The PATH English Courses

by Frank E. Smith

The PATH program has been an important learning experience for me and my students. I have had an opportunity to rethink my approach to the theory of teaching while developing some skills that have had immediate application to most of my other classes. In fact, by tailoring those skills and methods, I have been able to be more effective in higher level courses. Study of the learning theory of Piaget and others has confirmed but modified my beliefs about the conduct of teaching. I believe that I now have more evidence to support the intuition on which my teaching has been based. Specifically, I can now argue more convincingly against be- havioral education. Also, I learned a great deal working with other faculty in a close, cooperative, conflicting situation. Higher educa- tion has always emphasized the instructor's isolation and individuality. I still believe in the value of that, but I am aware of the limitations of extreme individuality. I originally approached the PATH program look- ing for personal growth opportunities, and it has provided them.

The PATH program also seems to have been good for most of the stu- dents. Whether they have all learned to think better is unclear, although some of them did learn to think about better things. In any case, the program defeated the usual impersonal, indifferent environment that most students encounter at a community college by providing valuable encourage- ment and support between students. More importantly, some students' attitudes toward education have changed. They have been able to see, because of the interlocking classes and increased casual contact with teachers, that the learning environment, while demanding, is not inher- ently undecipherable or hostile. Student failure to learn may often be understood as a function of perceived student-teacher conflict. By setting up essentially non-threatening relationships, we have been able to redirect student attention to success as an outcome of ability and effort. That lesson may be the most valuable.
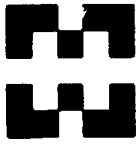
The PATH American Government Course

by Molly Waite

Given the opportunity to prepare an experimental course in political science, I set out with great expectations. I hoped to develop perfect learning cycles and to stimulate students so their behavior patterns would change. Due to these high hopes, I encountered tremendous frustration with my American Government course in the PATH program.

My learning cycles proved overly difficult because they required too much prior knowledge by the stud*nts. The assignments did not always teach what was intended, nor were they consistent from the exploration activity through the application. Students were frustrated by my questions in class and by vague assignments. I, in turn, felt angry at being so ineffective. From the beginning to the end of the semester, I was not aware of great progress by the class in general. Some students failed or dropped out along the way, which increased my sense of failure, since I thought that, with more time and attention from me earlier in the semester, they could have been salvaged.

Looking at the positive side, I acquired a much more realistic perception of my students' backgrounds and skills. Thanks to my supportive colleagues in the program, I was able to understand some academic problems I was encountering with the students. The PATH program also gave me the time and support necessary to develop a more experiential course in American Government. As a result, my teaching approach in this course and other courses has changed, even though it has not been totally implemented in each case. The experience has convinced me that the lecture (or "spray and pray" method) is not very effective and can be replaced by more hands-on-type projects.

Working closely with my colleagues for over a year has been another advantage of the PATH program. They provided reinforcement and encouragement during the rough times. I also found their insights helpful in analyzing student reactions and class performance. Moreover, my colleagues and I had the unique opportunity to take a group of students and to examine it from a variety of perspectives. In addition to seeing how individual performance differed or stayed the same in various disciplines, we were also able to learn more about our students' social and emotional dimensions.
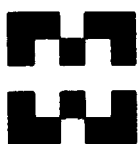
The PATH Physical Science Course

by Betty Windham

Having had the opportunity to teach physics for a year in the University of Nebraska's (Lincoln) ADAPT program for college freshmen, which also utilized the Learning Cycle based on Piagetian theory, I was most enthusiastic about introducing this method into the physical science course for our PATH students. Trying some of my learning cycles out on the rest of the program faculty during our weekly seminars gave me the feedback needed to make them more meaningful for community college freshmen.

For the most part, the students found this approach effective and challenging. However, despite their good will, they often complained about not having a textbook, of having to think, reflect upon their conclusions, and provide explanations of why they solved a problem or performed an activity in a certain manner. "Just tell us what you want us to learn" was not an infrequent response in the class. Of course, this would frustrate the most motivated instructor.

I should have allowed more time for certain activities than I had originally planned so that students would not become overly frustrated and would have sufficient time to self-regulate when new concepts were introduced. Because of this, I did not get to use as many learning cycles as I had planned. By the end of the semester, I was a little upset with myself and the students because we had not covered more material.

However, early in the second semester, my faith in this teaching method was quickly reinforced during the second half of the same course, which four PATH students elected to take. Although I taught this half of the course using a text which employed a more traditional inquiry approach, these four students surprised me with how well they applied what they had learned first semester in the PATH program course.

Onward with Piaget and the Learning Cycle!

The RISE Chemistry Course

by Jim Herbach

The RISE philosophy was used in the first semester of a two-semester sequence course in general chemistry. Therefore, there was a lot of pressure to prepare students to compete in the second semester with those who had taken a traditional course. It would have been better to offer the second course in the sequence or to offer a RISE chemistry course that had no continuation.

Students began relatively cheerful but seemed to lapse into boredom as the semester progressed. The teacher's innovation decreased steadily, and he ended the semester teaching in a traditional manner. Perhaps preparing the second half of the course first would have been useful.

I was forced to think more about principles and to research the history of my subject more, an experience that should be shared by all, because in chemistry we tend to become so involved with mathematical exercise that the subject's beauty is hidden.

The STARS Mathematics Course

by Bill E. Jordan

I have long been aware that most remedial programs are doomed from the beginning. Additional drill and memorization presented in the same old manner are not the solution to learning difficulties. Students will become better students only when their thought processes and reasoning abilities have been changed.

But the nagging question has always been, How does an educator do that? This question led me into involvement in this project because I saw a potential answer.

The thought processes I used in writing the learning cycles made me more aware of similar reasoning patterns used by my students in order to understand the concept I was trying to convey. In discussing the cycles with my students individually, I noticed fallacious reasoning of which I was not previously aware. I was forced to take a close look at how my students were thinking, what was causing them to make errors, and how I could change their manner of thinking.

I also found meeting with, talking to, and often disagreeing with instructors in other disciplines to be very interesting because this led to a much better understanding of other disciplines and to the realization that what we are all doing really isn't that different.

The most rewarding part was that, after all the hard work, all the sleepless nights trying to decide how to write a cycle on a particular topic, and all the frustrations when a cycle didn't work, to find that our program actually works! Students are changing their reasoning patterns and thinking on a higher level because some faculty members cared enough to spend a lot of time trying something different to help them.

I don't know what the future of our program will be because both students and educators are so steeped in tradition that they are usually unwilling to try anything new. However, I believe it would be tragic if programs like STARS that have produced such dramatic results are simply allowed to die.
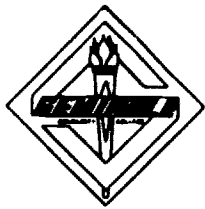
The STARS Humanities Course

by Aimeé Mason

As a philosopher by training and degree, I have in the past used the learning cycle concept in my philosophy classes. It is obvious that any philosophy student must attain the ability to think broadly and abstractly. As a teacher of humanities, I also teach in so-called learning cycles because the student must learn and understand broad concepts. Humanities courses by definition are interdisciplinary.

The advantages most apparent to me in using the Piaget method are smaller, more informal classes, and the fact that many students know each other from other STARS classes. However, a class of 27 is a little large for a Piagetian approach, and I regret the necessity for having classes of that size. In a class of 25-27, it is difficult to allow time for all students to participate in discussions.

As I see it, the Piaget method should be used long before a student reaches the college level. I have seen some borderline students helped greatly by this method, but they are students who will not ever be able to think abstractly.

I find the meetings with other STARS instructors most helpful. There it is possible to discuss the problems of individual students shared with other instructors.

The STARS Earth Science Course

by Lawrence A. McAdam

In graduate school at Florida State University, I first became aware of Piaget's work and theoretical implications for education. After graduate school I returned to teaching, knowing some theories of Piaget but understanding little of their application to the classroom. Through the COMPAS project, I was exposed to the "nuts and bolts" application of his work. Eureka! I realized that Piaget's theories could work in the classroom.

I have grown professionally by participating in the project. Rewriting curriculum into learning cycles forced me to re-evaluate my courses from the students' point of view. Also, working with teachers in other disciplines has been rewarding. It is important to know what is going on outside your discipline and to realize that the patterns of thought are the common threads that tie the educational program together. From this experience, there has been a rebirth in my enthusiasm for teaching.

Students' reactions to the learning cycle range from liking the involvement to feeling that there is too much work. Overall, students react favorably because they take part in their own education, which fosters self-directed learning.

The STARS English Course

by Dorothy M. Morrison

As a veteran English teacher, I have been gratified to find in the STARS program a "shock of recognition": things I have long believed and tried to practice have a valid base in learning theory. Moreover, I have long insisted that it is both possible and beneficial for students and teachers alike, even in large and increasingly impersonal institutions, to share concerns and perceive the relationships among various disciplines when provided with such a program as STARS.

It is, for instance, more than satisfying to find myself totally understanding and in sympathy with Bonniejean Christensen, who, along with her late husband Francis, is a leading advocate of bringing sound scholarship to the teaching of composition.

> "The four modes of discourse can be reduced to two:
> representational and discursive. The first can be
> understood as picturing appearance (description)
> and picturing behavior (narration), the second
> (whether exposition or persuasion) as talking about
> its topics. The first is concrete, the second
> abstract." [1]

Thus the Christensens have provided me with strong cues to distinguish examples of concrete and formal thought in student writing and a theory-based rationale for organizing sequences of compositions so that students will be given the means of moving toward more formal thought processes as well as to use both concrete and formal processes for optimum effectiveness in writing.

As a product and advocate both as a student and teacher of the "school within a school" philosophy of Atlanta's Bass High principal, W. Joe Scott, I early in my life profited from taking most of my classes with students who shared the same teachers. This grouping seems to me to provide students with opportunities to make connections among subjects and to enhance th teachers' opportunities to confer with one another about students' progre .. The STARS program has restored to me the sense of a genuine camaraderie u ng participating students and teachers. Additionally, as I move into my second semester in the program, I am already sensing a continuity and carry-over from one term to the next among STARS participants.

Therefore, the STARS program has given me, and I think students too, a very real sense that in education, sound intellectual scholarship and camaraderie make very agreeable companions.

[1]Bonniejean Christensen, The Christensen Method: Text and Workbook, (New York: Harper & Row, 1979), p. xiii.

The STARS Career Exploration Course

by Anna Wilcox

Career Exploration has been a three-credit course at Seminole for many years. When the STARS program was organized, I felt it would fit in perfectly. This course is designed to provide students with an opportunity to explore themselves and the world of work, to acquire the tools of rational thinking as they relate to decision-making, and to apply these tools to real-life situations. This is a tall order but one tailor-made for STARS students because the class encourages students to examine themselves in a supportive atmosphere.

As a facilitator, I presented the material, and the students designed the format and created the growth experiences. I sometimes felt like a referee, other times like a counselor but always like a friend. Our STARS students almost seemed like a theater troupe, enjoying lively discussions and role-playing sessions, and developing a real camaraderie.

As the semester unfolded, my concern was perhaps an unusual one. We, as faculty, had worked hard to help the students over the hurdle of entering college, establishing a good rapport, and providing a firm foundation for future success. Had we, in the process, given too much shelter, setting them up for failure when they entered the "real" world of college? Happily, my fears were unfounded. Our students are doing well and are still in touch with all of us.

The STARS program has been a wonderful experience for me. Becoming involved with a dynamic group of educators, establishing friendships, and sharing within our STARS faculty have been extremely rewarding.

The entire college has been supportive and shared the STARS enthusiasm. STARS is alive and well at SCC and still growing, thanks to the local and national leadership.
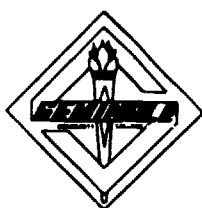
The STARS English Course

by Stephen C. Wright

The STARS program seems to bring out the best in each student. Students seem to want to address issues and to solve problems from their own points of view. What is remarkable about this is that through the common exercises in equilibration, students also come to respect each other's opinions.

The atmosphere created is different than that which surrounds a superficial kind of harmony in which nothing of value is gained through innovation. The atmosphere surrounding the STARS class is one of harmony, but it is a harmony out of which are generated intellectual inquiry and discovery. This would not be so unique except that the inquiry and discovery are processes by which students can actually see and feel the benefits of a broadened outlook and the application of this insight to their studies and to their daily lives.

The major aspect of this approach is that it broadens, in most instances, students' thinking. As such, the emphasis must not be the mere coverage of as much material as possible but the helping of students to understand and to appreciate the process of generating substantive thought.

EVALUATOR'S REFLECTIONS

by Dr. Melvin Hall

In a very real sense, quantitative and qualitative data sets collected during the evaluation each served to expand the interpretation of the other rather than provide confirmation or disconfirmation. Quantitative analysis focused largely on the concerns of cognitive development, the primary target of COMPAS. Qualitative analysis proved most useful in revealing complicating factors and variations which altered or limited interpretation of those quantitative data. This latter set of qualitative data provided very weak judgments of impact on cognitive functioning.

Reconciliation of the two data sets is thus more a task of weaving together the inferences resulting from each set than of confirming one inference with supportive evidence from a second perspective. In some instances a common theme is discerned, though for most concerns only questions arise as the two data sets are merged.

STUDENT CHARACTERISTICS

One area where more questions emerge than are answered, is that of the role of student characteristics in determining project outcomes. First, just who were the students involved in COMPAS? Does the relatively low level of Seminole student performance on the pre-test reflect a higher percentage of "high risk" students, or does it simply reflect a valid cross-sectional comparison of students among the schools? Further, it seems important to note that the selection procedures used by each school may also have affected the ability levels of students at each site.

Initial design statements for this evaluation included a comparison of students across sites through use of the CGP results on each campus. These scores would allow some assessment of the comparability of project students. Based upon the Harper case study, CGP data seem to be the most appropriate source of comparison since they appear related in some way to subsequent cognitive performance measures.

Resolution of this question of comparability of student populations raises yet another consideration since the CGP is clearly a preferred instrument for cross-campus comparisons. What specifically makes the CGP more relevant in predicting later cognitive functioning results? Is there a discernible profile or dimension of comparison? Would the ACT scores have been a better predictor if the student pool had included higher ACT scores, i.e. over 21?

The combination of the complex interactions of these measurement devices and contemporary notions of ability with the varied campus

recruitment plans resulted in a picture too complex to allow concise deter-
mination of the basis for initial differences between pre-test scores. Too
many possibilities existed as explanations of the differences in pre-test
performance. The impact of student ability and other characteristics on
the success of the project approach poses important, interesting and unan-
swered questions about the COMPAS effort.

IMMERSION

A second major area of comparison between quantitative and qualitative
data produced interesting consistency in ratings of the expected and meas-
ured levels of project impact. By combining several descriptive character-
istics, each of the six new cognitive programs could be rank ordered on a
composite characteristic labeled immersion. Factors included in this rank-
ing were: number of courses offered, number of project course hours ex-
pected or normally taken by students during the project term, the success
of block scheduling, the success of coordination efforts, reported learning
cycle use levels, i a general level of project support from the host in-
stitution. For each factor, an informal rating of each project was devel-
oped and later combined to rank order the level of change in student per-
formance expected at each site. Upon comparison with the "t" value for
changes in formal reasoning, this rank ordering of project sites demon-
strates fairly good consistency. Qualitatively and quantitatively obtained
rankings were:

> Quantitative -- Seminole, Harper, Joliet,
> Allegheny, Surry, Prairie
>
> Qualitative -- Seminole, Harper, Prairie,
> Joliet, Surry, Allegheny

Thus, with the exception of Prairie State, these rank orderings were quite
consistent.

In exploring how the ratings might have also picked up on the Prairie
phenomenon, an analysis of the ratings brings little clarity. Essentially,
the informal ratings were obtained as follows: points were assigned to
each site based upon interview data. Three years of interview data were
reviewed, using both student and faculty responses. Table 16 reviews the
point distribution.

The ratings associated with each institution reflect the levels of
success reported by project staff in interviews. The basic premise of the
ratings was that the intensity of students' experience would directly affect
the impact of project participation. Using a three-point scale, with one
reflecting minimal success, this informal scale provides only a very general
assessment of student immersion or project intensity.

TABLE 16

	Allegheny	Surry	Seminole	Harper	Prairie	Joliet
No. of Faculty Involved	5	3	8	6	8	6
No. of Courses Taken by Typical Student -- Fall Term	1	3	4	5	3	3
Success of Block Scheduling	1	2	3	3	2	2
Success of Coordination Efforts	1	2	2	3	2	1
Reported Levels of Learning Cycle Use	3	3	2	2	2	2
Institutional Support	1	1	3	3	2	1
TOTALS	12	14	22	22	19	15

BLOCK SCHEDULING

The primary tracker of block scheduling impacts (STAI) failed to estab-
lish any significant differences between schools or between pre- and post-
administrations. Conversations with faculty and students, of course, resulted
in a variety of statements. When combined, several ideas seem to be suggested
by this occurrence. First, students consistently across sites denied a link
between the success of block scheduling and reduction of their personal appre-
hension about school. Specifically, students at Harper and Seminole continued
to report anxiety at the end of the project term, despite their assessment of
the positive features of block scheduling.

The primary factor reconciling these remarks is the direction of the
impact of block scheduling. Students and faculty had tended to describe block
scheduling in terms of its impact on functioning in the small groups associ-
ated with COMPAS classes. Perhaps the assumption that any easing of these
in-class relationships would generalize to general anxiety about college was
unwarranted. In other words, the anxiety reduction associated with block
scheduling may not generalize beyond the classroom.

The dilemma which results, however, is how to explain improved retention
and increases in the number of science and math courses project students

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seemed to take. Further, when several students reported specific areas where they felt advanced over other non-project students, reduced overall anxiety would have been predicted. From the data, it is not possible to definitively address these questions. It is possible, for example, that since the variance in reactions to block scheduling recorded from site to site was no larger than that on each campus, the overall impact seemed insignificant. It also seems plausible that as a factor, anxiety is simply too complex to track from one single variable such as block scheduling.

GRADING

Perhaps the most powerful question raised by combining quantitative and qualitative results relates to the prediction of final course grades in project courses. In the Harper case study, correlation coefficients relating final course grades and cognitive post-test scores demonstrate very low levels of association. One potential mediating variable was an element of immersion common to many project sites: At Harper the use of learning cycles trailed off after midterm. It was not clear, however, exactly how traditional the remainder of the term was. If instructors reverted to traditional criteria as well as delivery formats, then the superiority of ACT scores as predictors of course grades would make sense. If this were not the case, however, no obvious answer for the lack of relationship between one measure of course goals and final grades emerges from the data.

IMPACT OF COORDINATION

One cloudy area is the impact of tight coordination and the accompanying block-scheduling on cognitive development. Allegheny presented one occasion for exploring this since recruitment problems had eliminated these two features from that program. When the results of cognitive measures are reviewed, however, Allegheny's movement appears strong in comparison to others. Unfortunately, there are limitations in the data which do not allow any precision in such comparison. Since no uniform anchor for comparisons exists, it is not possible to determine whether the failure of block scheduling and coordination suppressed a stronger potential impact or had no real effect on outcomes at all.

A further limitation of the data is the imprecision of the immersion estimate used to rank order sites. At Allegheny, for example, coordination and block scheduling efforts did not prove successful, but a higher level of learning cycle usage was reported. Learning cycles were used more consistently as well as for a greater percentage of the semester. While there is no definitive support for this, it may be that the Allegheny results testify to the relative strength of the learning cycle technique in generating overall project impact. If this were so, any true immersion estimate would have to account for this by weighing the factors differently as in the beta weights of regression type equations.

IMPLICATIONS FOR FUTURE PRACTICE

By combining the best advice of current project participants with the inferences which may safely be drawn from project data, several implications for future practice may be drawn. When combined, these COMPAS lessons fall short of defining the ideal project, but do provide a point of departure for local project planning.

1. Recruitment

The clearest messages from current project sites are related to student recruitment and selection. First, the involvement of a college counselor or admissions staff member on the project team must be strongly encouraged, given this year's results. Further, it is crucial that project team members take responsibility for the entire student recruitment process. It is hoped that the presence of a counselor on the project team would insure a realistic target for enrollment levels, as well as identification of a broad enough target pool for recruitment.

Clearly students should be recruited into the program first and then actively screened to insure that appropriate students are not arbitrarily screened out. But it is also important that team members reach consensus on the type of student to be selected. Because recruitment is one of the few project activities which can only be done once, its initial success is quite important.

Most instructors indicated a preference for working with approximately 24 students. This classroom size might also drive global project enrollments unless a system is developed to handle the complex scheduling issues involved in organizing multiple sections of project courses. With a class size of 24, in-class groups of four to six students can easily be formed.

2. Courses/Instructors

In selecting project courses, a delicate balance must be maintained between the concerns of selecting compatible instructors and the equally important challenge of providing an attractive function core of course offerings. Course levels should be checked to insure that the courses involved do not overly screen students. Project team leaders should also teach project courses as a way of promoting credibility, ensuring that they will not have a radical shift in priorities, and nurturing their interest in project concerns. Instructors might also consider staggering their involvement to provide a two-platoon teaching system, though the second term might be smaller than the first to allow students more flexibility.

Some block scheduling seems warranted though its purpose is perhaps best restricted to facilitating coordination of materials with only a natural level of social support built in.

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Apparently if block scheduling were emphasized too much, it began to usurp the power of the teaching approach by fostering an unreal classroom environment. Tight block scheduling does not appear to improve project functioning commensurate with the limits it places on project activities.

3. Institutional Support

Another very clear area of signals from current projects supports the notion that college officials should be the first recruitment targets for team members. When school administrators were informed about the project and provided with updates of its activity, institutional support played a key role in project success. Of course there is no definitive proof that team members controlled this relationship. Clearly, on some campuses, key administrators are predisposed to become involved in funded projects. But regardless of the initial source, administrative support seems crucial.

One primary example of the importance of administrative support is the extra released time awarded team members at Harper and Seminole. Uniformly team members felt that release from one course during the spring term could not completely support development of learning cycles for a fall term course. Additional released time for development and concurrent released time for refining learning cycles were uniformly viewed as important.

4. Theoretical Base

A final area of concern is the level of understanding of Piaget necessary for a successful COMPAS-type program. Popular sentiment supported having a modest increase in the level of common understanding of Piaget and of the relationship between this global theory and the learning cycle approach.

It was anticipated that this would further promote dialogue on individual campuses and provide guidance to team members as various program options were reviewed. Further exploration of the theory would perhaps have clarified the modest potential of a student profile in predicting student success in the project. In general this use of theory would stabilize project conceptual focus rather than limit flexibility or creativity in project design.

SUMMARY

The data falls short of definitively explaining the "whys" of the project's outcomes. Monitoring of several project effects warrants their being labeled results of the projects. At several project sites, for example, sizeable leaps in the level of cognitive functioning were observed for students who would be predicted as having the best chance for displaying such a change. At other sites, however, lower levels of change occurred, ruling out a general maturation explanation.

The data further points out the problems and promise of current practice in recruiting and maintaining project students. The uniqueness of individual sites clearly mediates against any blanket judgments of these practices, but does allow for current practice and results to influence future decisions.

Throughout the evaluation, several consistent limitations of talent and resources have curtailed the project view taken. No attempt was made to assess the impacts of various time schedules from campus to campus, for example. Also, no data on faculty was collected, a vital element for any immersion equation.

Beyond these and other difficulties, however, the evaluation has attempted to portray the real life variety and complexity reflected in COMPAS. For that reason, the evaluation agenda was laden with description and reflection. As a final or summative review of COMPAS, this evaluation perhaps best offers a panorama of what the project has represented to its varied constituency. In doing so, more questions have inevitably been raised than resolved -- yet in many respects that is the hallmark of exploration for understanding rather than explanation.

SURVIVAL OF PIAGETIAN PROGRAMS

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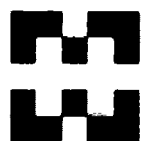
HOW CAN PIAGETIAN PROGRAMS SURVIVE?

excerpted from a speech by

Robert G. Fuller

Director ADAPT and Professor of Physics
University of Nebraska-Lincoln

A few years ago a group of people at MIT put together a paper[1] which was dedicated to Tactics for Change at institutions of higher education. Some ideas from their paper are related to our Piagetian programs and their survival.

DIFFICULTIES FACED BY PIAGETIAN PROGRAMS

Let us examine some of the difficulties our programs have encountered, for example: "The Entrepreneur Effect. Educational innovation is often due to the initiative of one person or a very few individuals."[2] If you fire or do not promote or do not give them tenure, then the innovation goes away. A few programs that have been committed to Piagetian ideas have gone away because of this.

Another difficulty is very closely related to the entrepreneur effect: "The Isolation of Infection Effect."[3] Name the innovation after someone. "By calling it Joe's new program, one is excused from becoming involved."[3] This happened to me in 1971. I was a budding young professor and began to use the personalized system of instruction which is called the Keller Plan by physicists. I started using it at Nebraska. Others in the department called it the Fuller Plan.

A third difficulty that comes up in dealing with Piagetian programs is related to "The 'Standard' Standard" game.[3] "An innovation encounters opposition ... (because others are concerned about) maintaining standards."[3] Piagetians have a different way of talking about knowing. For us, knowing is not measured in credit hours; it is not measured in memorized concepts. Therefore, the guardians of standards of your college or university will say, "It is all right to do ADAPT but it is not physics, or it is not political science, or it is not history, or whatever." People have been taken to task in their colle, by their colleagues because they say the Piagetian program is not academically viable -- "It's fine but it is not academic."[3] It does not meet the traditional standards and values of intellectuality. Therefore it is not appropriate at the college level.

Another difficulty, "The Prima Facie Affront. Whereas I have spent a significant fraction of my professional life perfecting my lectures and ... investing in the status quo, to suggest a change is to attack me,"[3] is a particularly sticky issue in dealing with tenured faculty. They have been

given tenure; they already know how to teach and have a fairly substantial commitment to the lecture notes they have developed during the years they were working on tenure. To suggest an alternative to their standard teaching techniques is considered a judgment or condemnation of what they have been doing.

Or consider "The Prima Donna Effect ... No one can tell me how to teach."[3] For example, the professor who has a distinguished teaching award from 1927 feels your suggestion that we may have learned something about how people think in the last 50 years is an insult, and while the idea might be OK, it ought to be modified to fit into the structure that he/she is already using in the classroom.

A committed faculty member can do almost anything in his/her classroom that he/she wants to as far as a teaching strategy is concerned. You only run into rigidities when you put together a program. One of the standard ploys of the university is "The Presidential Primary Gauntlet."[4] Remember in the U.S.A. the candidate has to run through 37 primaries. The primary sequence is the kind of program approval structure most universities have. If you want to start a new course, you have to write a description for the department; it has to be approved by the curriculum committee of the department, then the whole department, then the curriculum committee of the college, then the whole college, then the Dean, then the University Chancellor, then the Board of Regents, etc., etc. At every stage a number of people will think it has been done before or it's out of date. And that reminds me of "The Muscle-Bound Faculty -- The faculty as a whole has all of the brakes and none of the engines. There is a clear majority against anything you can mention."[4] In fact, it is absolutely incredible! You can almost get faculty to vote against a pay raise for themselves.

Another difficulty in institutional change is "The Conqueror-of-China Effect. For centuries China was able to assimilate one set of invaders after another. Academic institutions can swallow innovations without a trace." In 1971 I led a change in the physics curriculum at the University of Nebraska. We went from having two introductory physics courses over the next five years to having nine different levels of introductory physics courses. In 1981 we went back to three levels of introductory physics courses. The department decided to combine all of the physics courses for life science students into one. We are back where we were in 1971. Institutions have tremendous flexibility in swallowing up innovations and making them as rigid as the structure.

Finally, remember "The Anti-Logic Effect: ... educational innovations are almost never installed on their merits."[4] Even if an evaluator provides you with very positive data which you lay at the feet of your President, do not think he will embrace your program. Educational innovations are almost never installed on the basis of their merit, or on the basis of any kind of logical process as far as I can tell.

TACTICS TO OVERCOME THESE DIFFICULTIES

How can we overcome these difficulties? Fortunately the people at MIT put together a list of tactics for us to use. I want to discuss the ones we have found particularly successful. One that is very good they called "Wheel in a Trojan Mouse."[4] The idea is to start with a very small innovation which is the base of operations for a bunch of Greek commandos. In fact if you went to the University of Nebraska and asked 93.82% of the faculty about the ADAPT program, they would not have heard of it. The other 6% who would have heard of it could probably not name a single faculty member associated with it! We are a very small group. We think we have a big impact on the lives of students.

Another tactic must be stressed again and again: "Don't Ask Permission!"[4] If there is someone in your institution whose permission is absolutely essential, then that person has to be a part of your group. Don't ask permission too soon! Many academics forget a college professor has a lot of freedom to do whatever he/she wants, and so you do not have to ask permission.

"Be A Wolf In Sheepskin: identify some already established program and co-op this for your innovation."[5] This describes the beginning of ADAPT at the University of Nebraska. About three years before the ADAPT program started, a very innovative administrator at UN-L decided that freshmen had a difficult time adapting to life in the university. As one of our students said, "There are more people in my chemistry class than there are in my home town," so the univ rsity instituted freshman seminar courses. Every department was asked to offer a freshman seminar. What is a freshman seminar? In physics a senior faculty member sat down with a group of freshmen who thought they might be interested in physics, and they talked about the philosophy of physics. All the departments had started these courses, and by the time ADAPT got ready to start in 1975, the contents of the freshman seminar courses had nearly died. Freshman students could not deal with them, and the professors did not know what to do, but there remained a freshman course number in every department. We could institute a program held together by the commitment of the faculty and never ask anyone except our separate chairmen. We could say, "Remember that freshman seminar course that we do not know what to do with -- I would like to try it once." And so we put in the ADAPT program, which existed for four or five years, and no one really knew that it was there.

Now I can give you the counter evidence to the "Wolf in Sheepskin" tactic. Dr. K. Patricia Cross, author of the book, Accent on Learning, came to Nebraska as a consultant to improve undergraduate instruction. She obtained a quarter-of-a-million dollar grant for a new freshman

learning course, and the College of Arts and Sciences curriculum committee would not approve it! "Don't Ask Permission" and "Being a Wolf in Sheepskin" are very important if you are going to do a Piagetian Program.

A couple of other tactics have been important. I must mention "Manufacture A Mneat Mnemonic."[5] Some of you may wonder why all these Piagetian programs have some name for them, PATH, LIFT, DOORS, ADAPT, etc. If you don't have a program name, your colleagues will call it a Campbell program or Alex's program so they don't have to treat its view of the university with respect. They name it after you and let it go. So we have all gotten into naming programs. "Academic man ... lives by labels... finding the best name is often the single most difficult creative part of introducing a new product."[5]

"Play a Positive Sum Game"[5] is an important aspect of starting a program. Make sure that everyone who is involved in the program gets some positive benefits from being in the program.

"Pry With the Power of a Pittance."[5] -- Try to get as far as you can on very little money. One of the things we have never done at Nebraska is to allot any project money to academic year faculty salaries. The money we had was paid to develop courses in the summer. We have always had our classes taught as a part of the regular teaching load of faculty members at the university. I think this had a lot to do with our program lasting six years now. We have had a lot of persistence and have never had outside money to pay faculty to teach in the program. We have always taught in our program as part of our regular teaching commitment to the university.

"Establish Categories of Evaluation Yourself."[5] These projects are different from other kinds of things that go on in the university. You must decide for yourself what aspects of your programs are important and evaluate them. Do not get caught up in using traditional evaluation techniques.

"Keep House: Registrars can kill programs."[5] Counselors are also an important element in these programs. You have to recruit students for these programs so you need to have some way of getting students to sign up for your program. You must work with the registrar and the counselors so they understand your program and feel good about it. You might need a workshop for the counselors at your institution so they understand what your program is all about.

The largest core of resistance to Piagetian ideas is really with the faculty and not so much with the institutional structure. To overcome this resistance, you can use both "Invoke the Majesty of the Name"[5] and "Play the Conference Game."[5] You can say, "Well, I am a part of the great COMPAS consortium," or "They do it at the University of Nebraska," or "They talked about it at a conference in Denver." You can use the credentials of off-campus experts to convince people on your campus that what you're doing is all right.

I see "Cherish Diversity" and "Let the User Add the Eggs" tactics[6] as central elements in constructivist Piagetian-based programs. What we have in a Piagetian-based program is a way of understanding knowledge. I do not believe you can prescribe detailed behavior on the part of everyone in the program, and therefore these programs ought to have diversity. After comparing the various COMPAS programs, you will see that campuses are trying to design programs to fit their local needs. With a common commitment to a Piagetian perspective, we "Let the User Add the Eggs: The cake mixes that require only water to be added do not sell so well as those to which the customer adds the eggs."[5] The idea is to allow the users of a program to transform it, to add their own input for the local setting.

CONSTRUCTIVIST EPISTEMOLOGY

I do not think tactics alone can save our Piagetian programs. Our tactics have to stand on a solid foundation. This foundation has three basic features. It has to have CE, IE, and SC. What is CE? The C stands for constructing, for knowing is doing, at least mentally doing something. The CE stands for Constructivist Epistemology. What does that mean? It means that the point of view of Piaget and those of us who are trying to develop these programs is constructivist. We understand knowing to mean active mental processes on the part of the learner, not only on the part of the teacher.

Piaget distinguished two different kinds of knowing. One he called empirical knowing, which is how you learn as you act on external objects and experiences. How do you know to twist a knob to the right to open the door on your automobile? You know by acting on the knob, by doing something to it. Piaget is primarily interested in the other kind of knowing, which he calls logical knowing in which you ponder, or cogitate, or reflect, on your actions on the world. These are internal mental reflections about your actions on the world. This is the kind of knowing that Piaget argued is sequential. Piaget was interested in the interior process of knowing about the world by which you come to understand how to develop a systematic scheme for solving problems. What did Piaget say about logical knowing? He said it is constructed by the knower and is sequential. What does the knower do? He/she uses internal mental transformations, problem-solving strategies, or schemes, as Piaget calls them, in which he/she does some mental action on his/her experiences to make sense out of them.

As college professors we have been primarily interested in mental processes called formal schemes. We have a long list of those schemes such as proportional reasoning, i.e. the scheme of using proportions.

Another scheme is the "if everything else is equal" scheme, i.e. the separation and control of variables. There is also the "if ... then ... therefore" scheme which is the essence of hypothetico-deductive reasoning.

I have been trying to think of a metaphor for this kind of learning because I want to contrast this with some other metaphors of our culture. Let me talk about constructivism as a mental modeling clay concept of knowing. You have some basic internal components in your mind like pieces of modeling clay which represent the schemes you use. You can shape those to make sense out of your environment. For example, take a set of dice and a knower who is playing "Petals Around The Rose." The knower has some scheme already in his/her mind about roses and petals and dice games and how those things might all fit together. So the player in that game constructs an understanding of what the rules are. This understanding is an internal mental transformation of the sensory input the person gets from the environment and is matched to the mental schemes and organizational strategies that already exist in the mind of the person. Piaget understands this very much like a biologist understands homeostasis. The human being is trying to make sense out of the experience and wants to be what Piaget calls in equilibrium with the environment. This innate part of being human causes the students to learn new things. According to Piaget it is not smiley faces on the corner of the page; it is not M & M's when you get it right; it is this innate desire of a human being to know and understand and adapt in a cognitive way to his/her environment that provokes learning. Piaget has a word, equilibration, for this process of mental growth. We also use the word self-regulation, which is more like a cybernetics term, a feedback loop. It is the mental process that goes on as you try to make sense out of your environment.

Let me illustrate briefly what goes on in the process of self-regulation. Students don't come to the university with no ideas about physics at all. They have ideas, schemes, structures that they use to make sense out of the experiences they have with nature as described by the laws of physics. It turns out, however, that most people's schemes are easily contradicted by their experiences in a physics lab. Contradiction or puzzlement is the time when, according to Piaget's model, a person is especially prepared to make intellectual growth.

Notice the difference between this model and the learning theories you were taught in school. We were taught to chop knowledge up into small bits and make it easy for students to go from one step to another. Piaget's theory suggests that confusion and contradiction are the prerequisites for constructing new knowledge. As long as everything is going along and all fits together, the opportunity for students to make up new understandings is absent. When persons search for new relationships to resolve the contradictions between their experiences and their mental schemes, they are experiencing mental growth. All of us as professionals have had this experience.

The data we are taking, or some answers the students write, puzzle and haunt us, and perhaps days, weeks, months, or years later, we construct some new meaning out of the puzzling things. I argue that all of us as professional people have had experiences which show us this Piagetian way of talking about intellectual growth is valid. We puzzle over a problem, and finally something happens: maybe someone gives us a hint, or we have another puzzling experience, and we develop some new schemes or put old schemes together in a new way. This is the process by which we develop new and more adequate schemes.

There are some presuppositions for this kind of intellectual growth. It is assumed that the student is active at least mentally and that the student has some autonomy and is not following a strict list of rules and regulations that someone else has laid out for him/her. It is assumed that a learner is able to try a variety of things, to make some choices, and to be contradicted by his/her experiences. In other words a student needs to have freedom of action so that he/she can try things out and explore things for oneself. This is fundamental to the Learning Cycle model for classroom instruction. Another aspect of reasoning which is often missing in university classes is time for reflection. If you are really confused about something, you need to withdraw and puzzle it out, to figure it out for yourself. The resolution of a mental contradiction must be useful or meaningful and allow you to adapt more adequately to your environment.

This CE, constructivist epistemology, is a key element in the long-term survival of Piagetian programs.

Constructivist epistemology is in sharp contrast to many other current theories of education. The traditional one we all learned in graduate school is the so-called Empty Cup theory in which the students are empty and the professor has access to knowledge and fills them up. In this model of learning, the knowledge doesn't really go through the mind of either the professor or the student. Most of us grew up with an idea that you could stuff knowledge into your head. In fact I remember sleeping with a book under my pillow, hoping its content would soak into my head. This is a very different idea from the Piagetian one. In the cultural view of knowing, knowledge is exterior to the minds of people.

Another learning theory is a consumer model of knowledge. Knowledge is chopped up into credit hours, and the students have knowledge after they buy 128. I think it is appropriate that the degree is called B.S. Knowing is exterior to the mind of the student. You gulp knowing down like McDonald's hamburgers.

The Piagetian model of knowledge is really different from others used in our culture. According to Piaget, knowledge is constructed. It is activity on the part of the learner making more adequate schemes for the understanding experiences. What you want to do in a Piagetian system is to provide more and more variety of experiences.

I cannot emphasize enough how great is the difference between the Piagetian understanding of knowing and the empiricist models of our culture. Our culture sees knowledge as facts, content, concepts. At one time we had the $64,000 Question show on TV. We worship knowledge of trivial facts. That is supposed to be a great aspect of knowledge. Notice this kind of knowledge is quantifiable. It is external to the mind of the person. Many aspects of our culture, e.g. the back-to-the-basics movement, are more of the same empirical view of knowledge. "Kids are so dumb today,they don't know grammar." It is more emphasis on content and facts. I believe that empiricism, this view of knowledge, is an empty vessel for the future and in fact is being given up by scholars in most disciplines.

I see behaviorism in psychology as an example of this. All the psychologists at universities were trained as Skinnerians and ran rats for a long time. Now behaviorist articles have nearly disappeared from journals of cognitive psychology. And even physics, which you think would be the most empirical of all, is no longer empirical. You think of anything you can really believe is out there, external to your mind. The primary entities out of which all of these things you see are made, are protons and electrons. You discover there are other things smaller than protons and electrons called elementary particles. It turns out the number of elementary particles is proportional to the amount of money we have to build big machines to find more. There are no elementary particles external to the mind of physicists as we would have thought several generations ago. Rather the mental constructs used by the physicists influence the outcomes of their experiments. Now it turns out physicists and Piaget have much in common. Piaget was a person who studied cognitive development and had a view of knowing close to what we do when we actually do physics. That is CE, constructivist epistemology.

INTELLECTUAL EXCITEMENT

The next key ingredient for survival of a Piagetian program, once you have everyone turned into a constructivist epistemologist, is IE. To keep your program alive and well, you must have Intellectual Excitement. Many programs I have seen started as innovations in higher education die out when the intellectual excitement of the people who got it started goes away. You need to think about how you keep your own program intellectually exciting. Let me tell you some things we have done at Nebraska that can serve as models for other people.

First, you have to start exchanging ideas with each other, outside of your own departments and with other people in the program. How do we do that? At Nebraska when we write a Learning Cycle we want to try out on our students, we bring it to an ADAPT staff meeting and try it out on the other faculty members.

People in English are without mercy when I try to do a physics learning cycle with them. I am the same way when they try to get me to translate poetry. It is very helpful. We get a chance to talk about our teaching plans before using them with students. That is good and exciting.

Another thing we have done is write workshop materials. All of you have been through a workshop, I think. Every workshop has modules in which you analyze textbooks or exam questions. Have you ever sat down with those materials and your own test and written a page you might use in a workshop? Or analyzed a section of your text and shown it to other people in your program? We just finished modifying our workshop materials. It created a lot of discussion and havoc in our ADAPT faculty.

Another way is to get on the telephone and call up the other people in the COMPAS network in the same disciplinary area that you are and swap stories and find out what they are doing. That is one way, exchanging ideas, to maintain intellectual excitement of the group.

We have benefited from reading the Piagetian literature. Piaget wrote so many articles it is nearly impossible to read all his works. Also he is difficult to understand. He wrote in French, and the people who translate into English do not always understand his epistemology. Now many people are doing things with the ideas of Piaget, and those articles are accessible to most of us. The ADAPT group has taken an institutional membership in the Jean Piaget Society of the U.S.A. It puts out a small booklet, publishes articles and holds an annual conference. If you are an institutional member, they will send four different copies of their journal to you. Then people can keep up-to-date with what is going on in the Piagetian literature. The JPS also publishes books. Here is one that is very nice -- The Impact of Piagetian Theory on Education, Philosophy, Psychiatry, and Psychology.7 There are many resources in which we can find articles related to the ideas of Piaget and teaching. The Jean Piaget Society has a meeting every May in Philadelphia, so if you live near there, you could go to that meeting.

We have also found it extremely beneficial to have a Piagetian scholar in our group. Since the beginning of our program, we have had an educational psychologist whose area of interest was in formal operations, who read the Piagetian literature, who sent us his/her reprints and preprints, and who kept us advised of what is going on in Piagetian circles. He serves as a kind of "priest" to our "religious movement." He keeps us close to the original scriptures, not letting us wander too far afield. I don't know how you get such a scholar if you don't have one. You may have to recruit a psychologist and get him/her to read Piagetian literature.

A fourth thing we have done to maintain intellectual excitement is to conduct faculty development seminars on our own campus as well as on other campuses. There is nothing quite like going out into the bushes to convert the heathen with your ideas and your own material

and have them confront your ideas with their own as a way of challenging yourself to think more profoundly and more deeply about what you really believe and really think is important. It is a way of offering your ideas for the evaluation of others and a way to bring new faculty members into your program. Recruiting new faculty is an important aspect of every program. You need to think about ways of doing that.

SUPPORTIVE COMMUNITY

The final key to survival is a Supportive Community -- SC. From the beginning of the ADAPT program we have had a weekly staff meeting. A group of about 12 people on our campus have been involved in teaching in our program at one time or another. Only three people are actually teaching in the program at any one time. We hold a weekly staff meeting, usually a brown bag lunch meeting. From eight to 15 people come to that meeting. People who are not now teaching in the program still participate. Some haven't taught in the program for three years but are still emotionally involved, vested in the ADAPT program, and part of our supportive community. We talk about all kinds of issues. It usually doesn't degenerate into campus politics. What has brought us together is our concern about learning and teaching students. Those issues almost always come up. It is a tremendously exciting group and a very worthwhile experience for everyone. The reason this is important is that most universities do not recognize that faculty members themselves develop and change. The fact that faculty can grow and develop needs to be affirmed by some group. You need to have colleagues say, "That's all right." You have to have an opportunity to belong to a supportive community. I don't think once a month is often enough, not for us. Nearly all the people in the physics department think I'm committed to the wrong values.

How do I continue to work in an environment when there is one "Fuller" and 26 other physicists? If I am going to survive, I have to have some community of people on my campus that are committed to the same kind of values. I cannot stress this too much. I see it as a key element in the ADAPT program. Six years now and we do fantastic things as a group. Our people in humanities are beginning to write puzzles like the Algae Puzzle, the Mealworm Puzzle, the Frog Puzzle, in composition and poetry. No one else in the country is doing it. You are not very far from the edge of scholarship when you get into a Piagetian program of teaching because no one really knows very much about it. It is exciting. So you need that supportive community.

With growth comes pain. It is not easy to give up ten years of drill and practice in algebra and trig when you suddenly realize all the students are doing is memorizing rather than learning. To get some new idea and try to implement it involves pain. This group of faculty has to be willing to share the pain of growth not only for each

other but also for the students. We believe formal reasoning is greatly desired, but students have gotten to college by memorizing nearly every-thing. Now you confront them with a course in which memorization is not rewarded. It is a very threatening environment for them. Too often faculty members are not sensitive to the pain caused in students. In fact, being involved with a lunatic group like these Piagetians is pain-ful to some professional people. In the first year of the ADAPT program, six of us were teaching, three of us had Distinguished Teaching Awards from the University of Nebraska, and all of us got less than the average pay raise in our departments! Why? Because we were investing profes-sional energy in ADAPT and not writing papers about elementary particle physics or whatnot. We needed to be a group of people who got together and were willing to share in the transformation of our understandings of what it meant to be college professors and how students went about knowing things.

While the tactics we use are important to our survival, no tactic will work without the three key elements:

   (1) being constructivists in our view of knowing,

   (2) being intellectually excited about what we are doing, and

   (3) being a community supporting one another.

On this journey into the future, these three are essential if we are going to survive the 1980s.

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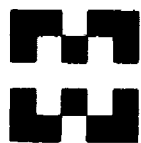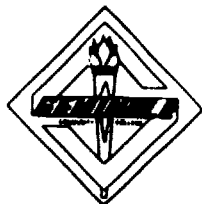
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APPENDICES

PIAGET IN A NUTSHELL

BY ROBERT KARPLUS

Two concepts of Piaget that are most helpful to college teachers are:
(1) sequences or levels in the development of reasoning and (2) self-
regulation (equilibration). Reasoning abilities develop gradually and
sequentially and always from less effective to more effective levels.

The second key idea, self-regulation, refers to a process whereby
an individual's reasoning advances from one level to the next. This
advance in reasoning is always from a less to a more integrated, differ-
entiated and better adapted level. Piaget views this process of intel-
lectual development as analogous to the differentiation and integration
one sees in embryonic development. It is also seen as an adaptation
analogous to the adaptation of evolving species. The process of self-
regulation is discussed in the appendix on the Learning Cycle.

Piaget characterizes human intellectual development in terms of four
major stages. The first two, called sensori-motor and pre-operational, are
usually completed before a child is seven or eight years old. The last two,
however, are of particular interest to college teachers; they are called the
stages of concrete operational thought and of formal operational thought.
What follows are some reasoning patterns that constitute important aspects
of concrete thought and formal thought.

Concrete Reasoning Patterns:

C1 Class Inclusion. The individual understands simple classifi-
cations and generalizations (e.g., all dogs are animals; only
some animals are dogs).

C2 Conservation. The individual applies conservation reasoning
(e.g., if nothing is added or taken away, the amount, number,
length, weight, etc., remains the same even though the appear-
ance differs).

C3 Serial Ordering. The individual arranges a set of objects or
data in serial order and establishes a one-to-one correspon-
dence (e.g., the youngest plants have the smallest leaves).

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These basic reasoning patterns enable the individual to:

(a) understand concepts and simple hypotheses that make a direct reference to familiar actions and objects, and can be explained in terms of simple associations (e.g., the plants in this container are taller because they got more fertilizer);

(b) follow step-by-step instructions as in a recipe, provided each step is completely specified (e.g., can identify organisms with the use of a taxonomic key, or find an element in a chemical solution using a standard procedure);

(c) relate his/her viewpoint to that of another in a simple situation (e.g., a girl is aware that she is her sister's sister).

However, individuals whose reasoning has not developed beyond the concrete level have certain limitations in reasoning ability. These limitations are demonstrated as the individual:

(d) searches for and identifies some variables influencing a phenomenon, but does so unsystematically (e.g., investigates the effects of one variable but does not necessarily hold the others constant);

(e) makes observations and draws inferences from them, but does not consider all possibilities;

(f) responds to difficult problems by applying a related but not necessarily correct algorithm;

(g) processes information but is not spontaneously aware of his own reasoning (e.g., does not check his/her own conclusions against the given data or other experience).

The above characteristics typify concrete operational thought.

Formal Reasoning Patterns:

F1 Combinatorial Reasoning. The individual systematically considers all possible relations of experimental or theoretical conditions, even though some may not be realized in nature.

F2 Propositional Reasoning and the Control of Variables. In establishing the truth or falsity of hypothesized propositions, the individual recognizes the necessity of taking into consideration

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all the known variables and designing a test that controls all
variables but the one being investigated (e.g., in the Mealworm
Puzzle, recognizes the inadequacy of the setup using Box 1).

F3   Proportional Reasoning. The individual recognizes and inter-
prets relationships between relationships in situations de-
scribed by observable or abstract variables (e.g., the rate
of diffusion of a molecule through a semi-permeable membrane
is inversely proportional to the square root of its molecular
weight; for every 12 banded frogs there are a total of 72 frogs,
therefore, for every 55 banded frogs there must be a total of
330 frogs).

F4   Probablistic Reasoning. The individual recognizes the fact that
natural phenomena themselves are probabilistic in character and
that any conclusions or explanatory model must involve probabi-
listic considerations (e.g., in the Mealworm Puzzle the ability
to disregard the few mealworms in the "wrong" ends of boxes
I, II, and IV; in the Frog Puzzle the ability to assess the
probability of certain assumptions holding true such as: the
frogs mingled thoroughly, no new frogs were born, and the bands
did not increase the death or predation rate of the banded frogs).

F5   Correlational Reasoning. In spite of random fluctuations, the
individual is able to recognize cau-es or relations in the phe-
nomenon under study by comparing the number of confirming and
disconfirming cases of hypothesized relations with the total
number of cases (e.g., to establish a correlation of, say, blond
hair with blue eyes and brunette hair with brown eyes, the number
of blue-eyed blonds and brown-eyed brunettes minus the number of
brown-eyed blonds and blue-eyed brunettes is compared to the total
number of subjects).

These reasoning patterns, taken in concert, enable the individual to
accept hypothesized statements (assumptions) as the starting point for rea-
soning about a situation. He is able to reason hypothetico-deductively.
In other words, he is able to imagine all possible relations of factors,
deduce the consequences of these relations, then empirically verify which of
those consequences, in fact, occurs.

At the concrete operational stage, these reasoning patterns are not
absent; however, they are only intuitively understood. Hence they are applied
only in familiar situations, only partially and unsystematicaliy. One can be
said to be reasoning at the formal level when these patterns have become
explicit and useful as general problem-solving procedures.

In the table on the next page, we summarize the most important
differences between concrete and formal thought.

CHARACTERISTICS OF CONCRETE AND FORMAL OPERATIONAL THOUGHT

CONCRETE THOUGHT	FORMAL THOUGHT
Needs reference to familiar actions, objects, and observable properties.	Can reason with concepts, relationships, abstract properties, axioms, and theories; uses symbols to express ideas.
Uses reasoning patterns Cl - C3. Patterns Fl - F5 are either not used, or used only partially, unsystematically, and only in familiar contexts.	Uses reasoning patterns Fl - F5 as well as Cl - C3.
Needs step-by-step instructions in a lengthy procedure.	Can plan a lengthy procedure given certain overall goals and resources.
Is not aware of his own reasoning, inconsistencies among various statements he makes, or contradictions with other known facts.	Is aware and critical of his own reasoning; actively seeks checks on the validity of his conclusions by appealing to other known information.

The college teacher who is interested in applying these ideas in his teaching should be aware that many theoretical and experimental issues relating to the theory are still being investigated. Piaget's original notion was that all persons progress through the major levels in tne same, invariant sequence, though not necessarily at the same rate. Yet recent studies suggest strongly that, although almost everyone becomes able to reason well with concrete reasoning patterns, many people do not come to use formal reasoning patterns effectively.

Since the above reasoning patterns that have been described as formal represent extremely worthwhile educational aims, and indeed are fundamental to developing meaningful understanding of theoretical and complex disciplines, the finding that approximately 50% of college freshmen in this country do not effectively employ formal reasoning patterns in a great many areas presents a real challenge.

In addition to this finding, five further points regarding concrete and formal level thought should be kept in mind by teachers. First, formal thought is more than this or that specific behavior. It is also an orientation towards approaching and attempting to solve problems. For this reason, a person who is confident and experienced in one area may reason hypothetico-deductively (formally) in that area, but may be unwilling or unable to generate hypotheses and reason flexibly in a threatening or unfamiliar area. Second, a person's ability to effectively deal with problems using formal thought is really open-ended in that he may deepen and broaden his understanding in a particular domain, and/or add new intellectual areas within which he can reason formally. Third, many persons demonstrate the use of reasoning patterns which seem to be a mixture of concrete and formal types when solving particular problems. This type of reasoning can perhaps best be termed transitional. Fourth, a person develops formal reasoning patterns only through the process of self-regulation. Concrete reasoning patterns involving class inclusion, serial ordering, and conservation about real objects, events, and situations are prerequisites for the development of formal reasoning patterns. Fifth, sometimes by applying memorized formulae, words or phrases, students can appear to be reasoning formally and/or be comprehending formal subject matter, when they are in fact not.

Although this essay has not touched on many aspects of Piagetian theory, we will briefly mention its major implications for college teaching.

The theory's major implications for college teaching are:

1. Be aware that some of your students use predominantly concrete reasoning patterns.

2. Be aware that many of the topics and concepts you teach require formal reasoning. You should know which topics those are.

3. Sequence subject matter so it follows the natural progression of familiar to less familiar and more abstract.

4. Demonstrate to your students a questioning and reflecting attitude towards the course you teach. Generate hypotheses, discuss alternative explanations and encourage your students to do the same. Turn your classroom into a laboratory where real problems are investigated and knowledge is derived from the evidence that is produced. Rewarding this type of activity by your students helps students (i) realize that many statements are hypotheses, rather than facts, (ii) reflect upon the meaning of these hypotheses, (iii) examine alternative hypotheses, (iv) examine evidence and its meaning and develop formal patterns of reasoning.

THE LEARNING CYCLE MODEL *

Piaget has identified four major factors which he believes relevant to the development of cognitive reasoning abilities. These factors are:

1. Maturation -- Students must be biologically mature and physically developed and therefore capable of operating physically in their environments.

2. Experience -- Students' past concrete experience and the ability to recall these experiences are critical for further development. Piaget outlines two types of experience: Physical Experience (drawn directly from objects) and Logical-Mathematical Experience (drawn by actions which affect objects).

3. Social Communication -- Students must be capable of communicating information via written and oral language.

4. Equilibration -- For cognitive growth, students must be supplied a situation of cognitive challenge where their existing mental operations are not adequate. The accommodative process (called equilibration) by which the student deals with this new information will result in cognitive growth.

A translation of this Piagetian theory into a workable model for designing learning experiences should incorporate each of these factors. When applied to adolescent students, factors one and three are probably not as important as factors two and four. Piaget himself stressed the interdependence of all four factors but suggested factor two and its proper relation to factor four are fundamental to learning and development.

For this research problem, the Learning Cycle will be divided into three major segments: exploration, concept invention and concept application. The following is an overview illustrating the important general characteristics of each phase.

Exploration

Following a brief statement of topic and direction, students are encouraged to learn through their own experience. Activities may be supplied by the instructor which will help the students recall (and share) past concrete experiences or assimilate new concrete experiences helpful for later invention and/or application activities. During this activity, the students receive only minimal guidance from their instructor and explore new ideas spontaneously.

> Emphasis -- Concrete experience
>
> Focus -- Open-ended student activity
>
> Function -- Student experience is joined with appropriate environmental disequilibrium.

1. This phase of the Learning Cycle provides students with rein-forcement of previous concrete experience and/or introduces them to new concrete experience related to the intended outcome objectives.

2. The activity allows for "open-ended" considerations, encouraging students to allow concrete experiences to evoke non-concrete ideas as possible relevant factors.

3. During the exploration activity, the instructor supplies encour-agement and hints and/or suggestions to maintain an appropriate level of disequilibrium.

4. This activity provides the instructor information concerning the students' ability to deal with the concepts and/or skills being introduced. In addition, the students will reveal the reasoning skills which they may evoke in searching for the solution to a problem.

Concept Invention

In this phase, the concrete experience provided in the exploration is used as the basis for generalizing a concept, for introducing a principle, or for providing an extension of students' skill or reasoning. Student and instructor roles in this activity may vary depending upon the nature of the content. Generally, students should be asked to "invent" part or all of the relationship for themselves with the instructor supplying encouragement and guidance when needed. This procedure allows for students to "self-regulate" and therefore move toward equilibrium with the concepts introduced.

> Emphasis -- Generalization of concrete experiences
> to abstract possibilities
>
> Focus -- Student's active involvement with instructor
> for generalization
>
> Function -- Student self-regulation and equilibration of
> generalized concepts and/or skills

1. During the invention activity, students are encouraged to formulate relationships which generalize their ideas and concrete experiences.

2. The instructor acts as a mediator in assisting students to formulate these relationships so as to be consistent with the outcome objectives.

Concept Application

The application phase of the Learning Cycle allows each student an opportunity to directly apply the concept or skill learned during the invention activity. This activity allows additional time for accommodation required by students needing more time for equilibration. It also provides additional equilibrating experiences for students who have already accommodated the concepts introduced.

> Emphasis -- Relevant use of generalized concepts
> and/or skills
>
> Focus -- Directed student activity
>
> Function -- Further equilibration through broaden-
> ing concrete experiences

1. To begin the application activity, students and instructors interact in planning an activity for applying the "invented" concept and/or skill in a situation relevant to the instructional objectives.

2. Finally, students are asked to complete the designed activity to the satisfaction of the instructor. While this extending activity allows students to directly apply the invented concept to a new situation, the broadening nature of the activity provides for further equilibration of new cognitive abilities.

Although the Learning Cycle allows each student the opportunity to think for himself, the instructor must be an ever-present "overseer" of the activity, and by providing probing questions, hints, and encouragement keep the activity going. Yet the instructor must guard against overplaying his role as director and planner.

STRENGTHS AND WEAKNESSES OF COMPAS PROGRAMS

At the conclusion of the COMPAS program, one and one-half years after the initial workshop at Illinois Central, the faculty was again brought together to share their experiences. At this meeting, time was set aside for the faculty to determine the strengths and weaknesses of the programs at their schools. Their responses have been compiled in this appendix.

STRENGTHS OF COMPAS PROGRAMS

1. In your experience, what were the major strengths attributed to using the Learning Cycle model of instruction?

> Fostered deeper understanding of content.
>
> More student involvement in the learning process.
>
> Created atmosphere conducive to open communication.
>
> Encouraged instructor to focus more on process as well as content.
>
> Promoted more creativity and ingenuity on part of student.
>
> Instructor forced to clarify the learning goals.
>
> Emphasis on the thinking process.
>
> Made students responsible for learning.
>
> Informality -- students comfortable to ask questions.
>
> Change of evaluation to written expression, as opposed to all objective questions.
>
> Group identity for students.
>
> Interdisciplinary experiences for students and faculty.

2. What positive feedback did you receive from project students which relate to strengths of your program?

> Greater depth of understanding.
>
> Atmosphere of openness, rapport between student/instructor.
>
> Interdisciplinary benefits -- students saw relationships among fields.

Higher interest level.

Could see relationship of content to "real world."

Provided support for "high anxiety program;"
    (students) "eased" into school.

Emphasis on thinking skills very helpful.

Lower attrition.

Classmates became friends; students still in contact
    after classes finished.

Students brought in examples of thought decoding.

3. What positive comments concerning your program did you receive
   from colleagues?

Counselors felt there was "   ace" to put students
    with specific needs.

Good administrative support.

A lot of questions.

"Would like to get involved" sometime.

Heightened awareness -- got lots of mail about program.

Impressed by retention and by interdisciplinary model.

4. What were the major strengths of the programs at your institution?

Close faculty contacts.

Cross-discipline interaction.

Channeled energies of good teachers, provided
    opportunity for teacher growth.

Self-evaluation on the part of teacher -- forced you to
    look at your discipline and your techniques.

Student/teacher interaction increased.

High retention rate of students.

Made instructors reorganize their courses.

Instructors forced to look from students' point of view.

Block scheduling.

Excellent recruitment.

WEAKNESSES OF COMPAS PROGRAMS

1. In your experience, what were the major weaknesses attributed to using the Learning Cycle model of instruction?

> Preparation of materials too time-consuming.
>
> Problem of reducing content and the implication for transfer courses.
>
> Anxiety and frustration often too high.
>
> Difficulty of finding good tools for evaluation: standard tests not always appropriate.
>
> Problem of turning work in on time.
>
> Expectation of students' behavior and learning cycles too high.
>
> Students preferred to be told rather than discover for themselves.
>
> Students with introverted personalities might be at a disadvantage.
>
> A lot of work on instructors' part.
>
> Some groups finished early; not all completed at one time.
>
> Students become closely knit, too much purely social, non-academic interaction.
>
> Never sure if the things on paper were actually learned.

2. What negative student feedback did you receive which relates to weaknesses of your program?

> Students often complained about testing as being too traditional.
>
> Students resented carrying others, since not everyone contributed equally.
>
> Amount of work too heavy.
>
> Some students felt like "guinea pigs."
>
> Some students had problems talking to the entire class.
>
> Good students disliked irresponsible students who asked for too much help.
>
> Some students did not like the instructor knowing so much about them.
>
> Some students complained about being with the same students in all their classes.
>
> Some students wanted the traditional classroom activities.

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3. What negative comments concerning your program did you receive
    from your colleagues?

    "Hope you guys are not the only ones who can teach
        people to think."

    Jealous of travel.

    Made fun of project.

    Some faculty saw it as a remedial program for slow learners.

    Losing of some content.

    Too noisy.

    Many faculty felt left out.

4. What were the major weaknesses of the programs at your institution?

    Student selection process.
        Hard to explain program to students.
        Not enough students for all classes.
        Selection of marginal students difficult if they do not
            wish to work.

    Lack of publicity and awareness of program.

    Problem of filling second semester in a full year program.

    Lack of time to coordinate with colleagues.

    Lack of follow-up.

    Lack of administrative support.

    Must sacrifice content in classes.

    Students realized other courses were often easier, and
        they tired of the extra work.

Project
COMPAS*
Newsletter

*Funded by the Fund for the Improvement of Postsecondary Education

Illinois
   Central
      College

*DOORS Program

Community
   College of
      Allegheny Co.

*Project LIFT

Joliet
   Junior
      College

*Project STEPPE

Prairie
   State
      College

*Project RISE

Seminole
   Community
      College

*Project STARS

Surry
   Community
      College

*Project CREATE

William
   Rainey Harper
      College

*Project PATH

EXCERPTED FROM APRIL, 1980, NEWSLETTER

Are any of you still struggling with organizing
your course for next fall? Having trouble with explor-
ation activities? How about developing application
exercises? Any of you waking up at 2 a.m. in a cold
sweat realizing that there is a possibility that you
could be a different classroom teacher next fall?

Well, if these questions pertain to you, don't
feel that you are alone. You have company! These con-
cerns were common at all of the schools we visited. We
found a lot of thinking, pondering, questioning, and
hard work going on. True, some individuals are find-
ing the going tougher than others. We tried to offer
some help and advice in our meetings with individual
instructors. In our general sessions, we tried to
encourage individuals to help each other through some
of the rough time. It is important to remember that
people in other disciplines can be of great help. We
also encouraged the site directors to create an atmos-
phere in the weekly sessions where this kind of give
and take can occur.

We had an opportunity to meet with various admin-
istrators, counselors, department chairpersons, etc.
The e meetings appeared to be informative and helpful.
I only hope that we were successful in explaining the
purpose of the various programs and what the individual
faculty members are attempting to do.

Project

COMPAS *

Newsletter

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Prairie
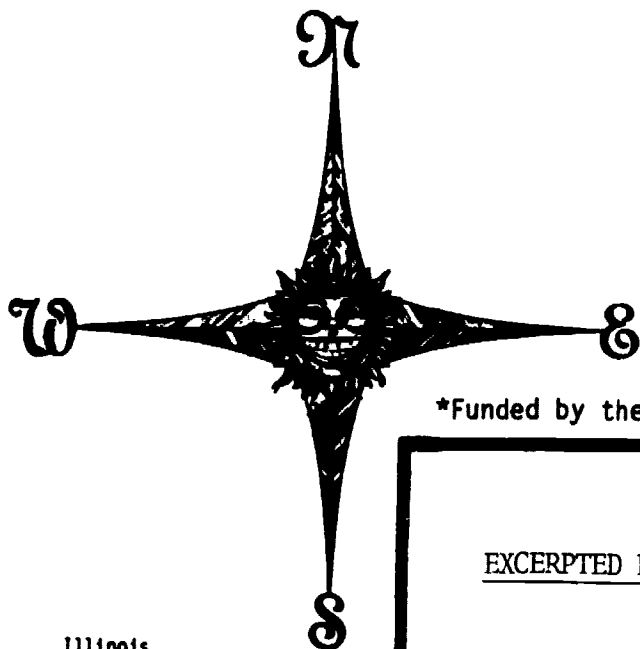State
College

*Project RISE

Seminole
Community
College

*Project STARS

Surry
Community
College

*Project CREATE

William
Rainey Harper
College

*Project PATH

EXCERPTED FROM MAY, 1980, NEWSLETTER

SHARING LEARNING CYCLES

Having personally visited all of the schools, I still see a great reluctance to share materials with other members of the project. The prevailing attitude seems to be that the learning cycles are not good enough or are not in their finished form. Several individuals have indicated that they would be willing to talk over certain things, but were unwilling to have someone look at the materials when they were not present to defend them.

I guess I can identify with this feeling, because I felt the same way. I had the feeling that my materials were the weakest in the DOORS Program. It always seemed that everyone else had better ideas than I did. I just about died when Tom asked us to send him copies of our learning cycles to keep on file and to send out when he received requests.

The point I am trying to make is that many of you have developed some good materials and come up with good ideas that could help others in the COMPAS Project. It is just a shame that these materials and ideas are not being shared so that everyone could benefit. I think it is important to realize that everyone feels the same way and that all of you are facing similar problems.

DOORS PROGRAM TO CONTINUE

The successful program at ICC called the Development of Operational Reasoning Skills (DOORS) will be offered to incoming students for the Fall Semester of 1981. The program description and a list of the classes is printed on the reverse side of this page.

Evaluation of the DOORS program has been encouraging. DOORS students enjoy the program and feel that it is a good way to begin a college career. Students in the program are assisted in development of thinking skills and strategies. As a result, DOORS students have been more successful than other beginning students in completing their initial college classes.

DOORS students heartily recommend the program to new students. Here is what some of them say.

"DOORS is something every freshman should get into. It gives the student a better insight into college and lets him discover new ways of learning and developing his reasoning skills. It has helped me in getting to know the students as well as the instructors and has given me a better insight into college."

"Overall I believe that the DOORS program is a success. It is beneficial to the incoming freshman as well as the older student. For the student who wants to learn but can't decide on a major, this program will open doors."

"The DOORS program will provide you the once-in-a-lifetime opportunity to start off on the right foot at the very beginning of your college career, and it will secure for you the foundation you will need in your future course of study."

Even though DOORS classes carry full transfer credit, many misconceptions concerning the nature and objectives of the program have developed since the program began in 1976. These range from "DOORS is a remedial program," to "To enroll in DOORS you must qualify for financial aides." With the experience with the students who have taken DOORS, we can begin to pinpoint many of the characteristics of students who can best be served by the program. A list of general characteristics of these students is given below.

1. Marginal Ability - Students who have low high school grades and low entrance scores make good candidates if they qualify for the college transfer level programs.

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2. Under-Achiever - Students who show promise through exam scores but did poorly in a traditional high school curriculum. The non-traditional, active involvement and change in emphasis made in the program produces motivation in these students.

3. No Definite Career Goals - Students who desire a college transfer curriculum but are uncertain about their vocational choice. The interrelated courses helps them view one discipline from the standpoint of another.

4. Older Returning Student - Although beginning college students, these older students have completed high school several years ago. Many of these type students are apprehensive about starting back -- most are unsure about their academic abilities.

THE DOORS* PROGRAM

DOORS offers a special opportunity to students beginning their college careers. This semester, the DOORS program will consist of four specially designed courses. Content from these courses is closely interwoven and relates to the personal experiences of the student. The purpose of the DOORS program is to aid students in developing sound reasoning skills while presenting relevant information and insights into several disciplines.

ADVANTAGES

Explore many fields of study while starting your college work.

Meet in informal classes utilizing your past experiences to the fullest extent.

Share several of your classes with some of the same students and get to know them personally.

Enroll in courses that fit together and build toward a common goal.

We encourage all students enrolling in the DOORS program to take all four DOORS courses. DOORS students may select other courses offered by the college, adjusting their course load to meet their individual needs.

The DOORS program for the Fall 1981 semester is as follows:

Department	Crs.No.	Sec.	Sem.Hrs.	Time	Days	Bldg.	Rm.	Instructor
Political Science	115	DO	3	9:00- 9:50	MWF	I	303A	Wysocki
Philosophy	110	DO	3	10:00-10:50	MWF	I	130A	Matthews
Social Science	110	DO	3	11:00-11:50	MWF	I	309A	Thompson
English	110	DO	3	1:00- 2:15	MW	I	234B	Mehl

Students may enroll in the DOORS program or obtain more information concerning the program by phoning 694-5330. TELEPHONE REGISTRATIONS WILL NOT BE ACCEPTED.

DOORS is a new and unique way to begin your college career All the classes are coordinated and stress an experimental approach to learning. In DOORS classes you will be an active participant in learning through your own experience.

*DOORS stands for Development of Operational Reasoning Skills.

into your FUTURE!!

The STEPPE Program

STEPPE is a unique program for beginning Joliet Junior College students. The STEPPE program consists of five specially designed courses. Content from these courses is closely interwoven and relates to the personal experiences of the student.

As a STEPPE student you may select from a core of five courses. Credit earned in these courses will apply to the general education requirements for an Associate in Arts and Science degree.

STEPPE Forward

STEPPE offers a comprehensive and coordinated introduction to the College Transfer Program. Using an innovative instructional technique, the STEPPE courses will aid students in developing sound reasoning skills while presenting relevant information and insights into several disciplines. Students who are exploring career opportunities as well as those who have already selected a major field will find the STEPPE program a refreshing and ideal way to begin their college career.

Advantages

Explore many fields of study while starting your college work.

Meet in informal classes utilizing your past experience to the fullest extent.

Share several of your classes with some of the same students and get to know them personally.

Enroll in courses that fit together and build toward a common goal.

STEPPE Courses

The STEPPE program offers beginning college students a wide variety of related classroom experiences. All students enrolling in the STEPPE program are required to take a minimum of three STEPPE classes. STEPPE students may then select from other STEPPE courses or from any other courses offered by Joliet Junior College, adjusting their course load to meet their individual needs.

STEPPE students may select a minimum of three of the following courses:

STEPPE   English 101 - learning to think and to write clearly — for all the STEPPE
                classes.

STEPPE   Geography 111 - "Everybody talks about the weather!" — STEPPE students
                will live it.

STEPPE   Math 111 - Useful and interesting math concepts will be explored through
                experience oriented exercises.

STEPPE   Psychology 101 - explore human behavior through experience rather than
                lecture.

STEPPE   Sociology 270 - STEPPE students will be given exercises in doing sociology
                in the real world rather than just talking about it.

The STEPPE program is limited to a small number of students intending to enroll in the College Transfer Program

If interested write STEPPE across the top of the application.

For further information, call: Will Miner - Ext. 371 or Len Hodgman - Ext. 354.

ERIC   ILT JUNIOR COLLEGE   1216 Houbolt Avenue, Joliet, IL   (815)   729-9020

Harper develops program

by JERRY HANSEN

Harper College officials are developing an innovative program they hope will help "high risk" students succeed in college.

It's estimated that half the students who enter college lack the "thinking skills" necessary to do college work. Those who lack the skills and did average or below-average work in high school are considered high-risk students. Helping those students is the goal of a program for which Harper officials are seeking grant funds.

"Thinking skills" are described as the ability to understand concepts and to reason. Students who lack those skills would find it difficult, for instance, to apply mathematical rules to solve equations or to understand concepts found in literature or poetry.

HARPER COLLEGE, along with six other community colleges, has applied for a $70,000 grant to set up courses to help such students survive college. After a year of training, faculty members would offer special sections of their regular courses.

"It would not be a remedial program," said Betty Windham, Harper physics professor who attended special workshops at Nebraska and now heads efforts to set up a similar program here. "Our aim would be to select students who come into college without any definite career goals, who know they want to go to college and who would benefit from the program."

With grant funds, faculty members would develop a core curriculum using principles of Swiss psychologist Jean Piaget.

Piaget's work is used most often to help elementary school children develop learning skills. But a program at the University of Nebraska at Lincoln pioneered using his methods with college students.

STUDIES SHOW that about half the entering college freshmen lack needed thinking skills, Windham said. Above-average students are able to develop the skills on their own, but below-average students, the target group, need special help. Community colleges, with their open admissions policies, face greater problems than four-year schools, she said.

About 30 students would be selected for the Harper program, which would consist of five courses offered during one semester. Students probably would be from the middle third of their high school graduating classes but would lack preparation to do college-level work.

In the core classes, including English, math, physical science, political science and psychology, students would develop such skills as classifying ideas, building relationships and criticizing their reasoning.

For example, in English, students would receive note cards with different parts of poems written on them. Students would group the different parts on their own and then work with the teacher in finding patterns. Finally, students would apply what they learn by writing their own poems.

THE PROGRAM is based on courses developed at Illinois Central College, a community college in East Peoria. During the two years the program has been used, it has helped reduce the dropout rate while also improving grades of students enrolled. Faculty from Illinois Central will help the other schools develop their programs.

Windham now uses some Piaget methods in her classes. "I've noticed definite improvement in the way they handle data in the lab," she said. "And student reaction has been positive."

The full-scale program would begin in September 1980. Students would enroll in special sections of courses now available. The students would take classes together.

"It's a good way to make a group of friends," Windham said.

The program should reduce the dropout rate and might attract students who otherwise would not attend college, said David Williams, vice president for academic affairs. With declining enrollment causing loss of tuition and state aid revenue, school officials are eager to increase enrollment.

Windham expects to learn whether the grant has been approved by June. She is optimistic, though, because the same proposal received favorable comments last year but was rejected pending an evaluation of the Illinois Central program. That evaluation was finished in February.

New program offered to motivate students

by PETE WICKLUND

Harper will soon begin a program to help "high risk" students attain motivation to succeed in college. The program, modeled after the similar one at Illinois Central College (ICC) in East Peoria, will be offered for the first time next fall.

Betty Windham will be the faculty leader for the new program. Miss Windham took a leave of absence last year to observe the program at ICC. Besides Harper, several junior colleges across the country will be starting "high risk" programs at their schools. These schools include Prairie State College in Chicago Heights; Joliet Junior College, in Joliet; Surry Community College, in Dobson NC; Community College of Allegheny County, West Mifflin, Penn.; and Seminole Community College, Seminole Flo.

The "high risk" plan is to develop "thinking skills" in students who did just average or below average work in high school. These "thinking skills" are described as the ability to understand concepts and to reason. "This will not be a remedial program", stressed Miss Windham. The program will be offered to students who believe they want to attend college but are not sure of what direction they would like to take. "Our aim will be to select students who come into college without any definite career plans, who know they want to go to college, and would benefit from the program," said Miss Windham. Approximately 30 students will be chosen for the first of hopefully many of the one semester programs. Harper officials will view the success of the program at the end of the first year.

The "high risk" program will be funded in part by the Department of Health, Education, and Welfare. Miss Windham hopes that after the program's trial run is over that the college will continue the program with Harper funds.

The program will revolve around basic, freshman, "core" classes. Among these will be classes in English, math, physical science, political science, and advanced reading skills. Students will also take psychology 099 (study skills). It will be in the study skills course where teachers and students will meet to discuss the goals and progress of the "high risk" program. All 30 students will be in the same courses together, a measure Miss Windham hopes will put the students more at ease.

The program will be interdisciplinary and according to Miss Windham will stress social interaction between the students. This close interaction between the students hopefully will increase the motivation necessary to do college level work.

The program is largely based on the work of psychologist Jean Piaget. Piaget did much work in the area of mental development in young children.

At the University of Nebraska Piaget's work was applied to college aged students and as a result the "high risk" plan was devised. The program has run at the University of Nebraska for four years. Miss Windham presently uses Piaget tactics in her classes at Harper. The results have been very promising and Miss Windham hopes that other teachers at Harper will begin to use them.

Reprinted from
The Harbinger
November 5, 1979

The CREATE Program

Surry Community College
Dobson, NC   27017
(919)386-8121

PROGRAM FACULTY

Scott Stevens
Site Director
Physics Dept.
Entered Program August, 1979
CREATE Course Taught: Physics

Paula Gupton
Mathematics Dept.
Entered Program August, 1979
CREATE Course Taught: Mathematics

Norwood Selby
English Dept.
Entered Program August, 1979
CREATE Course Taught: English

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The DOORS Program

Illinois Central College
Peoria, IL   61604
(309)694-5011

PROGRAM FACULTY

Richard Thompson
Site Director
Social Science
(309)694-5330
Entered Program Spring, 1977
DOORS Courses Taught: Introduction to Social Sciences;
                        World Civilization

Thomas Campbell
COMPAS Project Director
Administration
(309)694-5525
Entered Program Spring, 1977
DOORS Courses Taught: Foundations of Physics

Rich Hoffman
Physical Science
(309)694-5389
Entered Program Fall, 1979
DOORS Courses Taught: Foundations of Physics

Mary Matthews
English Dept.
(309)694-5526
Entered Program Fall, 1981
DOORS Course Taught: Introduction to Philosophy

Carol May
Behavioral Science
(309)694-5328
Entered Program Spring, 1977
DOORS Courses Taught: Introduction to Sociology

Phil McGill
Mathematics Dept.
(309)694-5378
Entered Program Spring, 1977
DOORS Courses Taught: Concepts of Mathematics

Thoma Mehl
English Dept.
(no longer employed)
Entered Program Fall, 1980
DOORS Course Taught: English Composition

(continued)

The DOORS Program -- Illinois Central College

(continued)

PROGRAM FACULTY

Jimmie C. Miller
Social Science
(309)694-5320
Entered Program Spring, 1977
DOORS Courses Taught: Principles of Macro Economics

Art Moser
Mathematics Dept.
(309)694-5379
Entered Program Fall, 1979
DOORS Course Taught: Concepts of Mathematics

Joyce Orr
English Dept.
(309)694-5349
Entered Program Fall, 1981
DOORS Course Taught: English Composition

Linda Robertson
Program Counselor
Student Services
(309)694-5281
Entered Program Fall, 1981

Karl Taylor
Adult Basic Education
(309)694-5341
Entered Program Spring, 1977
DOORS Courses Taught: English Composition

Jack Teal
Program Counselor
Student Services
(309)694-5151
Entered Program Spring, 1977

Pete Wysocki
Social Science
(309)694-5574
Entered Program Fall, 1981
DOORS Course Taught: American National Government

Karen Zucco
Behavioral Science
(309)694-5329
Entered Program Fall, 1978
DOORS Course Taught: Introduction to Sociology

The PATH Program

William Rainéy Harper College
Algonquin and Roselle Roads
Palatine, IL   60067
(312)397-3000

PROGRAM FACULTY

Betty Windham
Site Director
Physics Dept.
Ext. 527
Entered Program Fall, 1978
PATH Course Taught: Physical Science 111

Therese Butzen
Mathematics Dept.
Ext. 232
Entered Program Fall, 1979
PATH Courses Taught: Math 095, Math 120

Nancy Fojo
Program Counselor
Student Development
Ext. 342
Entered Program Fall, 1979
PATH Course Taught: Psy 110 (Human Potential Seminar)

Lee Kolzow
Special Services Division
Ext. 328
Entered Program Fall, 1979
PATH Course Taught: Reading 104

Frank Smith
English Dept.
Ext. 481
Entered Program Fall, 1979
PATH Courses Taught: English 100, English 101

Molly Waite
Social Science Dept.
Ext. 430
Entered Program Fall, 1979
PATH Course Taught: Political Science 201

The RISE Program

Prairie State College
202 S. Halsted
Chicago Heights, IL   60411
(312)756-3110

PROGRAM FACULTY

Glenn Schmitz
Site Director
Science Division
Ext. 274
Entered Program Sept., 1979
RISE Courses Taught: Physical Science

James Herbach
Science Division
Ext. 450
Entered Program Sept., 1979
RISE Course Taught: Chemistry

Don Alexander
Social Science Division
Ext. 208
Entered Program Sept., 1979
RISE Course Taught: Sociology

Kasey Kephart
English Division
Ext. 250
Entered Program Sept., 1979
RISE Courses Taught: English

Pat Faulkner
Social Scie e Division
Ext. 205
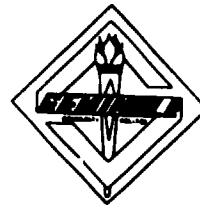Entered Program Sept., 1979
RISE Course Taught: History

Jim Moore
Social Science Division
Ext. 210
Entered Program Sept., 1979
RISE Course Taught: Psychology

Dale Haywood
Mathematics Division
Ext. 278
Entered Program Sept., 1979
RISE Course Taught: Mathematics

Don Uram
Program Counselor
Ext. 106
Entered Program Sept., 1979

The STARS Program

Seminole Community College
Sanford, FL   32771
(305)323-1450

PROGRAM FACULTY

Alexander K. Dickison
Site Director
Mathematics/Science Division
Ext. 431
Entered Program Sept., 1979
STARS Course Taught: Physical Science

Lucinda Coulter
Social Science Division
Ext. 220
Entered Program Sept., 1979
STARS Course Taught: Economics

Richard L. Detwiler
Mathematics/Science Division
Ext. 204
Entered Program Jan., 1980
STARS Course Taught: Contemporary
                     Chemistry

Robert J. Ek
Business Division
Ext. 291
Entered Program Jan., 1980
STARS Course Taught: Business Law I

Minnie Johnson
Social Science Division
Ext. 242
Entered Program Sept., 1979
STARS Course Taught: Sociology

Bill E. Jordan
Mathematics/Science Division
Ext. 217
Entered Program Sept., 1979
STARS Course Taught: Essential Math

Aimeé H. Mason
Humanities Division
Ext. 276
Entered Program Jan., 1980
STARS Courses Taught: Humanities I
                      Humanities II

Lawrence A. McAdam
Mathematics/Science Division
Ext. 209
Entered Program Sept., 1979
STARS Course Taught: Introduction to
    Astronomy & Meteorology

Dorothy Morrison
English Division
Ext. 372
Entered Program Jan., 1980
STARS Course Taught: Fundamentals
                     of English

Leora Schermerhorn
English Division
Ext. 376
Entered Program Sept., 1979
STARS Course Taught: English I

Anna Wilcox
Program Counselor
Student Development, Ext. 282
Entered Program Sept., 1979
STARS Course Taught: Career
                     Exploration

Stephen C. Wright
English Division
Ext. 397
Entered Program Sept., 1979
STARS Course Taught: English II

The STEPPE Program

Joliet Junior College
1216 Houbolt Avenue
Joliet, IL 60436
(815)729-9020

JJC

PROGRAM FACULTY

Wilbur A. Miner
Site Director
Physical Science Dept.
Ext. 371
Entered Program Sept., 1979

James Cooper
Mathematics Dept.
Ext. 372
Entered Program May, 1981
STEPPE Course Taught: Math for General Education

Leonard Hodgman
Physical Science Dept.
Ext. 363
Entered Program Sept., 1979
STEPPE Course Taught: Physical Geography

Gilbert M. Nicoll
Mathematics Dept.
Ext. 365
Entered Program Sept., 1979
STEPPE Course Taught: Math for General Education

Philip Piket
Social Science Dept.
Ext. 378
Entered Program Sept., 1979
STEPPE Course Taught: Marriage and the Family

Beverly Shields
English Dept.
Ext. 323
Entered Program Sept., 1979
STEPPE Course Taught: English

Kenneth Warman
Public Service Dept.
Ext. 360
Entered Program Sept., 1979
STEPPE Course Taught: Psychology

SOURCES OF INFORMATION ON PIAGET AND HIGHER EDUCATION

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