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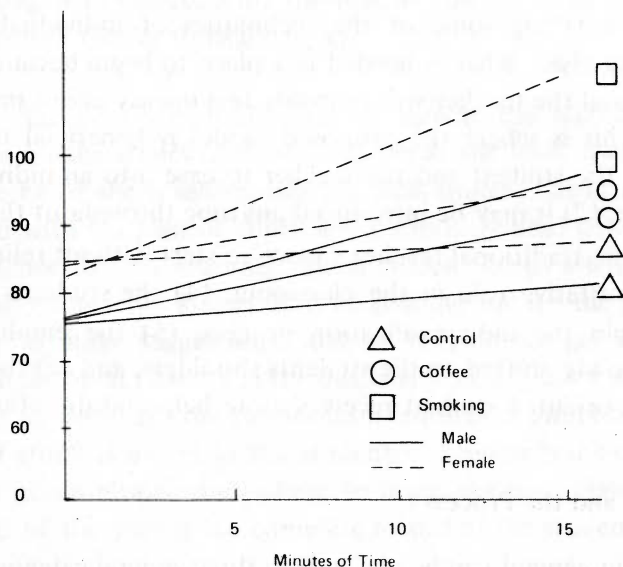
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Figure 1. Effects of Two Stimulants on the Pulse Rate Over

A Fifteen Minute Time Span



## A MODEL FOR IMPLEMENTING INDIVIDUALIZATION IN THE SCIENCE CLASSROOM

Barton Philipps, Harrisburg, Pennsylvania

Teachers today find themselves in the middle of tremendous education changes and as teachers they will be expected to play an important part in implementing course revisions. Which part shall they play? Some have closed their eyes to the new directions and hope they will go away, but like the ostrich these teachers are just fooling themselves. The numbers of open classroom elementary schools are increasing and the traditional ways of presenting science in the high schools will encounter greater student resentment. It therefore behooves teachers to begin to look for a way to introduce change in their classroom. What I propose is a model which shows how to easily lead the students into an individualized science program.

The word "individualize" seems to be everywhere and a clear and concise model of how to incorporate it into the classroom is needed. It is not feasible to walk into the classroom and tell the students to "do their own thing" because for so many years they have had every-

thing presented in a lock-step fashion. The fear of losing command and the students running wild in the room has probably kept more teachers from trying some of the techniques of individualization than anything else. What is needed is a place to begin because both the student and the teacher will probably feel uneasy about individualization. This is where the proposed model is beneficial because (1) it allows the student and the teacher to ease into an individualized program, (2) it may be introduced anytime throughout the year, (3) it gives the traditional teacher a place to start without relinquishing his authoritative role in the classroom, (4) the students have a place to begin the individualization process, (5) the emphasis of learning is slowly shifted to the students shoulders, and (6) the more traditionally oriented student receives more help and direction from the teacher.

### **The Student and the Process**

Students in general can be placed into three general categories and a model is necessary for the students smooth transition into the individualized classroom. The three types of students are: (A) the student who is able to plan and direct his own studies with very little assistance from the teacher, (B) the student that has some fragmented ideas, but cannot put his plan of study together without help, and (C) the student who has no idea of what to do in the classroom. Unfortunately too many of our students fall into the second and third categories, but this is to be expected from our teacher-centered instructional methods. Usually it is the teacher who learns more by lecturing than the students and yet we continue to use this method in spite of its poor results.

The degree of individualization reached by each student will vary. The process which brings about individualization begins with an experiment the teacher has found, in the past, to have stirred student interest. It should be an experiment that can easily be modified and extended by the students for different results and more information. An example of this type of experiment would be extracting chlorophyll from geranium leaves. When this part of the experiment is completed the students may try other kinds of leaves, flowers, fruit, stems and roots. Depending on the interest and curiosity of the student this experiment can be extended for days or weeks. By

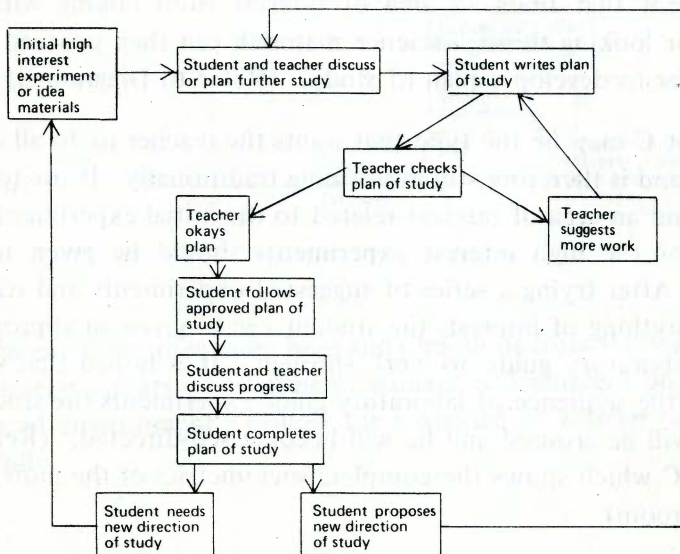
interacting with the students the teacher can begin the individualization process. (Refer to Diagram A)

The extent to which the teacher directs the learning activities depends on the student. Student A needs the least amount of help because he or she is self-motivated. This student has ideas of how to proceed with his plan of study and needs only brief discussions with the teacher to keep learning. Each student keeps a written plan of study so the teacher knows what he is doing and it's the place for the teacher to make suggestions; such as: (1) do not get this chemical close to an open flame, (2) try this chemical, (3) use a larger sample, and (4) do not place the paramecium cultures in direct sunlight. The plan of study is useful to the student in keeping track of how much he has accomplished and where to begin the next class period. At the end of the year it is a complete record of the student's activities.

Diagram A

The Basic Individualization Model

BEGIN



This is the basic model of interaction in the classroom and a copy of it can be placed on the wall for students to follow or duplicated and given to each student at the beginning of the individualization process.

Student B, upon completing the initial experiment, needs more of the teacher's time to discuss what he should do next. This student has a few fragmented ideas from the experiment, but needs the teacher's help to put them into a workable plan. The main point to consider here is that the student has some idea of what he wants to do, but is unable to formulate the plan without the teacher's assistance. Once the student-teacher discussion concerning the new plan is ended the student should be able to write the plan of study and proceed with relative ease. Teacher assistance will be needed more than with student A.

The third type of student, Student C, has very little interest in science, school in general, or cannot function in the classroom without specific direction and will need the greatest amount of help. When this type of student finishes the beginning experiment he will have little, if any, idea of what to do next. At this point the teacher explains some other directions the student can explore. If these are not of interest the student can be directed to look at some science books, magazines, filmstrips or some other sources of information. The student that finds an area of interest from talking with the teacher or looking through science materials can then proceed with the teacher to develop a plan of study. (Refer to Diagram B)

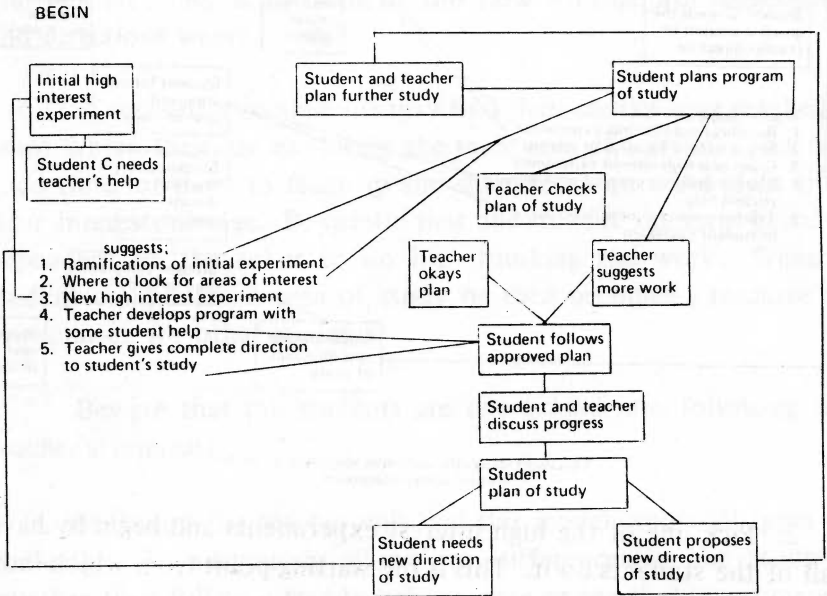
Student C may be the type that wants the teacher to do all of the planning and is therefore still performing traditionally. If the teacher cannot find an area of interest related to the initial experiment, then another of the high interest experiments should be given to the student. After trying a series of suggested experiments and still not finding anything of interest, the student can be given an appropriate science laboratory guide to work through. It is hoped that somewhere in the sequence of laboratory guide experiments the student's interest will be aroused and he will become self-directed. (Refer to Diagram C which shows the complete sociometrics of the individualized classroom)

### **The Techniques in Brief**

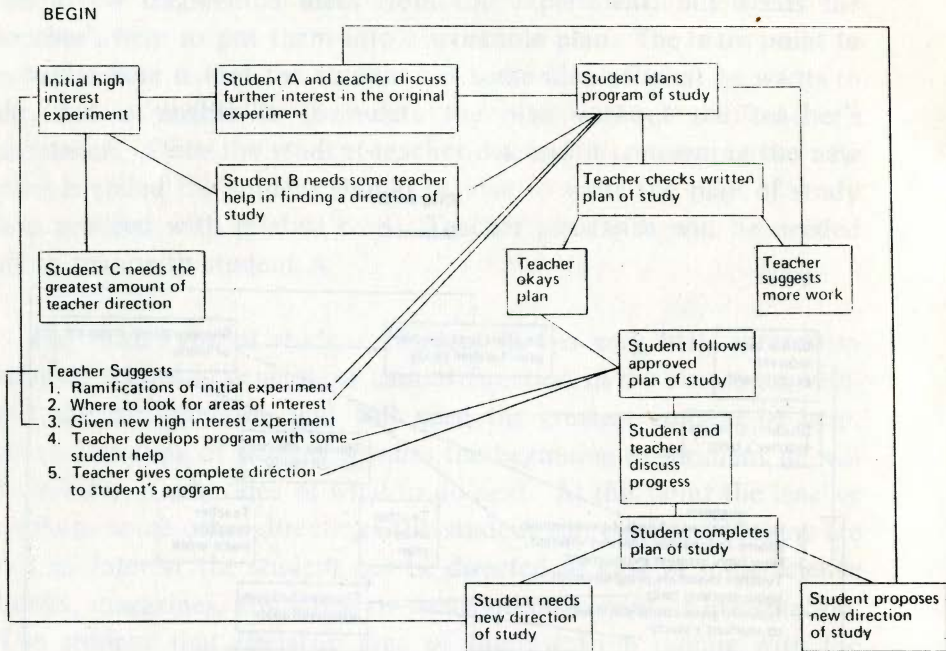
1. Before beginning to individualize, have at least a series of ten experiments which have proven in the past to elicit student enthusiasm. These experiments should be typed and ready for use at anytime.

Diagram B

Student C



Student C requires more help and directions from the teacher than the other students. This type of student is dependent on a teacher-centered environment. Follow the sequence of 'teacher suggestions' carefully.

The Complete Individualization  
Model

This chart shows the complete sociometrics of the individualized classroom

2. Pick one of the high interest experiments and begin by having all of the students do it. This is the starting point from which individualization begins.

3. Allow the students to work on the experiment and pursue all of its ramifications for as long as they wish.

4. When students want to learn more about the experiment or needs some directions to continue, discuss their ideas with them and then have them write a plan of study. The plan of study can be in outline form, but it should contain enough detail to make the student's idea(s) clear to the reader. The plan tells the teacher what the students want to do and is a good record of his classroom activities. The degree to which the teacher helps write the plan will depend on the student's abilities. Give the student every opportunity to find his own area of interest. If the student still cannot find an area of interest, then he should be given another high interest experiment.

Completion of the high interest experiment may still leave the student without direction and at this point the teacher should plan to direct the student's studies. Hopefully, this student will become self-directed at sometime during the year.

5. As student interest grows the teacher's main function will be to keep things moving through individual discussions. To be as individualized as possible the direction of study should flow from one experiment to the next and the logic of the flow rests with the student. The teacher's task is to facilitate this flow with helpful suggestions and directions where needed.

6. On occasion two students may find their studies have reached a point where they are exploring the same area of science. This is a good time for them to team up and share techniques and ideas until their interests diverge. Be careful that one student does not become dependent on the other to do his thinking and work. When a student completes an area of study, he then becomes a resource of information for other students.

7. Beware that the students are not guided into following the teacher's interests.

In conclusion the teacher will find this model covers all types of students. It adequately allows for differences in the students whether they follow a traditional sequence or one that is completely self-directed. Keep in mind that a student will probably fall into all three categories (A, B, and C) at various times during the year. The model itself is not complex, it is flexible and will easily accommodate to the teacher and the students.