafness) strikes, explaining, if possible, the reason for your choice.

The number of words employed by each of the seventy-five subjects and teams was used as the score for this test.

I appraised the degree of satisfaction left by the students in each of the two settings. At the end of the two sessions, they filled out a sheet with these instructions:

> You have been given a chance to work on something

in two ways–by yourself and with two of your classmates. Please answer the following question about your experience. Which way did you enjoy working most--working by yourself or working with others?

The original study with sixth graders (Study I) was repeated with a total of 180 college students from two introductory psychology classes (Study II). The data were collected on successive days rather than on the same day. Teams were contrived on two bases: a. sex and b. score obtained on a course examination rather than an intelligence test. Tasks were the conventionally printed forms of the English Expression text, Forms 1A, and 1B, the Cooperative English Tests, and Forms 1A and 1B of the STEP Writing and Essay tests.

In Study III, to increase the relevance of the task, a unit test in psychology was used for both groups and individual students. An intact university class group of seventy-five students took equivalent forms of the unit examination in two successive sittings, individual and group, on the same day. The students knew that their recorded score (grade) would be the higher score of those obtained on their own or the midpoint between the team score and the individual score.

Results

In Study I, as predicted for Task X and Task Y, the two groups of seventy-five students did, on the average, perform significantly better as team members than as individual students. For Task Z, the differences between individual and small group performance were not significant; neither were they what I expected. In the essay as in the grammar and comprehension tasks, the seventy-five students tended to perform better as team members than as individual students.

In Study II my predictions were confirmed for Tasks Y and Z, but not for Task X. On the comprehension test, groups surpassed individual students. On the essay test, individual students were more proficient than groups. But on the grammar test, individual students surpassed groups.

In Study III Emery (H. Emery, "Benefit and Satisfaction in Individual vs. Group Problem Solving." Unpublished master's thesis. Middle Tennessee State University, 1969.) found that the seventy-eight students who took the unit examination in psychology had higher team scores, on the average, than individual scores. Three-fourths of the students in the introductory psychology courses benefited from the team effort.

The preferences or, more specifically, the level of satisfaction the students in these studies indicated correlate with the level of proficiency actually demonstrated. The sixth graders preferred the group setting to the individual setting for all tasks. For Tasks X, Y and Z respectively, 79, 58 and 69% preferred the group setting to the individual setting.

The college students in Study II preferred the group setting for Tasks X and Y (75 and 80%). For Task Z, in which their individual performance surpassed their team performance, 55% preferred the former. The students in Study III, then, indicated that they preferred the team setting, but not at a statistically significant level.

The serial effect of the two situations was studied also, i.e., whether performance on the task in the first session turned out to be higher (novelty effect) or lower (practice effect). In Tasks X and Y, no differences were found; in Task Z, there was a tendency, though not statistically significant, for performance on the first task to be superior.

Discussion

The specific question posed in this series of studies -- does the kind of task make a difference in both peer and individual learning -- was answered yes. On the whole, peer learning of the younger students surpassed their individual learning, especially in the more routine language tasks. The college and graduate students profited from the team effort also especially in short-answer tests. On the essays, performances varied considerably; at the university level the pendulum of performance and preference had swung from no difference to considerable difference in favor of individual setting.

A study of this sort has a number of limitations, particularly when I try to generalize from results. From a theoretical point of view, these findings contribute nothing to what group process *per se* is, only to its products. No tapes or other recordings of group sessions were made. Many people wonder if what goes on in most groups is a simple pooling of resources or a dynamic, innovating function. Is the group at best a check and balance, a gatekeeper in making decisions? Or is a group as likely as individual students to come up with something not only truly novel and adaptive but also impossible of being conjured up by any one group member, genius or no genius? This question must be answered. Meanwhile, group process goes on and may well be a tool of learning worth more promoting in the classroom.

Are the tasks selected for the studies a limitation? To a certain extent, a standardized test is always an "artificial" task in a learning setting with much time spent in instruction; also, teachers make mastery tests. On the other hand, these tests are more objectively scored than many others, the items are less likely to be ambiguous, and the potential variation in scores is considerably greater than possible in a nonstandardized setting. And for applying results it is most important that these tests are part of a series of academic achievement tests which provide results highly related to or correlated with schoolwork in the area.

Two informal investigations in peer learning were conducted recently as logical extensions of the three more formal studies. Toward the completion of a course, six graduate students took a mastery test of approximately seventy-five short-answer questions (association and multiple-choice). The following week, before their papers were returned to them, they were given copies of the test and asked to take the test as a group. The group score was the score obtained by the highest achiever. It might be inferred, at least from these data, that the group process in this case was a pooling of resources. No new correct solutions emerged.

As an experiment in multi-solution learning, twenty members of a graduate class in early childhood education were randomly assigned to one of two settings: a three-person or an individual one. They were told to write down the names of twenty-five to one hundred objects that would foster independence in a nursery school and/or kindergarten program. The number of objects was tallied. The average score for individuals was fifty-six, for groups seventy-six. This is a sizable difference for a conventional group of students in a university setting.

In summary, the findings in this series of studies support the Kelley and Thibaut hypothesis that group process, whether problem solving in an experimental laboratory or peer learning in a classroom, is a viable tool in human endeavor, especially if the task is set, sequential, and structured to lead to a specific conclusion. Conversely, the more open-ended and ambiguous the task and its ultimate intent, the less efficacious the process is likely to be. To provide the widest range of admissible evidence or possibilities for solution, group members should complement rather than supplement one another in background. The converse part of the hypothesis was not tested by the studies; only its effect was acknowledged.

The following suggestions are for teachers interested in using more peer learning in their classrooms:

1. Assume that the students in your classroom can benefit from peer learning, especially if these small group activities are planned as part of the ongoing program of education. Expect and encourage the process by calling attention to corrected mistakes and to the merits of weighing alternatives before making decisions. Ask for the individual preferences of the students. Some students consistently prefer to work and do better on their own. Expect this; acknowledge it.
2. The older the students the more diversified they could be in the skills they bring to the group.
3. Keep the groups as small as possible, from three to five.
4. Arrange for students to select their own team members as much as possible. They have more opportunity to make observations regarding one another than the teacher does of any one of them.
5. Make use of group process for planning, implementing, and evaluating, in short, for every activity in the program. If something is done by persons, it could be done by a small group and indeed could be more expertly done there.

Summary

Group process is more beneficial than individual effort for a task of many sequential parts. Five investigations explored the effects of a variety of multi-part tasks on peer and individual performance in the classroom. More than five hundred sixth graders and university students in eleven classes performed one of three language tasks -- in grammar, reading comprehension, and writing -- or took a psychology unit test as individual students and in three-person groups. These teams included high, average, and low achieving students, of both sexes, from a variety of socio-economic backgrounds.

Results showed sixth graders both more proficient in and satisfied with group process over individual performance, regardless of task, although their individual and group essays differed only slightly. Undergraduate and graduate students benefited from group process in taking tests, but their individual essays surpassed their team effort when number of words (verbal fluency) was used as the scoring index.

Let Letter Grades Go!

Mary Beth Stek*

All schools, both Christian and public, have a responsibility to their students. Part of this responsibility is a constant re-evaluation of school policies so that the student's needs can be met in the best possible way. This should include re-evaluation of policies in such areas as discipline, counseling, and grading. All schools should look closely at their policies and be prepared, if necessary, to discard some of the traditional ones and adopt others which would better enable them to serve their students.

The current grading system is one area in which re-evaluation is imperative. I am referring to the practice of evaluating a student by placing the letter grade A, B, C, D, or F, on his performance. It is time that this traditional system be given up. Many arguments support this, some basically educational. Letter grades are misleading; they do not show the true picture of a student's ability or achievement. For example, what does a "B" in arithmetic really say about a child's ability? For one child it may mean that he is doing his best, but hasn't really mastered the multiplication tables; for another it may mean that he knows the multiplication tables, but his work is generally careless; and for yet another it may mean he has only mastered 80% of his work. Letter grades are also arbitrary, what is an "A" for one teacher is a "B" for another and vice versa; there are poor or no standards by which to calculate grades.

Grades also have an effect on students--they begin performing for a grade and as a result show little initiative and imagination. They also settle down into mediocrity. If a teacher gives five grades a semester, a student can do well enough occasionally to establish some credit and then just slide and still manage a "passing grade." Students have the system cased; they know how things will average out.

Psychological arguments for replacing the traditional grading system also exist. The most important of these is that grades become labels that are attached to the students, labels that say such things as "RETARDED," "UNDERACHIEVER," "HOPELESS," and, of course, "GIFTED." On the basis of these labels, which are attached early, the student is judged for the rest of his time in school and, in fact, for the rest of his life. Thus the present grading system can be injurious to a student's self-worth. Many students feel that they have to prove their worth or value as persons. They equate their worth with their academic performance. A failing grade means more than failing a subject; to many it means personal failure.

Grades often hinder positive relationships between teachers and students. A teacher, instead of becoming someone who shares knowledge and experience, becomes a "grade dispenser." Students learn because they are afraid they might get a bad grade. This is hardly the foundation on which to build an education. Other students are overcome by the negativism; bad grades have put them down so many times that they no longer want to learn (and this is true of elementary as well as high-school students).

The present grading system also distorts life. Schools are supposed to prepare students for life. When they get out of school, however, there are no more grades; it is strictly pass or fail. They have learned that they can get by with a passing grade by cramming before a test, but this no longer works. Every day is a test situation, and to survive they must do their best all the time.

Theological arguments for replacing the traditional grading system also exist. If we are going to run God-centered schools, we should treat students the way God treats us. Two relevant parables come to mind. The first is the parable of the negligent servant in Luke 12:42ff. Verse 48 says, "From everyone who has been given much, much will be demanded." The servant was evaluated by his opportunities and capabilities.

The parable of the talents is perhaps even clearer on this point (Matthew 25:14ff). The servants in this parable were evaluated not by comparison to one another nor by accumulated talents, but by their individual potential. Each was judged by what he had done with the "talents" given to him.

If we as Christians are going to strive to pattern

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our lives after the life of Christ, we should do this in our roles as Christian educators too. We have a responsibility to our students: by our lives we must reveal the ways of God to man. Could this not also be relevant in our evaluation of students? Could we not view each student as an individual person with abilities and potential peculiar to him and evaluate him according to them?

I say yes we can and propose that we replace the traditional grading system with a method of evaluation based on and conforming with our Christianity.

We must begin by remembering that each student is an individual and as such possesses abilities and potential which are his and his alone. By these, then, he should be evaluated. The teacher should write prescriptions or objectives for each student, basing them on his or her abilities. Written reasonably, they will be something to refer to when measuring the student's progress.

The teacher should hold regular and frequent conferences with each student to discuss progress. Conferences should be held both when he is doing well and when he needs some extra help. This allows for positive reinforcement (a student who needs help needs positive reinforcement as well as the other student) and helpful suggestions.

The teacher should hold regular and frequent conferences with parents too. Then they can participate in and feel a part, an active part, of their child's education.

I realize that at the end of the year a decision on the child's sufficient progress for the next grade will have to be made. I hope that with the removal of "grades" the system of grouping students into grade levels will also be re-evaluated. Now however, the traditional groupings remain in most schools. The decision to move a child into the next grade should not be made by the teacher alone. It should be reached through discussion with the teacher who will be receiving the student, the parents, and the student himself.

This is just a brief glimpse at what I feel is a more Christian grading system than most of us know or practice. It will have to be worked out in greater detail before it can be applied to a given situation. It is a beginning, however, and it is time we begin to change.

Walking to School

Marie J. Post

This is the day for that big test in Lit.
and probably a quiz in each class.
Those German declensions were something to learn!
(It rained and how green grows the grass!)

These books are a load. Each day it gets worse.
Too much homework - mom even agrees.
No time for that poem she assigned us to write.
(I didn't know there were buds on the trees!)

I haven't completed the history notes
and tomorrow will be the last test.
Maybe in study? No, German comes first,
(That robin is building a nest!)

Already the bell. That means I'll be late
Tomorrow - detention room
extending the time I must spend at school.
(And tulips already in bloom!)

IMPLICATIONS of PIAGET *for the Elementary Classroom*

David W. Anderson*

The influence of the Swiss developmental psychologist Jean Piaget is being felt more and more in American education. The numerous books and articles by and about Piaget and his theory can fill whole sections of a library (as, for example, at Temple University's Paley Library, in a section maintained by the Jean Piaget Society).

Although Piaget's primary concern has been with psychology, his theory bears directly on the field of education. The relevance has been noted by many in schools that educate teachers, but the implications of his research are not often realized in the classroom. The classroom teacher should then be made aware of the many practical insights into child development and the pedagogy flowing out of Piaget's thought.

An adequate summary of Piaget's theory of cognitive development requires more space than I care to take. Such summaries do exist (Pulaski, M. *Understanding Piaget: An Introduction to Children's Cognitive Development,* New York: Harper & Row, 1971. Wadsworth, B. *Piaget's Theory of Cognitive Development.* New York: McKay 1971). The present purpose is to suggest five very basic implications for educational pedagogy derived from the work of Piaget. I hope that readers unfamiliar with Piaget will be stimulated to acquaint or further acquaint themselves with his work, while those who know his theory of cognitive development will be encouraged to apply this knowledge more directly in their classes.

Implication 1

1: The curriculum must match the child's stage of cognitive development.

The firmly established curriculum in most schools can inhibit cognitive growth and extinguish creative thinking by failing to consider the developmental level of the child. What is of interest to the child, and therefore motivates him, depends on his stage of development and how closely the subject matter presented to him relates to his level of intelligence and what he already knows. A major task for the teacher, therefore, is to identify the child's stage of development and then provide experiences appropriate for that stage.

Piaget posits that the child passes through cer-

*David W. Anderson teaches fifth grade at the Philadelphia-Montgomery Christian Academy, Dresher, Pa. He presented this paper at the spring meeting of the Mid-Atlantic Christian School Association in Dresher, Pa., May 3, 1974.

tain stages which form a hierarchical and constant order of growth, each stage building upon and extending thought structures acquired during the previous stage. Such an on-going, evolutionary process brings the child from a primarily reflexive organism at birth to one capable of abstract, formal reasoning. These four stages in cognitive growth are: (a) the sensory-motor stage (approximately birth to two years), (b) the pre-operational stage (approximately two to seven years), (c) the concrete operational stage (approximately seven to eleven years), and (d) the formal operational stage (usually reached around eleven or twelve years).

Each of these stages is defined by its own particular thought structures. The elementary program deals principally with children of the pre-operational and concrete operation periods. The teacher must recognize the characteristics of each child's thought processes during these stages as they relate to his ability or inability to handle various subject matter.

He must also evaluate particular subject matter in the curriculum for its appropriateness to the developmental levels represented in the classroom. Such evaluation considers the child's accumulated experience, or the ease with which appropriate experience can be gained (Wickens, D. "Piagetian Theory as a Model for Open Systems of Education." M. Schwebel and S. Raph, ed. *Piaget in the Classroom.* New York: Basic Books, 1973, pp. 179-188). Obviously, this evaluation of a child's cognitive development must be an on-going process, which requires the teacher to become an astute observer of children's behavior as it reflects cognition (See implication two).

Of course, matching the curriculum to the child's cognitive level does not mean providing experiences at that level only. The teacher must seek to encourage progression to a higher level. Children should be confronted with problems whose solution requires reasoning at a slightly higher level than that at which they generally function. This can be done by building into the curriculum experiences which present possible cognitive conflict (what Piaget terms *disequilibrium*); the resolution of such a conflict is both the result and evidence of cognitive growth.

Because of the way cognitive structures develop, a child's curricular sequence should be determined by his psychology (Kaya, E.A. "A Curricular Sequence Based on Psychological Processes Rather than Subject Content." *Exceptional Children,* 1961. 27. 425–428ff). Piaget's scheme of cognitive development provides a model of the stages for teaching certain concepts (Pulaski and Wadsworth). Some basic characteristics of a child's thought processes appear in the second implication of Piaget's theory, which builds upon and extends the first implication.

Implication 2

2: In learner/teacher interactions, the teacher must cultivate an awareness and understanding of a child's thought processes. Using Piaget's framework eases evaluation of the child's cognitive functioning.

A: Teachers must become students of the children.

Followers of Piaget's thought must become (a) astute observers of children's behavior, (b) critical listeners to their speech, (c) assessors of their thinking abilities, and (d) stimuli for provoking their thoughts (Smart, M. "What Piaget Suggests to Classroom Teachers." *Childhood Education.* 1968 44, 294–300.). Piaget's theory stresses the activity of the learner as the vehicle for cognitive growth. The teacher must, therefore, observe the child as he manipulates objects in his environment and question him to probe his thoughts. In this way he can better understand the child's cognitive functioning. Attention should center on how the child solves the problems, with additional suitable materials provided for help when necessary. Children (and adults) learn from trying to work out their own way of doing things, and their errors are as instructive as their successes. Thus, the teacher ought to go beyond correcting the learner's errors and try to follow the reasoning that led to an incorrect answer: Down what intellectual avenues did he travel? The child's answer may not have been incorrect according to the reasoning he used; rather, a faulty understanding of the initial problem situation may have led to an improper cognitive attack. Or, he may simply not have had the cognitive wherewithal to attack the problem in the first place. Here the teacher must evaluate the child and the task for their "match" and the task, if it is too advanced for the child's present level of understanding, must be broken down and manipulative materials provided to foster cognitive growth.

B: Teachers must be aware that children's thinking is qualitatively different from adult thinking.

The obvious result of this difference is that children simply do not see or understand things as an adult would. This is often forgotten by teachers, who expect (demand, even) adult-level responses from the child—both academically and socially.

Piaget emphasizes the individuality of each child

as well as a progression from the child's thought processes to the adult's thinking patterns (Inskeep, S., Jr. "Building a Case for the Application of Piaget's Theory and Research in the Classroom." *The Arithmetic Teacher*. 1972. 19. 255–260). To attempt to mold the learner according to adult thinking is futile. The subject matter must be made to fit the child, not vice versa. Patience and true acceptance of individual differences comes with the understanding that the source of thinking grows from within the child (Furth, H. G. & Wachs, H. *Thinking Goes to School: Piaget's Theory in Practice*. New York:Oxford, 1974).

As stated previously, elementary school children are usually functioning at the pre-operational and concrete operational stages of development. The teacher must be aware of the characteristics of children's thought during those periods. Several major characteristics are briefly described below.

Language and thought

The major achievement during the pre-operational stage is the development of language. This developing verbal ability permits representation of many actions very quickly and in the absence of actual objects familiar to the child. Thus the rate at which experiences can occur is increased. This symbolic representation through language is based on experiences the child has had with objects in his environment. Even in the concrete operational period, language and thought are meaningful only as they stem from the individual's interactions with real, concrete objects and events. Presenting the child with verbal symbols in reading instruction, for example, will not yield true learning if the child has no experience with the object symbolized.

Although a great deal of cognitive growth occurs during the pre-operational period, complete development is not yet attained. The child's thinking is still perceptually bound, and his attention is usually fixed upon a limited perceptual aspect of the stimulus. He is unable to explore all aspects of the stimulus object at the same time. Also, the pre-operational child is unable to follow a series of transformations in an object or event, so centers on the separate elements of the sequential changes. Thus he cannot judge correctly between two equal amounts of clay when one is shaped like a ball and the other like a hot dog. He is unable to consider both length and width at the same time. It is only as a result of continued experiences that he eventually learns to decenter his attention and focuses on the whole object or series of transformational states.

Conservation

The pre-operational child does not have the concepts of conservation and reversibility-- the concept that the amount of material stays the same regardless of any changes in shape or position, and that any transformational changes can be reversed so that the original situation is regained. The ability to decenter attention and the concepts of conservation and reversibility appear during the concrete operational stage after a multiplicity of experiences with material objects. The child who cannot reverse operations, while being able to add or multiply, will have difficulty in subtractions and division. Therefore, such mathematical operations should be taught with concrete objects until the concepts of conservation and reversibility have been internalized.

During the concrete operational stage the child's thought is no longer dominated by perceptual influences, but remains tied to concrete actions. Purely verbal or hypothetical problems are still beyond his ability to handle, but if the same problem is stated in terms of real, concrete objects, he is usually able to solve the problem (cf. Wadsworth, p. 90).

Knowing when a child is able to conserve will affect the teacher's expectations of him in the classroom. Knowing his need for concrete materials as an aid to thought should help the teacher be more patient and understanding while the child has difficulty with the more involved concepts. He must also remember that children who are able to conserve in one task may be unable to conserve in another task or with different materials and that if the demands of the environment are too far removed from concrete actions, children are likely to revert to purely intuitive thought (cf. Smart). Piaget indicates that it is not until age ten or eleven that children develop a full concept of conservation.

Egocentrism

Another characteristic of the pre-operational child's thinking--a characteristic never really outgrown--is egocentrism, "the cognitive state in which the individual sees the world only from his own point of view, without being aware that other points of view exist" (cf. Wadsworth, p. 39). This has obvious limiting effects on perception, conceptualization, and communication. During the sensory-motor period the child believes he is the center of the universe; it is only through his interactions with objects and persons in his environment that

he learns that this is not so. This type of thinking remains in the pre-operational period. "What is foremost in the child's thoughts is what he believes others are attending to also (Duckworth, E. "Language and Thought." M Schwebel and S. Raph, ed. *Piaget in the Classroom*. New York: Basic Books, 1973, pp. 132–154). Often a child gives incorrect, seemingly inappropriate, irrelevant responses simply because he has interpreted the teacher's question in his own egocentric manner. Often adults fail to comprehend another's meaning because they interpret his words in the light of their own personal orientation.

A child's egocentric thought processes affect how the teacher seeks to communicate to his students, as well as how the child receives such communication. A teacher must be certain that the child understands directions and explanations. Such communications should be given clearly so as to lessen the probability of misunderstanding. The teacher must try to anticipate possible misunderstandings. He must also thoughtfully and carefully listen to what the child is saying so he can understand his thinking and guide his growth.

Knowledge as construction

The child's existing concepts or thought structures are continually being reorganized and reconstructed to incorporate new information gained through his experiences. Cognitive growth is not simply the result of adding new concepts to what is already present, since new concepts may often conflict with existing ones. Rather, changes in the existing structures are required so that new data can be assimilated. The teacher must remember that the child must construct his own concepts of reality, that knowledge is acquired by this process of construction, rather than by absorption and accumulation of information from the external world. Therefore the child cannot be taught directly. To explain or even demonstrate something to him according to adult common sense may result in his learning something quite different from what was intended (Kamii, C. "Piaget's Interactionism and the Process of Teaching Young Children," M. Schwebel and S. Raph, ed. *Piaget in the Classroom*. New York: Basic Books, 1973, pp. 216–230).

The teacher must remember not only that children must construct their own concept of reality and that these constructions will differ according to the general level of cognitive functioning, but also that the child's reasoning will be qualitatively different from his own. The individual child's conception of the world is limited only when judged from a higher level; his conceptions are never wrong, but always appropriate to his level of cognitive development. The teacher must realize that the child's ideas may be different, but not incorrect for where the child is developmentally. Any response the child produces should be accepted as valid for that child, but he must then be led to self-correction by means of questions and experiences designed to promote cognitive growth. Failure of the teacher to recognize this in making evaluative responses to what the child has done can cut off communication and stifle creativity in the young learner. Rather, the teacher must seek to encourage each child to be free and open in expressing his feelings and ideas; he will thus not create a "failure syndrome" and not overly emphasize the right/wrong orientation that forces the child to concentrate on being right instead of understanding.

Interaction

Precisely because knowledge must be internally constructed by the child must the emphasis in learning be on action. Indeed, for Piaget, knowing is action on objects (cf. Pulaski). It is only as the child enters the period of formal operations that he is able to deal with abstract ideas without the aid of concrete manipulative materials.

Social and physical interaction are two parts of intellectual growth. Through games and activities with concrete materials, actions become internalized, and this internalization of action (i.e., thought) becomes the basis for the abstractions of the more advanced levels of thinking. Children at the stages of development under consideration need to have concrete materials available for their use, or else be able to visualize objects they have had experience with and can easily recall to memory.

Equally important is social interaction. Through group activities the child learns that his point of view is not the only one. Growth in the child's perception or conceptualization of the world occurs as he is forced to reconcile his views with those of his peers and of adults or validate them, maybe in contrast to the other views.

This interaction of the curriculum and the child can be viewed as an on-going process of intervention designed to promote growth in cognitive structures. The teacher must value action through experimentation and exploration by the child. He must then make the value known to the child by encouraging him and helping him to be aware of his actions and the effects his actions have on objects, situations, and other people.

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What is (Scientific) Truth?

by Charles C. Adams*

We read in the gospel of John that when the Lord declared to Pontius Pilate His purpose for coming into the world, namely, to "bear witness to the truth," Pilate responded with the question "What is truth?" Whether Pilate was voicing genuine perplexity or simply mocking in a manner suitable to Judean procurators, the point, in either case, is that he raised a most interesting question. Little insight is necessary to see that it is a most fundamental question, and the way it is answered may very easily determine the direction to move in attempting to answer many other questions. Perhaps it is valid to say that the answer to that fundamental question might not only determine answers to many other questions, but very likely will determine the questions themselves.

In light of this, I suggest that whatever a student learns during his four years in a Christian high school, surely one of the most important items is what truth is. More specifically, if a student learns very little else in his science classes, he should leave with some grasp of the nature of scientific truth. Well, what about it? What do Christian high school students learn — what are they taught about the nature of scientific truth?

Revealing Fundamental Truths

A chemistry textbook currently used for high school juniors, in contrasting the quantitative and empirically-based methods of modern chemists with the qualitative and somewhat speculative science of the ancient Greeks, declares that "Modern scientific methods make use of experiments to reveal fundamental truths." (Metcalfe, Williams and Castka, *Modern Chemistry*. New York: Holt, Rinehart and Winston, 1970, p. 47.) At first glance one is tempted simply to let this statement slide on by, dismissing it as just another feeble but valiant attempt on the part of the author of a highly technical textbook to inject a wee bit of philosophical trivia before getting on to the heart of the matter: facts and equations. But how many of these facts and equations, and more importantly, how much of their context, are determined or *spirited* by that wee bit of philosophical trivia? In the very first pages of that same chemistry textbook the author uses the word *truth* as he introduces his initial discussion of the scientific method: "Scientific methods require strict honesty, the ability to withhold a decision until all the evidence is in, and the desire for truth."

What do these statements and their context teach a student about the nature of scientific truth? Since the word *truth* has profound meaning in the faith life of a Christian, how does the meaning of *truth* in the Scriptures compare with the meaning of *truth* gleaned from our science textbooks? If you are tempted to say that we are talking about two different *truths* and therefore the problem is simply semantics (using the same word to describe two different concepts), consider that the author of that chemistry text used the verb *reveal* and the adjective *fundamental*, two words loaded with theological and philosophical overtones, to describe scientific *truth*.

Truth as Correspondence to Facts

It is a fair generalization that in Western culture the unquestioning attitude of most students of science toward scientific *truth* is that *truth* and *factuality* are synonymous. In more philosophical terms: There exists, distinct and independent from our mind, *factual reality*. To the extent that our knowledge of reality corresponds with the *facts of reality*, our knowledge is *true*.

This understanding of *truth* is by no means novel. Modern science has origins in ancient Greece. The idea of *truth* as correspondence-to-reality (*facts*) can also be traced to Greek sources. Plato's student Aristotle, whose writings for 2000 years were regarded as the "last word" in many areas of science, denied the existence of his teacher's world of ideals, but maintained the truth-as-correspondence-to-facts notion by positing a rationally ordered real world that could be known by either man's *intuitive reason* or *science*. *Science*, as defined by Aristotle, "is a mode of conceiving universal and necessary truths" (*Nicomachean Ethics*, Book VI, Chap. 6).

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It is interesting to point out here that Aristotle's understanding of *truth* was considerably more sophisticated than the common understanding of scientific *truth* today. For Aristotle there existed certain *truths* which simply could not be "discovered in the laboratory" or "derived from equations." These were "the first principles on which scientific truth is based." They could not themselves be the object of science since they are the necessary starting points for scientific demonstrations. These "first principles" could be apprehended only by *intuitive reason*.

With the Renaissance and the scientific revolution of the seventeenth century, there developed a mind that sought to dissociate itself from intuitive reason and to anchor its certainty in the causal interrelationships of the physical *facts* of the physical universe. Encouraged by the great success of Newtonian mechanics in explaining and predicting many of the *facts* of reality, this mechanistic world-and-life-view came to its fullest (and most extreme) expression in the writings of men like Pierre Laplace. Laplace, like Aristotle, believed in a rationally ordered and rationally comprehensible universe. But armed with Newtonian mechanics he could step beyond the rationalism of Aristotle and boldly assert:

> An intellect which at a given instant knew all the forces acting in nature, and the position of all things of which the world consists--supposing the said intellect were vast enough to subject these data to analysis--would embrace in the same formula the motions of the greatest bodies in the universe and those of the slightest atoms; nothing would be uncertain for it, and the future, like the past would be present to its eyes. (Milic Capek, *The Philosophical Impact of Contemporary Physics*, New York: Van Nostrand Reinhold, 1961, p. 122.)

Elaborating on this statement, Milic Capek, a contemporary philosopher of science says:

> Underlying this Laplacian concept of causality, which has become an article in the orthodox creed of classical science, is the claim that the history of the physical universe can be represented as a mathematically continuous series of instantaneous states, each state being represented by an instantaneous configuration of a fantastically large number of simultaneous corpuscular entities with sharply definable positions and velocities; each of these configurations is implied by any previous one while in turn it implies any future one. (See preceding reference.)

Incredible as it may seem, especially in Christian schools, the average high-school student maintains a view of the physical universe that is frighteningly akin to that of Laplace. Of course he will reject the dehumanizing implications of such a view by embracing dualisms such as "nature-grace," "body-soul" or "physical-spiritual," thus, in his mind, leaving room for man's freedom and God's providence. But when an average high-school student walks into a physics or chemistry lab session, he confronts his data as *facts* of reality, and to the extent that he is able to explain these *facts* in terms of *laws* (which he believes are also facts), he is confident that he has learned *truth*.

Worshiping the Creation Rather Than the Creator

The fundamental problem of understanding scientific truth to be rooted in correspondence to factual reality is that a wedge is driven between the Creator and the creation. When reality is seen as conforming to certain laws that man can know through his rational abilities, those laws, and hence reality itself, acquire a status of virtual ontological autonomy. One may admit that they were origi-

nally created by God (although often we unconsciously so limit the term *create* that it applies only to concrete substantial *things* and not *laws*), but the day-by-day working of the creation is seen as a self-sustaining machine. In the words of E.A. Burtt:

> God thus ceases to be the Supreme Good in any important sense; he is a huge mechanical inventor, whose power is appealed to merely to account for the first appearance of the atoms, the tendency becoming more and more irresistible as time goes on to lodge all further causality for whatever effects in the atoms themselves. (*The Metaphysical Foundation of Modern Physical Science*, New York: Doubleday, 1924, p. 99.)

This wedge driven between the Creator and the creation, at least the physical creation, becomes one of the foundation stones for that dualistic world-and-life-view that sees no coherence between spiritual and physical, soul and body, grace and nature. All the beautiful declarations such as "all of life is religion" or "Christ is Lord over all areas of life" or "this is my Father's world" will remain *just* that until the data in the chemistry and physics labs are seen as more than just *facts,* which lead us to an understanding of *truth* which is correspondence to *facts*.

The apostle Paul was obviously blessed with some insights into this problem. He wrote in Romans 1:

> For the wrath of God is revealed from heaven against all ungodliness and wickedness of men who by their wickedness suppress the truth. For what can be known about God is plain to them, because God has shown it to them. Ever since the creation of the world his invisible nature, namely, his eternal power and deity, has been clearly perceived in the things that have been made.

And getting to the heart of the matter, he explains in verse 25: "they exchanged the truth about God for a lie and worshiped and served the creature rather than the Creator."

When *truth*, that is, *fundamental truth*, is seen as correspondence to *facts*, the *cold, hard facts* of *reality*, we are in danger of absolutizing those facts and hence worshiping the *creation* instead of the *Creator*. Many a physics student is led to *believe* that, apart from air friction, a body of mass at the earth's surface will fall with an acceleration of -9.8 meter/sec^2 *because* Newton's Second Law of Motion and the Universal Law of Gravitation are *true*, are the *facts*. Here the physics student is in danger of worshiping the *creation* rather than the *Creator*. Many a chemistry student is led to *trust* that his solution of hydrochloric acid has been neutralized by sodium hydroxide *because* the phenolphthalein indicator has just turned from clear to light pink. And, he believes, it is a *fact*, that is, it is *true* that phenolphthalein turns pink in a pH range of 8.2 to 10.6. Here again the student is in danger of worshiping the *creation* rather than the *Creator.*

This problem, it might be added, is manifested not only in the science classrooms. Scholasticism, that stubborn grandfather of Reformed Orthodoxy, still makes its presence known in many areas of our lives both inside and outside the school. Consider the emphasis given to the "attributes of God." Granted we must *know* God, but why do we insist that He conform to discrete *rational qualities* which we call, for example, omnipotence, sovereignty, and omniscience. Could it be that we begin to see God as defined by these *rational qualities* rather than seeing these qualities as *rational ways* that He chooses for revealing Himself to men? On another note, consider the glee with which many of us receive news that archeologists have discovered ancient documents whose historical records parallel those of the Scriptures. To say that this lends added credence to the Scriptures is surely not much short of blasphemy. Yet our faith in the *facts* is so strong, and our view of *truth* as something that can be *verified* by the *facts* is so unshakable, that we begin to think we can add to our faith in God's Word by means of *empirical data*. But here again, we have put our faith in (hence we have worshiped) the creation rather than the Creator.

Truth as Troth

Does the Word of God support a view of *truth* as correspondence to *facts*? If we carefully study both in the Old and the New Testaments the many contexts of the word, *truth*, we begin to perceive a very different meaning of the word. Consider the following approach: look up the work *truth* in Young's *Analytical Concordance*. Grab both a King James and a Revised Standard Version of the Bible. Then look up the references, read carefully the contexts, and notice how the original Greek and Hebrew words were translated into the two versions.

According to Young, the word *truth* is used in the Bible in Genesis 24:27. Abraham's servant is meeting Rebekah at the well. He says, "Blessed be the Lord God of my master Abraham, who hath not left destitute my master of his mercy and his truth." The RSV translates the last word as *faithfulness*.

The Psalms abound with references to God's truth. In almost every case, however, the word *truth* can be translated (and very often is in the RSV) as *faithfulness, troth*, or *fidelity*. In Psalm 100 we read, "The Lord is good; his steadfast love endures forever, and his faithfulness (*truth* in KJV) to all generations" (RSV). In Psalm 146 we read, "Happy is he whose help is the Lord God of Jacob, whose hope is the Lord his God, who made heaven and earth, the sea and all that is in them; who keeps faith (*truth* in KJV) for ever" (RSV).

The New Testament is similar. The Greek word *aletheia* is translated as *truth* more consistently than the Hebrew words were, but context lends itself to the Old Testament meaning of the word, that is, *faithfulness*, *troth* or *fidelity*. If, when we read the word *truth*, we understand it as *troth*, the evidence of God's continuing *faithfulness* to his creation, the various verses containing the word hang together more harmoniously. Consider John 1:17: "The law was given through Moses; grace and truth came through Jesus Christ." And John 14:6: "Jesus said to them, 'I am the Way, the Truth and the Life.' " To do justice to these uses of *truth*, or *troth*, one must really sit down for a number of hours and read carefully *all* the references to these words, paying most careful attention to the contexts.

A few verses in Scripture, when isolated from their total context, might lead one to see *truth* as something like *correct statements*. For example, in Mark 5:33 the woman who touched Jesus' garment and was healed of her hemorrhaging, "knowing what had been done to her, came in fear and trembling and fell down before him, and told him the whole truth." Also, in II Corinthians 12:6, Paul says, "Even if I should choose to boast, I would not be a fool, because I would be speaking the truth. But I refrain so no one will think more of me than is warranted by what I do or say." But when these verses are confronted with the rest of Scripture, it becomes clear that understanding *truth* as *correct statements* is our misinterpretation or reading into the verses.

Now what about the science classroom? What does *truth* as *troth* do for an understanding of science, the scientific method and *scientific truth*? *Truth* as the evidence of God's *faithfulness* to his creation can only enrich our classroom and laboratory experiences. Why is it that we can count on the Universal Law of Gravitation? Why is it that we can hurl men into space, confident that when they return, the pull of the earth's gravitational field will accelerate them at a rate of -9.8 meter/sec^2 at sea level? Why? Not because the law of gravity is a cold hard *fact*. But instead because the Lord is *faithful* to his creation. He upholds it. He created not only the *things* but also the *law structures* that govern the way those *things* behave. And he sustains the *things* and the *law structures*. A reading of Colossians 1:15-20 can greatly enlighten our understanding of John 1 and John 14:6. Why is Christ called the Truth? Because, as we read in Colossians, "All things were created by him and for him. He is before all things, and in him all things hold together."

With this understanding of the word *truth*, a mechanistic view of the cosmos is all but impossible. The *facts* now tell us of God's *faithfulness*. To those who by the grace of God have the light of his Word, the heavens *truly* are declaring the glory of God and the firmament showing his handiwork. The glory and handiwork not of a *watchmaker* god, who at one time wound it all up so that it could run on its own, but of a *faithful* God whose *truth* endures through all generations.

In a century when causality is being called into question by the most profound thinkers of our time (see, for example, Bohr and Heisenberg on the concept of contingency in quantum mechanics), it is most comforting to have your faith not in causality, but instead in a faithful God. High-school teachers are sometimes deemed foolish if they attempt to give their students a feel for some of the more non-logical points of modern quantum physics and quantum chemistry. After all, these students have been living in a Newtonian world and faith. I reply that in a Christian school it might be a good thing to shake their faith in the laws of nature so that their faith in their faithful God might be strengthened. The science classroom just might be the best place for the young Christians to learn about the *truth* of God.

Finally let's return to that very instructive verse in Romans 1: "They exchanged the truth about God for a lie and worshiped and served the creature rather than the Creator." If we see *truth, scientific truth* as simply correspondence to cold, hard, *immutable facts*, then we have exchanged the truth for a lie and we do worship the creation rather than the Creator. But if we see *scientific truth* as *troth*, as the evidences of God's *faithfulness* to his creation, then in the spirit of Zechariah 14:20-21, the spirit of *joy*, there shall be inscribed on the pulleys, springs and balances, "Holy to the Lord," and every crucible in the chemistry lab "shall be sacred to the Lord of Hosts." And we will have worshiped the *Creator* rather than the *creation*.

Changing Times—Unchanging Standards

by Harriet Eldersveld*

One happy day the eighth-grade English teacher became an instant celebrity because she could describe how Babe Ruth really looked when he pointed to the bleachers and lifted the next pitch over the wall. Most of the people who watched Hank Aaron break the home-run record could only read about Babe Ruth.

The English teacher has no illusions about becoming an instant celebrity because she can remember sitting in the seats in the eighth grade at Roseland Christian School. Even most of the people teaching there now can only read about those days. So much for my age, justifying this historical look.

In Massachusetts Bay Colony, schools were founded to teach people to read the Bible. The earliest Christian schools in this country were founded to preserve the use of the Dutch language and customs as a safeguard for religious beliefs. This loyalty to religious beliefs is certainly commendable; the Christian school survived and flourished for almost a century because of the stability of its spiritual foundation.

The constitution of the society of a typical Christian school states something like this: "This society is founded upon the Word of God as interpreted in the three standards of faith, namely, the Belgic Confession, the Heidelberg Catechism, and the Canons of Dort." It might also add that the school was founded on these standards because "we Christians of Reformed persuasion believe that the whole of life must be brought under the authority of the Word of God and that the education of children rests with the parents—and that our children are included in the Covenant of Grace."

Since these Christian schools began, their basic principles were definite, inflexible, historic, and Biblical. The uncompromising Dutch immigrants accepted the responsibility of Christian education and dogmatically held to the standards.

This early Christian school lived in the age of the triangle. These were the times of the stable family in our society. The Christian home was powerful. The Christian school was the extension of the home, responsible for training its children to interpret God's world in the light of God's Word. The church provided spiritual direction, doctrinal training and Christian fellowship for the family. The system worked well in closed communities. Few who were not properly born or duly indoctrinated invaded this home, school or church.

Then the schools flourished academically. Well-trained teachers used new equipment effectively. The curriculum was expanded and enriched. The schools enjoyed professional approval, and many graduates excelled in their fields.

Today the walls of isolation and security have been destroyed. Times have changed. So far the standards are unchanged. God, through us, has kept them for almost one hundred years.

Changing times have focused attention on Christian schools. Many current difficulties in the public schools, including lack of discipline, send parents scurrying for the shelter of a Christian school, just when our schools are experiencing a decline in enrollment. So we are nudged into a stance of generosity. Recent propaganda coming from the office of the National Union of Christian Schools sells Christian education without apology. We have much to give Christian parents, the fruits of a century of Christian education: the stability of the basic principles, the unchanging standards.

Personnel, methods, procedures, curriculum and buildings are the variables. To accommodate Christian parents we must improve and extend all these available resources. We have trained teachers, administrative expertise, Christian textbooks, a film service, periodicals for Christian education, established Christian schools in both stable and changing neighborhoods.

Recently, the Christian parents in Charleston, West Virginia, protested the use of certain textbooks in their schools. Frantic when the books were not removed from the schools, parents took their children out of the school. Through the efforts of one of the mothers, they hastily set up a Christian school.

The protesting parents of Charleston, West Virginia, should have known how much we could have helped them. We have ideas about establishing a school. We could have advised the mother, who is a nurse and not an educator at all. Some of our well-trained teachers could be teaching there, re-

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placing the non-professionals who are only doing the best they can under the circumstances. The parents would have had a choice of textbooks if ours were available, not just the ones they blindly accepted from the publisher who moved in on them.

In this later phase in the history of the Christian school the opportunities for influence are limitless. We have the externals to share because we kept the standards.

A long time ago I sat in the seats at the Roseland Christian School, where inadequate textbooks were used by teachers with vision but little training.

Times changed, and my children sat in the same seats. The equipment was much improved. The teachers had graduated with degrees. The curriculum was greatly expanded. The standards were respected and understood by most teachers and parents. The churches gave financial and spiritual support.

Times changed again, and now I stand at the teacher's desk in the same school. Concerned and sometimes frantic parents send their children here because we have the stability of the standards, plus trained personnel, good textbooks, Christian discipline and a rich curriculum.

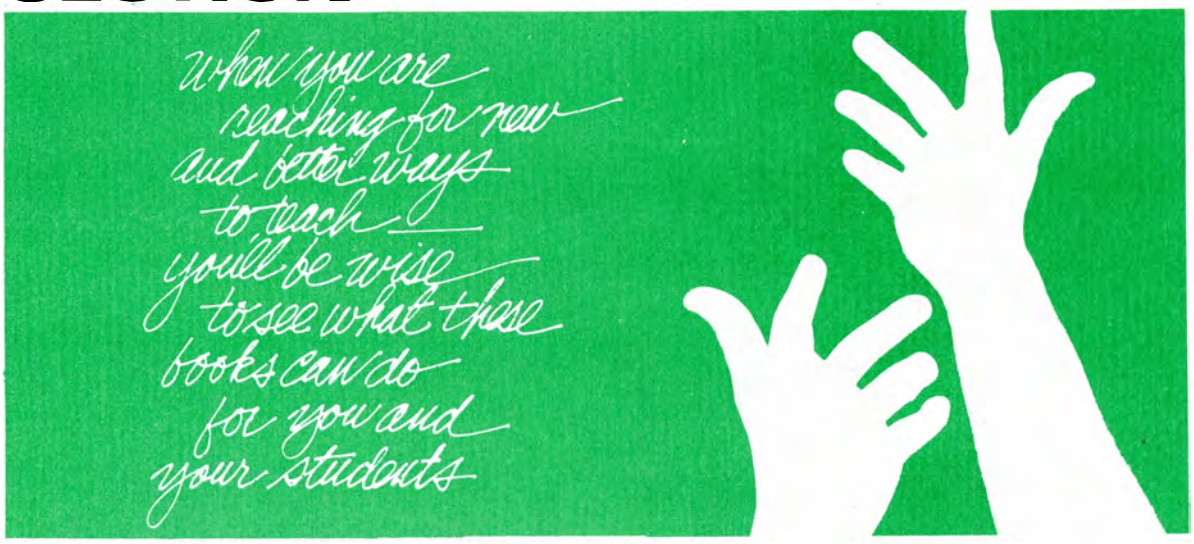
The children I face are from a different race, with a different history and culture. They represent a variety of churches and a variety of homes. They have been admitted to our school because "they are children of parents who believe the Apostolic Creed as historically understood" and their parents have had an interview to learn about the basic principles, the standards.

That is only the beginning. How can I ever tell them about a century of Christian education? How can I make them care that the standards did not change when the times did? How can I tell them that I once sat in their seats, that my children sat in their seats, that there is a triangle, a secure triangle? How can I help them put their triangles together? They know they cannot possibly understand all of this. They simply want us to share what we have with them. They know that it is good. Some day, I hope, they will understand that what we are trying to do is to teach their children, God's children, about God's world in the light of God's Word.

We are sharing what we have. Our enrollment has become inclusive, open to a variety of Christian students. Maybe, consequently, our school board and our faculty must remain exclusive, to know, love, and guard the standards. The times will change again. We want to be here when they do, to share and give what we have.

Getting back to the English teacher, she and some of you were around, sitting in the seats of the Christian schools when Babe Ruth was hitting home runs. The rest of you will have to read about it. If you are really of Reformed persuasion, you had better not apologize for using the three standards of interpreting God's Word. Do you know a better set of doctrines that survived a hundred years of changing times?

BOOK REVIEW SECTION



GENEVA TO GEELONG

Geneva to Geelong. Edited by Gordon Oosterman. National Union of Christian Schools, Grand Rapids, Mich., 1974. 118 pp. *Reviewed by Paul A. Boertje, Bible teacher at Valley Christian High School, Cerritos, California.*

This publication of the curriculum department of the NUCS endeavors to make the ideas and influence of John Calvin timely and relevant. While many may have heard of Geneva, perhaps few really know where or what Geelong is. And looking throughout the syllabus for a chapter that indicates what is taking place in this city in southeast Australia is in vain. However, there is a kind of answer on the inside cover of the manual.

The scholarly research and insight of the various contributors to this publication is noteworthy. The primary resources used to substantiate the views and interpretations are valuable. An attempt to defend against or soften the criticism of Calvin appears here and there throughout the publication. There is an honest and sincere attempt to provide, for those who may need it, a convincing, charitable appraisal of his ideas and influence. Perhaps the ancient philosopher's adage might be apropos here: "Never defend yourself; your friends don't need it, and your enemies won't believe it anyway."

This publication should be read and then reread by every professing Christian who wants to appreciate the contributions and influence of this reformer still seen in succeeding generations. The legacy and fruit of his labours are remarkable. And so what Calvinism is, as related to Calvin's Calvinism, is up to us. Is it a heritage worthy of perpetuation? Does it have inherent worth and intrinsic value? Should we be apologetic about it in the ecumenical atmosphere? Are some ashamed of continuing its emphasis? Or might it not rather be: it is a heritage and tradition worthy of our very best in perpetuating it to the generations following? Surely this manual is an honest endeavor, and a successful one, to create excitement about the ideas, ideals, and influence of Calvin and Calvinism.

For advanced students, particularly those interested in history, this manual will provide an enriching experience as they see the influence of Calvin upon such countries as Germany, France, Scotland, England, Belgium, the Netherlands. The bibliographies are excellent and extensive. The insights of the contributors are perceptive and

practical. Many chapters would make excellent material for discussion groups; I regret that there are not more "For Discussion" summations like the one at the close of chapter three.

We are indebted to the members of the administration and faculty of Calvin College for this scholarly work, as well as to the NUCS for publishing it. How sorely we need this kind of material when Calvinism is at its ebb tide. I recommend it to everyone, and may it contribute immeasurably, as stated in the preface, as a "resource guide for teachers . . . a text for superior students . . . or a personally enriching handbook" on Calvin and Calvinism.

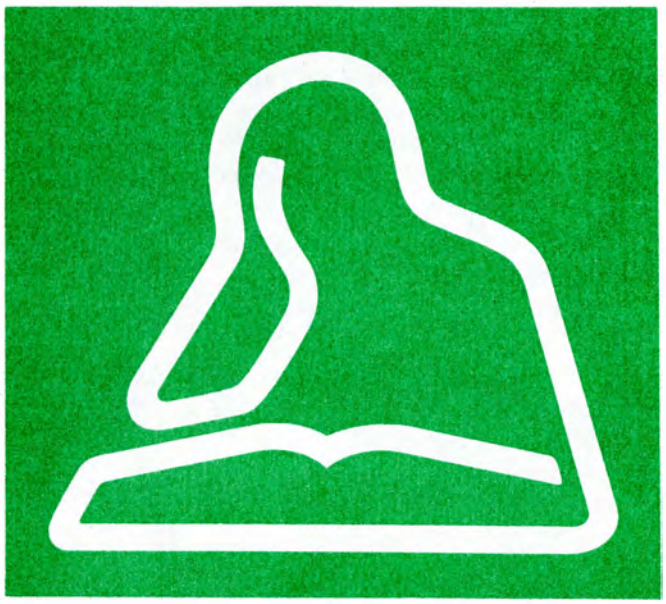
MAN AND THE OUTCAST

BY DAN VANDER ARK, GARY MEYER AND BRUCE HEKMAN

Man and the Outcast. National Union of Christian Schools, Grand Rapids, Michigan, 1974. 39 pp. *Reviewed by Stanley Cole, English and language teacher at Valley Christian High School, Bellflower, California.*

One of the perplexities of sainthood is our ambivalence toward being "poor, wayfaring strangers, atraveling through this world of woe." The problem of "apartness" figures heavily in the experience of Christian education. "Apartness" has always been a major motive for Christian schools, sometimes admittedly and sometimes proudly so. It has often caused the American public to view us with some suspicion. Indeed, it seems that our society may be reassessing just how much "apartness" it is willing to tolerate. "Apartness" still keeps us quite distinguishably "Dutch." And most of us are not proud to be associated with that unique brand of "apartness" practiced by our Dutch brothers in South Africa.

This potpourri of feelings that we adults have toward alienation is more than matched in the feelings of the students we teach. Many of them have some sort of struggle between pride and dismay because of their association with a Christian school. The complaint most often heard from resentful students is, "Why must we be different?"



One form of alienation, increasing in frequency, is the experience of the "guest" student trying to find not only a home amid our unique ways but also friends among those of us who have their friendships firmly established and are not eager for new ones.

All of this makes the new NUCS thematic unit, *Man and the Outcast,* a particularly pertinent offering. The invention of Dan Vander Ark, English teacher at Holland Christian High, it has been remodeled and expanded by Gary Meyer, English teacher at Chicago Christian High and Bruce Hekman, English professor at Covenant College. It is designed as a nine-week course for the ninth or tenth grade, but seems adaptable to many other situations.

Forty per cent of the in-class time is devoted to reading. A list of recommended books, short stories and poems—about 100 each—has been supplied. Synopses are provided when possible and the books rated according to difficulty. Warnings are attached to books which might offend some readers. The students not only read; they also keep journals of their daily responses to the "outcast" theme, keep files of their readings, watch occasional films, and on selected days share their objectives, which are carefully spelled out. The unit is so comprehensive as to include suggestions for relevant personal devotions.

For those who have not used the thematic approach to the teaching of literature, this seems a particularly well-laid plan to begin with, the teacher guide is very constructive and suggestive. For those experienced in the thematic approach, this is another most relevant theme well-applied.

Teacher, You're Talking Too Much!

Here is a system to determine how you are handling talk in your classroom

by Harold Gillette*

There is evidence to indicate that the overwhelming volume of classroom talk is from the teacher, from the kindergarten through 12th grade. In fact, the teacher not only talks far more than any one student in the class but talks far more than all the students in the class put together, about 70% of the total.

Though some teachers may at first regard this as unbelievable, most teachers will regard it as highly unfortunate; for though there is doubtless general agreement that the teacher is the most important factor in the classroom learning situation and should speak more than any other one person, this much suggests unhealthy teacher domination. Some studies seem to indicate that there is more interest, more enjoyment, and more learning when there is a higher degree of pupil talk, as well as less of discipline problems.

For those of us who are easily unconscious of not only the volume but also the kinds of our classroom talk, there are useful instruments which have been designed to measure the process, instruments which a teacher can utilize without the expenditure of time and money in research and in summer courses. One such was developed by Ned Flanders at the University of Minnesota and is called the FIAC (Flanders' Interaction Analysis Categories), a system for coding and analyzing verbal interaction between teacher and the class. Here is a device which has the merits of simplicity, reliability, and usefulness as an instrument for teacher self-evaluation.

Most of us will be surprised—perhaps even appalled—to find exactly how we usually handle classroom talk. These findings can lead not only to a heightened awareness of what we are *actually* doing in contrast to what we *think* we are doing in terms of our objectives—they can also lead us, as they already have others, to greater teacher supportiveness and to a more congenial classroom atmosphere for discussion and learning.

The FIAC system may be used by a teacher without any outside help if he will tape-record samples of talk in his lessons and then later by himself code the verbal interaction as he plays the recording. Or the teacher may choose to have a fellow-teacher either code it "live" in the classroom or code it for him later from a tape-recording. Both the number of individuals involved and the length of the samples coded are at the discretion of the teacher who desires the feedback on his own teaching.

The system uses ten categories of teacher and pupil talk, one of which is recorded every three seconds. If verbal interactions occur at a faster rate, more than one can be recorded in a three-second interval, if so desired. The categories are coded according to their number, but the number of each is only classificatory; there is no scale to be implied. The categories are described in Figure 1.

Though coding was originally done in this system so that data could be later portrayed on a 10 x 10 cell matrix, Flanders afterwards developed a simpler version in which more immediate feedback was possible. In the simplified FIAC version the categories may be indicated on a time line display (Figure 2) on which the coder puts a slant mark (/) after each three seconds, this to be in the row that is numbered the same as the category just heard. These marks are entered from left to right so that each full row contains data from a recording period of two and a half minutes. Hence, four full rows would represent ten minutes, etc. At the end of the desired observation period the tallies for each category are added up and analyzed.

By noting the totals of various groups of categories, at least several ratios can be found. If one desires the ratio of teacher talk to pupil talk, it can be found by comparing the total number of tallies of categories one through seven with the

*Harold L. Gillette is from Bellevue, Washington. Reproduced with permission from *Christian Teacher* / May-June 1974.

total number of tallies of categories eight and nine. If one wants to investigate possible over-emphasis on the categories where teacher authority is more prominent in order to see if there is a dominance of teacher lecture, direction, and discipline, one can find what is termed the I/D ratio (indirect to direct ratio) by comparing the total number of categories five through seven. Further, if a teacher seeks to find still another factor in the classroom atmosphere—the degree to which he is being supportive in his response to students—he can compute what is called the i/d ratio, which is the ration of categories one through three compared to categories six and seven.

Another value of the Flander's system is that it not only preserves the number of tallies for the different categories but also gives the sequence in which they occur. By studying sequence patterns one can learn much of his own common teaching patterns. For instance, what category appears most after a teacher question? after a teacher lecture? after a pupil response? after a pupil initiation? If the objective for that lesson is to review or drill on material studies, a typical 4-8-4-8 pattern is to be expected. But if the teacher is hoping for an open-ended discussion in which one might expect a 4-8-9-3-9 or a 4-9-3-9-9 sequence and instead he invariably gets a 4-8-5-5-5 sequence, this speaks volumes as to both the quantity and direction of teacher talk.

Classroom talk—too much from the teacher? It is not difficult to find out. You will be glad you did.

TEACHER TALK	Indirect Influence	1. *Accepts feelings*: accepts and clarifies student feelings in a non-threatening manner. This may include predicting or recalling feelings.
		2. *Praises or encourages*: praises or encourages student action or behavior; can include nodding head, saying "go on" or "um hm?", even tension-releasing jokes.
		3. *Accepts or uses student ideas*: this may involve clarifying, building on, or developing ideas that are student-suggested; however if the teacher then brings in more of his own ideas, this changes into category five.
		4. *Asks questions*: these are questions about content or procedure, based on teacher ideas, which the student is expected to answer.
	Direct Influence	5. *Lectures*: gives facts or opinions about content or procedure; expresses own ideas; gives own explanation or cites an authority other than a student.
		6. *Gives directions*: directs, commands, orders with student compliance expected.
		7. *Criticizes, or justifies authority*: tries to change student behavior from non-acceptable to acceptable pattern; scolds; states why the teacher is doing what he is doing; refers to self in large degree.
STUDENT TALK		8. *Responds*: reacts to teacher solicitation for a specific response; limits talk to the bounds set by the teacher; gives a short answer in which his freedom to express his own ideas is highly limited.
		9. *Initiates*: expresses own ideas; brings up a new topic; goes beyond the existing structure; takes the freedom to develop own opinions.
		10. *Silence or confusion*: this includes pauses, short periods of silence, and periods of confusion during which communication cannot be understood.

FIGURE 1—Flander's Categories for Inter action Analysis

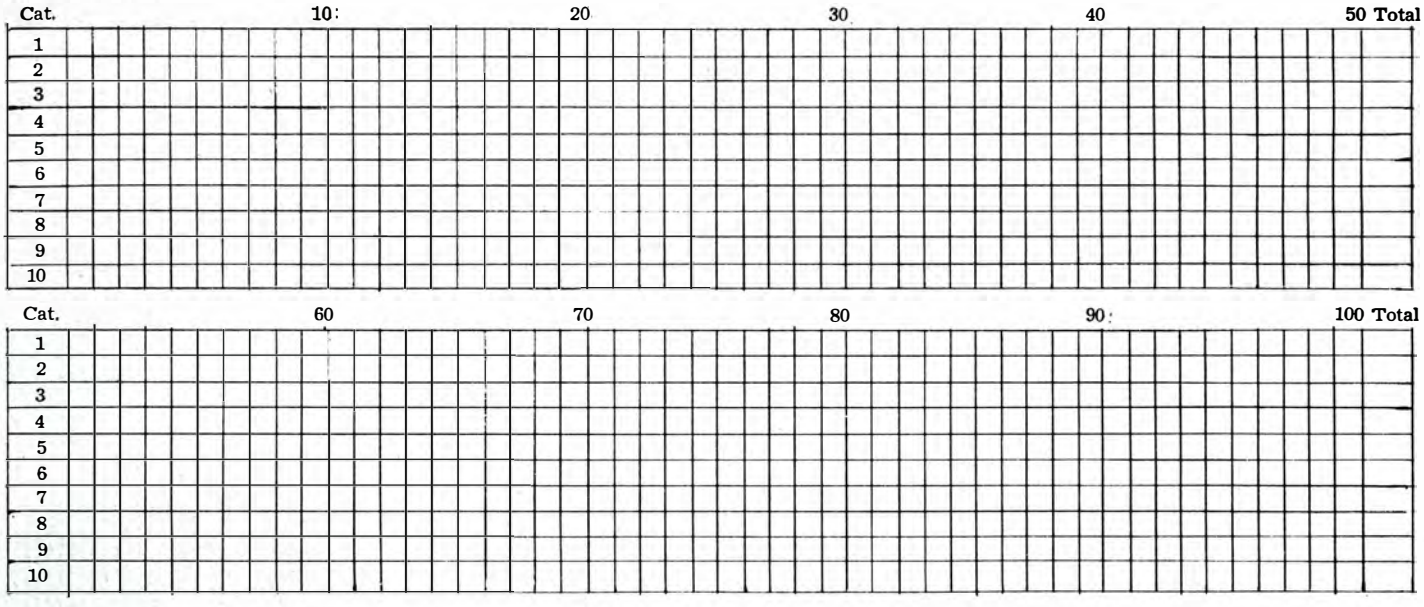


FIGURE 2—Time Line Display Form for Tallying and Displaying Flander's Ten Categories

Are Christian Teachers Different?

by D. B. Capill*

According to the New Testament, Christians are always different. They have the tangy, preservative quality of salt. They are as light in an age of spiritual darkness. Christians are called to be a different kind of people, and the degree to which they allow God's Spirit to transform them as people will be reflected in their vocations.

The Christian teacher should be professionally competent but never stagnantly satisfied with his present level of performance. He should not be in the profession because of the pay or the holidays involved. He will know the hours of forced isolation required for preparation and marking. He will love the children he teaches but be wary of courting popularity. He will always be more concerned for the quality of instruction and scholarship than for marks in an over-competitive system.

But these, surely, are features of any good teacher, not just of the Christian teacher. What characteristics distinguish the Christian teacher from all others?

1. He is governed by Scripture and thinks in a scriptural way. Romans 6:17 and 18 is one place where a certain way of thinking is clearly taught: "But thanks be to God, that you who were once slaves of sin have become obedient from the heart to the standard of teaching to which you were committed, and having been set free from sin, have become slaves of righteousness." It is the mind that is in a central, controlling position, and not the feelings or emotions (the heart). Paul teaches that the Holy Spirit directs the mind to an acceptance of doctrine clearly taught in the Bible (but often despised today). There is, then, an acceptance of the doctrines of fallen human nature, of man's inability to save himself, and of man's personal redemption through the finished work of Christ. These doctrines are accepted through the Holy Spirit's activity upon the mind, and then the heart (feelings) responds, so that we love the Saviour we have come to know.

But this is not the end. This knowledge and this love affect the will and lead on to determined action. We set out upon a Scripture-directed path—this is real conversion—aimed at making us slaves to a new Master, the One who has set us free from selfishness, futility, and despair. The mind is thus at the head of our faculties but not autonomous. It takes its cue from Scripture (God-given truth) and is subject to Scripture. The emotions are to be controlled, and the actions are to be constantly checked, by Scripture. Scripture is thus the reference point outside of fallible humanity, and since Scripture was given by a God who loves us and who directs us for our own good, this reference point can produce stability of character and unified, purposeful action.

2. The Christian teacher discerns what agrees with biblical truth and what opposes it. There are two levels at which educational thought should be examined; the philosophical base and the curriculum base. The former ultimately decides the latter, and the teacher who does not think independently will find himself merely drifting within the system. If the Christian really thinks and lives according to the revealed truth of Scripture he will make it his business to examine the underlying influences in the educational system. Dr. R. S. Peters, professor at the London University of Education, has remarked that in education there now is "controversy about almost everything of importance . . . conflict about the aims of education, about the curriculum, about teaching, schools, discipline and

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school organization." Within such a turmoil of ideas it is important for the Christian teacher to discern the drifts.

In considering curriculum, one must question also and not merely accept trends automatically. Professor J. F. Kerr has defined "curriculum" as "all the learning which is planned and guided by the school—the outcome of deliberate intention." Here is a clear statement that what is taught and what is left untaught and unmentioned are the results of deliberate choice. Who makes this choice? How do the personal beliefs and values of the leaders affect the choices, i.e., the curriculum? In an age of increasing secularization and widespread rejection of Christian standards, just what are we allowing to be fed to youth?

We need to keep asking two questions: What does this mean? Where does it lead? The Christian will be concerned to accept that which is meaningful and wholesome, and that which leads to a better knowledge of God and his truths (and not just a better knowledge of mankind).

3. The Christian teacher recognizes the areas under attack and the sources of the attacks. He will recognize that absolute freedom is an unattainable ideal that only panders to self-indulgence and irresponsibility. The established traditions and institutions are all under attack, and one should not fool oneself into believing that any single one will remain untouched. From the dissatisfied Left and from the rallying Right, from universities, teachers' colleges, theological colleges, from spokesmen in the Church and in society, the attacks come. Permissiveness and materialism increase, and spiritual values are not insisted upon.

Oddly enough, many people see no relation between the discarding of Christian standards and such developments as the collapse of family life and the decline of the individual's ability to cope with the pressures of life, juvenile delinquency, and so forth. R. B. Kuiper has described the situation well in *The Bible Tells Us So:*

> Two supremely important questions are with us every moment of our lives. It is utterly impossible to dodge either of them. They are: What is true? and What is good? God has answered both of these questions for us in the Bible, and, of course, His answers are right. To reject the Bible as the Word of God is to reject those answers. And he who does that is like a vessel drifting on the ocean without rudder or compass. He is "at sea" in the most complete and most terrifying sense of that term.

The Christian teacher will be testifying constantly to the truth of such words, and while the world turns its back on God, he will not be surprised when personality disorders and role conflicts spiral and little children show signs of utter frustration and confusion.

4. The Christian teacher is aware of the clash between the traditional Christain values and the permissiveness or despair of the ultra-moderns. The latter reject learning by antithesis and discard all absolutes. They wield a tremendous influence (though many Christians still seem to be unaware of it), an influence that is shifting our whole culture into an anti-Christian relativism. When children have been brought up almost entirely on the value system of the ultra-moderns, they will tend to reject out of hand the traditional Christian values. The tragedy is that they will have, in fact, no real free choice to choose Christian standards. On the other hand, if Christian training is given and if the children choose to reject it later, at least they have a valid choice open to them.

5. The Christian teacher sees connections between people, and between beliefs and teachings. In general he sees that our twentieth-century world is largely the product of an almost unchallenged acceptance of the ideas of Karl Marx, Charles Darwin, and Sigmund Freud. When one looks more closely one sees that even seemingly harmless entertainers are peddling serious philosophies of life and presenting life-styles contrary to the Christian way of life. The popular American comedian Woody Allen is far from funny, really. He is philosophically akin to the great and serious Swedish film director Ingmar Bergman, whom he most admires. Begman, in turn, has been most captivated by August Strindberg, the rather mentally unstable Swedish playwright of the turn of the century who repeatedly failed to find happiness in marriage and turned to Indian religions in order to find some meaning in life. Bergman has twice tackled one of Strindberg's greatest plays, *A Dream Play*, for he is fascinated by its nebulous, mystic character. Bergman's films reflect this interest, and many film makers follow Bergman. But how far these people are from the world of reality and historic Christianity! Strindberg wrote a preface to *A Dream Play* in which he says:

> Everything can happen, everything is possible and probable. Time and place do not exist: on an insignificant basis of reality the imagination spins . . . The characters split, double, multiply, evaporate, condense, disperse, assemble. But one consciousness rules over them all, that of the dreamer; for him there are no secrets, no illogicalities, no scruples, no laws. He neither acquits nor condemns, but merely relates.

The Christian teacher sees connections between people, and seeks to analyze and reveal the beliefs of the leaders of today's culture.

6. He builds on the truth revealed by God in Scripture. He does not build on feelings and experiences that fluctuate and cannot be analyzed. Faith rests on fact, and faith is reasonable (though it is more than reason). The Christian teacher appreciates the whole of Scripture and does not believe that the Holy Spirit has a monopoly on a few verses such as John 3:16 and Romans 3:23. He will evangelize in depth by declaring the *whole* counsel of God and not favorite passages only, passages that some Christians have come to believe have a magical way of converting people. The Christian teacher should be careful to point out two things that are often neglected today: that the Christian enters the narrow way by a narrow gate. The gate is narrow and unpopular for it involves a cost; the way is narrow and unpopular for it involves a cross.

7. Finally, there are things that the Christian teacher does not underestimate.

First, there is the frailty of human nature. He knows that "the heart is deceitful and desperately corrupt" and that it is easier to lead people in an immoral direction than in a godly one. He knows that we all tend to choose soft options, to save our own skins, to conform, to become absorbed with the material things that cannot really satisfy our heart's desires.

Secondly, he does not underestimate the strength of the attacks being made upon the Christian faith, especially through the mass media. He recognizes how they lower moral standards, stimulate and feed our lusts, encourage greed and selfish ambition, emphasize the outward and superficial.

Thirdly, he does not underestimate the power of God to intervene. In fact, this is what encourages him to oppose all that is ungodly and to face the loneliness and criticism that will inevitably be his lot. The longer he lives, the more God's Spirit reveals to him the emptiness of men's philosophies and the selfishness of their designs. Increasingly, like the prophets of old, he walks by faith and abides in Christ's Word, and he declares the old remedy as the only remedy, for there is only one name given under heaven by which men must be saved.

The Christian teacher is called to be different: different in his walk; different in his insights; different in what, for Christ's sake, he opposes; different in his positive commendation of a loving, holy God whose reality he knows.

IMPLICATIONS OF PIAGET FOR THE ELEMENTARY CLASSROOM

Continued From Page 15

Motivation and interest

Equilibration is a source of internal motivation for the learner and is, therefore, a third part of intellectual development. Equilibration is the process of obtaining a state of cognitive balance (equilibrium) with no conflict between existing thought structures and new stimulus events. It is towards a state of equilibrium that the child is constantly moving. Disequilibrium, then, is the source of internal motivation for the child. Obviously, for the active, developing learner, the ideal state. Rather, after continued interaction with the environment he is forced to reconstruct his views of reality and cognitive growth ensues.

Thus, the interests of the child should provide the teacher with clues to appropriate curricular content. Children normally have an enormous curiosity and a wide range of interest. Teachers ought to capitalize on this curiosity rather than stifle natural interests by forcing others. The open classroom movement seeks to start where the children's spontaneous interests, in or out of an open classroom, are. The teacher, in fostering the child's cognitive growth must convey such a healthy respect for the child's own interests that he feels free to pursue his own directions in exploration.

Duckworth (Duckworth, E. "The Having of Wonderful Ideas." *Harvard Educational Review,* 1972, 42, 217–231.) considers "the having of wonderful ideas . . . to be the essence of intellectual development." The teacher should seek to provide occasions for creative thinking and exploration within the class environment and encourage the child in his pursuit of these ideas. Duckworth asks why children's curiosity and resourcefulness diminish in later years and answers that it is because intellectual breakthroughs are less and less valued, dismissed as trivial or discouraged as unacceptable. This is particularly true of the more creative and unusual ideas, which the teacher often views as a threat. Thus, says Duckworth, the child is discouraged from exploring his own ideas or made to feel that his ideas are unimportant. The teacher who is aware of the child's thinking will realize that the world is still unfolding for him (as, I hope, for adults); the thoughts and discoveries of the child are new to him. They are not "silly" or "evil" ideas; the child honestly does not know his world, but is actively seeking to understand it. Teachers must be prepared to accept children's ideas, en-

courage them, and provide settings in the classroom which suggest avenues of "research" for them to follow up their interests and make new discoveries.

Implication 3

3: Knowledge of cognitive development demands individualizing the curriculum.

The major factor in cognitive development is the interaction of maturation, physical experience, social interaction, and equilibration (cf. Wadsworth). Obviously this interaction will foster widespread individuality. Teachers, therefore, ought to expect such individualized development and provide for an individualized curriculum. This does not conflict with Piaget's notion of stages. The point is that children pass through the same stages in the same sequence, but at different rates, depending on the interaction of the four factors mentioned above.

To start developing an individualized curriculum the teacher must use the child's intellectual level and spontaneous interests. Care must be exercised, however, not to isolate each child in this process of individualization, for, as noted earlier, social interaction is very valuable for cognitive growth.

Piaget's theory seems to call for a freer, more open type of curriculum than the highly structured, closed one prevalent. Motivation, according to Piaget, is intrinsic. Therefore, the child's interests and needs become a central issue in developing curriculum (cf. Wickens). The classroom must provide adequate and attractive materials for the child to explore. Varied activity/interest centers should be developed (and changed frequently) to encourage children in the pursuit of their ideas.

Also, the teacher's planning must remain flexible and open to change as the child's spontaneous interests take the lead in determining what the curriculum content should be at any one time. The teacher selects and provides materials to stimulate the child's interests, but must always expect the development of unexpected things for the child to pursue.

Such an environment will give the child a free and more relaxed attitude. Many schools place undue pressure upon the child, thus fostering feelings of insecurity and inadequacy when he is unable to succeed. Maybe the child cannot succeed because he has not developed the cognitive structures required by the task. He is often penalized for his "lack" of development, rather than given appropriate experiences which might yield growth. Learners must not be aftaid to make errors; teachers must not be aftaid to let children know they make errors too. Only then, as he becomes comfortable in every learning situation and feels competent in acting on his environment, will the child feel free to explore and experiment.

Implication 4

4: The educator must become a provider and manipulator of thinking/learning environments.

As stated, physical and social interaction are parts of cognitive growth. Their importance cannot be underestimated. In Piaget's terms, thought during the pre-operational and concrete operational period is tied to action. In fact, thought is defined as the internalization of actions. But if what the child at this state of development is required to do is too far removed from concrete experiences, he will be unable to complete the task successfully. Since the curriculum must be consistent with the child's cognitive level, lively interaction of the child with his environment must be encouraged. Thus, the teacher must provide--and allow--not only as many possibilities for action and interaction as possible, but also the necessary raw materials. This is particularly true in teaching math.

Social interaction is equally important and must be encouraged, not put down. Such interaction helps bring the child out of his egocentric thinking as he is faced with conflicting ideas. He needs to learn that his point of view is not the only possible way of perceiving objects or events. Thus the teacher must promote channels of communication between children in problem-solving areas.

"The teacher is an occasion of, not the implanter of knowledge" (cf. Furth and Wachs, p. 23). In the traditional classroom, the child's attention is focused primarily on the teacher as the source of all knowledge. Piaget's work indicates that the focus of attention must be the active learner (emphasis on the *active*). This will avoid those awkward situations when someone asks the teacher a question to which he does not know the answer, but, believing his authority to be on the line, he over-verbalizes and neither answers the question nor directs the child toward finding out for himself. Thus any spark of interest in the child is short-circuited.

The role of the teacher must be to create environments in which learning can take place. This requires presenting the child with materials which both suggest problems and provide the means of searching for a solution to the problem. The child should be learning as a result of his own interaction with objects in his environment rather than pas-

sively responding to a teacher's presentation.

Finally, the materials selected, and the observations and discussion they provoke, are to be open-ended in order to encourage creative thinking. Out of such thinking will inevitably arise an unexpected or untried idea which provides the starting point for further learning activity.

Implication 5

5: The clinical interview technique provides a valuable model for learner/teacher interaction.

When interviewing children, Piaget makes use of a non-directive type of open discussion designed to delve into the inner workings of their minds. This "reflective" or "echoic" questioning, made in response to the children's observations or inferences, illumines their thinking processes by requiring them to verbalize the rational process by which they arrived at their conclusions.

Teachers should employ this method of attack so they can not only understand the child's reasoning but also goad them into deeper exploration. The teachers can question, challenge, suggest different approaches, and encourage the child, thus stimulating the child's creative and divergent thinking and also enhancing his expressive abilities. Another goal is to help the child question and evaluate his own ideas, not accepting as valid the first thought that comes into his mind. This can be accomplished by posing alternative explanations and helping him to discover new ideas (Elkind, D. "What Does Piaget Say to the Teacher?" *Today's Education*, 1972, 61, 46-48).

This approach implies that the teacher refrain from judging the child's reactions, instead encourages him to continue exploring, evaluating, and building on his own discoveries. The teacher's biggest problem in this respect is expressed by Kamii:

> It is truly an art to teach without giving all the correct answers and without going to the other extreme of sitting back and watching children play . . . it is far better for children to wonder seriously and remain curious about the environment than to be told the answer and learn incidentally that the answer always comes from the teacher's head (p. 225).

Conclusion: The Goal of Education?

The following two quotes illustrate the trend which education must follow if it is to be effective in this scientific time:

> If the aim of intellectual training is to form the intelligence rather than to stock the memory, and to produce intellectual explorers rather than mere erudition, then traditional education is manifestly guilty of a grave deficiency (Piaget, J. *Science and Education and the Psychology of the Child.* New York: Viking, 1970, p.51).

> The principal goal of education is to create men who are capable of doing new things, not simply of repeating what other generations have done--men who are creative, inventive, and discoverers. The second goal of education is to form minds which can be critical, can verify, and not accept everything they are offered (Ripple, R. and Rockcastle, V. *Piaget Rediscovered: A Report to the Conference on Cognitive Studies and Curriculum Development.* March, 1974).

Thinking is what education is all about. Schools today are more concerned with such skills as reading, writing, and math. These should be viewed as tools to be used in intelligent living, not as final goals in themselves. The activity of thinking should be of primary interest. How else will the child know how and when to make use of these other, more specific skills?

It is necessary to encourage thought and promote the growth of cognition. Mass, public education with its structured curriculum and stress on specific, departmentalized subject areas, everyone being expected to follow the textbook as he is herded through the twelve grades--this system is like an assembly line designed to produce characters of the same mode, meeting constant specifications. Such characters are functioning "unividuals," rather than thinking, creative individuals. Such a system assumes that it knows what is best for all persons at all times, which further assumes that all children are alike. There is no doubt, however, as to the un-alikeness of children. Yet, despite much talk among school administrators about individualizing, schools neither plan nor program for individual differences. Piaget's research underscores the existence of such differences and demonstrates the importance of capitalizing upon these differences of thought and interest to promote cognitive growth.

Often the "intellectual explorer," the "creative, inventive discoverer" has had trouble in the schools (e.g., Edison and Einstein). The problem, however, is that the schools were inhibiting their cognitive activity. Perhaps if the schools were to become more interested in thinking (a la Piaget), the creativity of each child would come to the fore and more teachers would experience the joy of watching children grow intellectually.

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