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Abstract. A team of nine members assumed the responsibility for teaching 1250 students utilizing team teaching and large group instruction on an experimental basis. Students used modified versions of AAAS and IPS science curriculum materials. Modification of materials was necessary to operate effectively with laboratory groupings of 125. Heterogeneous grouping and individual progress was stressed with students working at their own rate. Physical changes included the removal of three walls to provide for a U-shaped complex. Additional laboratory supplies were also purchased due to class size. The program was closely associated with the class guide system and flexible scheduling in operation at Bettendorf Middle School. Based upon student response and evaluation, it is felt that this program presents controversial results in connection with costs involved, utilization of instructors' backgrounds, and individualization of instruction.

BACKGROUND

With the closing of the school year in the spring of 1968, only one assurance was given, that the school would open in the fall with a record breaking enrollment. The situation in the science department at that time would call for class sizes of 38-40 and a lecture-laboratory curriculum, if the traditional classroom and approach were used.

This did not fit the methods of teaching and learning experiences that the school administration advocated. Current school philosophy theorizes that students learn best in an atmosphere which (1) provides interesting material, (2) has active involvement of the student, (3) does not pressure students too far beyond their abilities, and (4) allows the student to meet some success for his efforts.

A program had to be envisioned which would allow us to meet the administration's ideas with the physical handicaps that existed. The product that has developed is the Bettendorf's Middle School large group instruction, team teaching program.

To implement the program a curriculum had to be selected. A laboratory directed program was decided upon in order to actively involve the student. Prepared programs had to be viewed for possible modifications to meet large group instruction. Introductory Physical Science published by Prentice-Hall was chosen for the eighth grade and AAAS—A Process Approach, published by the Zerox Education Division for the sixth grade. A seventh grade

biology program was not available, so the present program was modified to adjust to the large group instructional facility.

Team Organization

The science team consists of nine members plus a full time paraprofessional. The team was divided into three groups. Three members were responsible for the eighth grade IPS, two for the seventh grade biology, and three for the sixth grade AAAS.

These subteams plan the basic curriculum for their grade level. The other members of the team help the subteams in any way possible. They also prepare themselves in areas prepared by the other subteams. For example, the IPS subteam plan and revise a unit to fit the large group approach. They then brief the other members of the team on the unit, trying to foresee any possible questions or problems that may arise. The subteam then presents the material to the students. The subteams are also responsible for keeping materials available for the units they prepare.

Six instructors are in the lab at any one time, and the students can go to any of the instructors for help. If an instructor does not feel he can adequately explain a question, he can refer the student to another member of the team.

Subteams are responsible for evaluating the units that they prepare. Evaluation of the student is based upon his lab work, as presented in lab notebooks, and unit test results.

Large Group Instruction

The basic large group consists of 120 students in the lab complex during each mod. The students are homogeneously grouped according to grade and heterogeneously grouped by ability. Lab partners are assigned on the basis of the previous year's work in science.

Since individual progress is the underlying theme of all classroom instruction, the lab partners are allowed to progress as rapidly as possible. Brief introductions for the day are given to the group as a whole over the public address system. After these preliminary announcements are made, the students are released to begin work. They are free to get any materials they need and are allowed to converse freely among themselves.

At times it is necessary to present certain materials in more depth. Most situations of this type require a less permissive atmosphere. There are two rooms in the science complex to handle small group discussions. These rooms will hold up to thirty students at a time.

Students are permitted to take examinations at their own dis-

cretion. Once they feel they have covered a unit they take the exam. If they fail the test they review the unit to try to pick up what they missed. This procedure worked most satisfactorily except for the lower ability students. These students must be encouraged to meet specific objectives within a given period of time.

TABLE 1 STUDENT SCHEDULE

MOD-TIME	MON.	TUES.	WED.	THURS.	FRI.
1. 8:00 8:18	X		X		X
2. 8:21 8:39	X		X		X
3. 8:42 9:00			X		X
4. 9:03 9:21			X		X
5. 9:24 9:42					
6. 9:45 10:03					
7. 10:06 10:24					
8. 10:27 10:45					
9. 10:48 11:06					
10. 11:09 11:27					
11. 11:30 11:48					
12. 11:51 12:09					
13. 12:12 12:30					
14. 12:33 12:51					
15. 12:54 1:12					
16. 1:15 1:33					
17. 1:36 1:54					
18. 1:57 2:15					
19. 2:18 2:36					
20. 2:39 2:57					
21. 3:00 3:18					
22. 3:21 3:39					

Scheduling

The school is set up on a flexible-modular schedule. The school day is broken down into twenty-two 18 minute mods with three minutes between each mod. This modular system allows a wide variety of possible period lengths. The science department decided to meet the students three times per week, twice in four mod, seventy eight minute periods, and once in a two mod, thirty nine minute period. The two large periods are utilized for laboratory work and the short period for specific instructions and testing.

This flexibility in individual student schedules provides a maximum of fourteen mods per week for selected study by the student. This selected study time is called "quest". Students assemble according to their class guide groupings for "quest time". This group consists of approximately 120 students. Under the direction of the class guide, the students disperse to the various areas according to availability, desire, and need. Up to twenty five students per mod are permitted to use the laboratory and resource center during "quest time".

Table 2. Teacher Schedule

MOD-TIME	MON.	TUES.	WED.	THURS.	FRI.
8:00					
1. 8:18					
8:21					
2. 8:39					Teacher's
8:42					
3. 9:00					Time
9:03					
4. 9:21					
9:24					
5. 9:42					
9:45					
6. 10:03					
10:06					
7. 10:24	Resource				
10:27	Center				
8. 10:45					
10:48					
9. 11:06					
11:09					
10. 11:27				Teacher's	
11:30					
11. 11:48				Time	
11:51					
12. 12:09					
12:12					
13. 12:30					
12:33					
14. 12:51	Teacher's	Teacher's	Teacher's		
12:54					
15. 1:12	Time	Time	Time		
1:15					
16. 1:33					
1:36					
17. 1:54					
1:57					
18. 2:15					Resource
2:18					Center
19. 2:36					
2:39					
20. 2:57					
3:00					
21. 3:18				Resource	
3:21				Center	
22. 3:39					

Teacher scheduling is based upon the need for six instructors present in the laboratory complex each of the twenty mods of scheduled classes per day. The average load per instructor consists of eighteen mods of student contact time per day. Of these eighteen mods an average of sixteen are spent in the laboratory complex and two in the resource center. The remaining four mods consist of unstructured time for the instructor.

Physical Facilities

The science complex with its large laboratory facility had to come from existing rooms. To build the laboratory, the walls between two small laboratory-type science rooms and two standard class rooms were removed. Three other standard class rooms were obtained, one to be used as a teacher planning area and resource center and two for use in small group instruction.

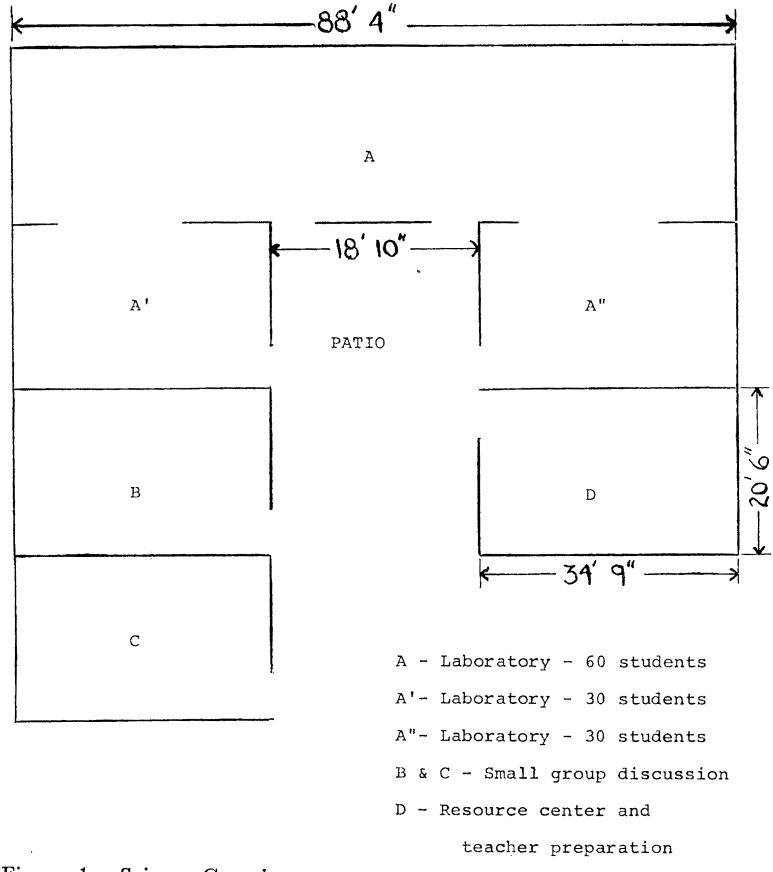

Figure 1. Science Complex

The large laboratory complex is the center of the science program. It accommodates 120-130 students at a time. Students work four at a table. There are three demonstration counters for dispensing materials, with sinks for water and gas outlets.

The one standard room is a science library for students to use for resource material. This is also the main study area for quest students. In this room the teacher planning areas are located, thus making a central area for students to work and to be able to find instructors for individual help. The other rooms are for small group instruction activities.

Financial Outlay

Any new program cannot be a success unless it has equipment to use. When a science department changes from a traditional situation to one of complete student involvement, a high financial outlay must be expected. If the program involved is one in which all the students do 90% of their work in laboratory situations, the cost will remain high. The large group situations increase the cost of the program even more. In small classes, equipment for 30 students can be purchased and be used for five periods a day, thus teaching 150 students with equipment for 30. This is not possible with large groups. If there are 120-130 students in science at one time, equipment for 120-130 students has to be purchased.

A comparison of the budget for science was made for the last four years. This comparison shows the increase in cost.

TABLE 3 BUDGET COMPARISON

	School Year	Type of Program	Grades Involved	Budget
	1966-67	Lecture-lab	6 - 8	$ 4,766.00
	1967-68	Lecture-lab	6 - 8	5,262.00
	1968-69	Large group	6 - 8	14,720.00
(Proposed)	1969-70	Large group	6 - 8	14,525.00

Advantages and Problems

As with any new approach, large group instruction and team teaching has its advantages and problems. In the two lists below the advantages that have been found and the problems encountered are presented.

Advantages

(1) Less responsibility is placed upon individual instructors, providing an excellent orientation for instructors new to

the system.
(2) A more efficient use of teachers' areas of specialization is provided.
(3) A minimum number of dispensing areas for expendables is sufficient.
(4) A central storage area for expendables can be established.
(5) Students are provided with a number of instructors with which to identify.
(6) Instructors are permitted to counsel individual students without jeopardizing the entire class.
(7) There is a maximum efficiency of personnel involved.

Problems

(1) Personal satisfaction among some teachers diminishes.
(2) The cost of laboratory equipment increases with increased class size.
(3) Complete cooperation of all personnel involved in the program is necessary.
(4) The attention span of the students is decreased by multiple distractions within the room.
(5) Students with introverted personalities can lose identity within the group.

Summary

Team teaching and large group instruction has provided the means to meet certain specified objectives, but has produced new problems to be solved. As a result of the physical limitations placed upon us, this program has most effectively achieved the following objectives: (1) Student interest through student participation (2) a lessening of the pressure demands placed upon students through individualized rates of study and (3) removal of the teacher as the center of the classroom and replacing him with the student. Yet, this program has produced several unique problems. Teachers have to re-evaluate their source of personal satisfaction. It must come through being a member of the team, not an individual. Students must accept more responsibility as they are placed in increasingly larger groups. Material costs soar with large groups of students being involved in laboratory work at a given time. And a special effort is necessary on the part of the teacher to get to know numbers of students, not just a few individuals.

Team teaching and large group instruction must undergo further study and evaluation before all of its merits and problems are found. Its problems must be worked out and its merits must be strengthened before it can be considered a complete program.

This paper presents the program as it was up to the end of the first semester of the 1968-69 school year. Since it is an experimental

program changes still must be made to mold it to the ideals of the science department. Modifications are being made at the present time.