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ABSTRACT

This investigation assesses the environment of the elementary child experience, rather than his academic achievement or personal adjustment. Subjects included 22 collegiate teams in 11 open space schools, and 11 teachers in 7 self-contained classrooms. In each self-contained classroom, a minimum of 15 observations was made (five each of reading, mathematics, social studies and science). A new instrument was developed for scoring the activities of the children, the group children worked in, and the amount children moved. The four basic measures used were 1) the amount of movement not specifically directed by the teacher; 2) the proportion of time children spent waiting, listening or passive; 3) the proportion of time spent in large groups; and 4) the proportion of time spent in educational games, cooperative work, and doing, when not in large groups. An original questionnaire measured the degree to which teacher and principal respondents believed in formal control of children. Results indicate that school environment experienced by the student is affected by school organization: a high degree of activity is more likely to be found in an open space team teaching school than in a self-contained classroom. Implications of the findings for school design and possible long-range effects of the active classroom are presented. A 16-item bibliography and attitude questionnaire are included. (Author/MJM)

TEAM TEACHING AND THE "ACTIVE" CLASSROOM

A COMPARATIVE STUDY OF THE IMPACT OF SELF-CONTAINED CLASSROOMS AND OPEN-SPACE TEAM TEACHING SCHOOLS ON CLASSROOM "ACTIVITY"

by Erika Lueders-Salmon

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Team Teaching and the "Active" Classroom. A Comparative Study of the Impact of Self-Contained Classrooms and Open-Space Team Teaching Schools on Classroom "Activity".

Erika Lueders-Salmon

ABSTRACT

Earlier investigations have studied teachers from collegial teams in open-space schools; this investigation extended the earlier work to observations of elementary school children. The study was a first attempt to assess the environment children experience, rather than their academic achievement or personal adjustment. It was planned to be a basis for future research.

Of chief interest was the classroom giving the child choice, opportunities to work independently, and encouragement to behave actively; this is described as an "active" classroom. The study related measures of child "activity" to type of school architecture (open-space or self-contained classrooms), size of teaching team, a measure of teacher attitude, and other variables.

A new instrument was developed for scoring the activities children were engaged in, the groups children worked in and the amount children moved. Four basic measures were used to characterise an "active" classroom. They were (1) the amount of movement not specifically directed by the teacher ("Movement"); (2) a negative item, the proportion of time children spent Waiting, Listening or Passive ("Passive"); (3) a negative item, the proportion of time children spent in Large Groups ("Large Group"); and (4) the proportion of time children spent in Educational Games, Cooperative Work and Doing, when not in Large Groups ("Doing"). All four indicators of the "active" classroom gave consistent results, although the first three were taken independently of each other. This greatly reinforced the significance that could be attached to the findings.

An original questionnaire measured teacher and principal "Control orientation" -- the degree to which the respondent believed in formal control

of children.

A sample of twenty-two collegial teams in eleven open-space schools and eleven teachers in seven self-contained classroom schools was observed. All schools were in middle-class neighborhoods. In each self-contained classroom or team area a minimum of fifteen observations was taken (five observations in each of Reading, Mathematics and Social Studies or Science). The unit of analysis was the team of teachers in an open-space school and the single teacher in a self-contained classroom.

It was predicted that the open-space classrooms would be more "active" than self-contained. Statistically significant differences were found on all four measures of "activity" as expected. Of the four measures it was most striking that there was approximately twice as much "Movement" in the open-space schools as in the self-contained classrooms. Possible causes of this effect include: the ability of teams to share their planning tasks and so to plan for a greater variety of activities; the greater space in open-space classrooms encouraging children to move and teachers to let them move; the carpeting in open-space schools reducing noise and making movement less obtrusive.

It was predicted that teachers with informal "Control Orientation" would have more "active" classrooms. This was found to be true, particularly on the measures of "Movement" and "Passivity". The scores on the "Control Orientation" index did not differ significantly between the teachers in the two types of school. Principal "Control Orientation" was unrelated to "Movement" and "Passivity", and only slightly related to "Doing" and the use of "Large Groups".

In self-contained classrooms the higher grade levels were less "active" than lower grade levels; presumably this was partly due to greater emphasis on curriculum. In the open-space schools (after controlling for other variables) the higher grade levels were more "active" than lower grade levels, particularly as measured by "Movement" and "Passivity". This was not predicted, but may be related to lesser emphasis on curriculum combined with recognition by teachers of the greater maturity of older children.

It was predicted that because of organizational problems large teams would break up into smaller sub-teams. Analysis of team history confirmed this hypothesis.

It was predicted that teams of three and four members would have more "active" classrooms than teams of two members. This was found to be true, particularly with regard to "Doing" and "Large Group" work. It is suggested that this effect is caused by the larger team being able to plan more activities for the children.

It was found that teams in the sample teaching two grade levels had less "active" classrooms than those with just one. This may have been caused by a lack of planning for the ungraded situation by the teams sampled.

The remaining predictions concerned the level of teacher cooperation in the open-space schools. The measures of teacher cooperation used proved inadequate to test these hypotheses. However, the one measure that was usable, teachers' report of "hours spent in cooperative teaching", as predicted, correlated highly with teacher "Control Orientation", with the more informally oriented teachers reporting more time spent in cooperative teaching.

The research confirmed that structure, as well as ideology, has

major effects on the child's environment in elementary school; in particular, open-space schools were much more "active" than self-contained classrooms. It is suggested that such a change in the environment a child experiences might have a significant effect on his expectations of society. This could have major implications for future school organization and curriculum development.

A particular value of the study is that consistent quantitative measures were developed that describe an aspect of the classroom environment, which can be used in future research.

CHANGE IN EDUCATION

Principals of elementary schools show special pride and satisfaction when they can announce "we are team teaching in our school". Team teaching, one discovers fast, has many meanings and definitions; the range goes from teaching of children by a group of adults who cooperate continuously and share their pupils as circumstances dictate to mere departmentalization, where teachers exchange classes for certain subjects.

Team teaching itself is not a new discovery. In the late 1930's a well formulated cooperative group system, similar to some of today's team teaching activities, was unsuccessful.[1)] However, since the late 1950's many different schemes have succeeded and hypotheses about the possible pros

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[1]Shaplin in Shaplin and Olds (eds.)

and cons of team teaching, most of them speculative, have been put forth freely. Descriptions of different practices are manyfold.[2)]

Since team teaching represents a tremendous organizational change in the execution of the teaching task, studies have mainly been concerned with the teacher in this new situation. There have been separate studies of hierarchical teams and collegial teams[3)] as well as a comparison of the two types in an experimental setting.[4)]

The impact of this new organization on the student has been assessed less often. The few studies that have been done so far have used small sample sizes, some of them without adequate control groups. Most were mainly concerned with standard academic achievement tests and personal adjustment tests.[5)]

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[2]E.g., Lobb describes different guidelines that can be followed when a school contemplates the introduction of team teaching. His suggestions are based on extensive field observations; Polos describes different ongoing projects; Trump speculates optimistically about team teaching.

[3]"Collegial" teams comprise members of equal status, whereas "hierarchical" teams have a team leader and, sometimes, further status differences within the team.

Bair and Woodward focus mainly on the Lexington Project, as do Shaplin and Olds (eds.), but the latter also have reviews of the main team teaching projects (most based on hierarchical teams) to the date of their publication (1964). Meyer, Cohen et al. concentrate on collegial teams in open-space team teaching schools. They find specifically an increase in the feeling of autonomy and influence in the team members when compared to self-contained classroom teachers. Within such teams, Molnar found that where members participated equally in team meetings, they felt more influential and autonomous than members in teams with uneven participation.

[4]Lapossa found that in trying to solve a specially assigned problem, more disagreeing behavior and tension was exhibited by larger teams (larger than four) than smaller ones and by teams with leaders compared to those teams without.

[5]Heathers in Shaplin and Olds (eds.); Bair and Woodward

Lambert, et al. did analyze classroom interaction (based on Withall and Flanders models) in addition to measuring academic achievement and personal adjustment. The study was done over a two year period of time involving two newly formed hierarchical teams and control groups.[6] Their results are highly sensitive to the specifics of the two teams in the study.[7] The teams differed only in a few instances significantly from both other control groups.

AIMS OF THE STUDY

Our own study focused on two very different school organizations: the self-contained classroom school and the open-space team teaching school. The self-contained classroom school, the architecture of which is often quite reasonably called an egg-crate building, does not need to be described: the long hallways with classrooms to each side should be familiar to all readers. The open-space school appears in many variations of one basic theme: rooms big enough to hold from two to thirty (sic) standard size classes. These rooms, usually called "pods", have all kinds of shapes: some of them have permanent interior dividers; some are like domes, without any inside structural

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[6] The teams were divided into master teachers and interns; each team was responsible for three grade levels. The control groups were six (grades one through six) self-contained classrooms in the same school where the teams were. They had a few specialist come in to help these self-contained classroom teachers. The others were completely self-contained classrooms in a nearby school (again grades one through six).

[7] E.g., the change of the master teacher in the second year in one team seems to be reflected in the data.

supports to act as dividers for groups of children; some have one big learning center or library as the middle core while others leave the central space for teachers to use as they please. In all of the open-space pods which the writer visited, the teachers either formed one team together or divided into sub-teams. The writer did not see any pod in which there was no cooperation among the teachers at all; however, what was considered "teaming" varied greatly.

Visits to open-space team teaching schools yielded the impression that children moved around more freely and that there was a generally higher level of activity than in the conventional self-contained classroom setting.

In this study we were interested in documenting these impressions and also in finding some explanation for them. We were, of course, particularly interested in differences between open-space team teaching schools and self-contained classroom schools, but examined as well other structural variables (e.g., the size of the teaching team). Differences in the environments which students experience could, however, also be the result of different teacher attitudes towards teaching and the teacher's concept of a desirable classroom environment. Specifically, one could expect teachers in schools with "new" types of organization to also have "new" attitudes. An original measure of teacher attitude was therefore developed in an attempt to determine this effect, and control for it.

This study did not concern itself with the issue of whether the classroom should give the child an active role where he can learn from his own independent behavior.[8)] Nor did it assess differences in the school

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[8]This would be defended by many educators, e.g. Jackson, Silberman, Holt and others.

environment as experienced by the student in terms of academic achievement or personal adjustment. The study's chief interest was to quantify and then explain the classroom giving the child choice, opportunities to work independently, and encouragement to behave actively: for the rest of this paper, such an environment is described as an "active" classroom.

THE RESEARCH PROBLEM AND STUDY DESIGN

The study could not be based on available theories and was itself a pilot study for further research. The reasoning behind the study, the study design and the sampling of participants for the study are now described briefly.

Theoretical Framework

Jackson[9] describes very convincingly the need for a self-contained classroom teacher to impose rules and regulations on the children's activities. It is very difficult for one adult to conduct and supervise an "active" classroom containing twenty to thirty children. Even though we all know the teacher whose classroom is buzzing, where no boredom can be found and where no orders are necessary, we also know that these artists are rare. To conduct such a classroom a great deal of preparation is demanded from the teacher. Much time and many ideas are necessary to set up a classroom so that children can choose from a range of purposeful activities. To guide children to cooperate on projects and use each other as resources demands that the teacher spend time

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[9] Jackson, Life in Classrooms.

with small groups while other children are involved in different activities. If children are working on different tasks at the same time, it is to be expected that they will move around in the classroom at different times to fulfill these tasks, adding to the confusion of an "active" classroom.

In the business world and in universities, complex tasks are usually not solved by one expert working in isolation, but typically by groups of people (e.g.,research teams), where different experts pool their ideas and expertise to solve a problem. We expected that similar organizational help could be utilized by teachers: in open-space team teaching schools more people can share the planning of instruction and utilize each other's ideas. It seemed likely that an increase in the size of the planning group of teachers would have a positive effect on resolving the complex task of planning for an "active" classroom.

But, even if a teacher has many instructional aids available and can share with others in the preparation of curriculum units, it is still difficult for him to supervise many diverse activities and small groups at once. Again, it seemed likely that an increase in the size of the supervising staff would reduce the severity of this problem. If several teachers and their classes share one room, the teachers can share responsibility for all the students and the management of the enlarged classroom. It was expected that this would make it easier to manage an "active" classroom: the teachers could limit the scope of activities each had to supervise; they could alter the size of the group of children with whom they worked to fit the task (e.g., children playing games, listening to records or reading need fewer teachers than do children who struggle with the concept of fractions); they could also

let the children move in a larger area since there would be other adults in the room.

Such a group of teachers in an open-space classroom who plan together and share the responsibilities of the classroom management was defined as a team. Hence the first research question was:

'Does the existence of a team lead to a more "active" classroom?'

It was argued that there are benefits from a team being able to share the tasks of planning for an "active" classroom, and then managing it. To some extent, therefore, a larger team --which can divide the labor to a greater extent --was expected to have a more "active" classroom than a smaller team. The second research question, then, was:

'Does a larger team have a more "active" classroom than a smaller team?'

Taking the reality of elementary schools into account, we realized that an enlargement of the team is quite often accompanied by an increase in the range of ages of the children for whom the team is responsible. A small range of grade levels being taught by a team may facilitate finding appropriate activities for children.[10] However, with a very large team or a large number of grade levels the organizational problems could become very significant. The third research question was:

'As the team size and number of grade levels taught increase, is there a decrease in "activity"?'[11]

Very large teams were expected in open-space schools with very big pods.[12] The "natural" size of a teaching team is the number of teachers within one pod, since they necessarily have to cooperate in their activities

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[10] E.g., the fast third grader can work with a group of fourth graders or tutor a second grader.

[11] The small group literature dealing with group size is not applicable, since the groups studied typically are not ongoing work groups, and this changes the interaction pattern (Kolman).

[12] A pod is the enclosed classroom area in open-space schools.

to some degree due to their proximity and audibility to each other. However, if the "natural" group were very large or the students very heterogeneous, sharing the planning and the responsibilities could become burdensome. For such situations a modification of the third research question was suggested:

> 'As the "natural" organization becomes too complex --from large group size or number of grades present --does the group break into smaller sub-groups so as more easily to achieve cooperation (or teaming)?'

While an attempt was made to measure "Teacher Cooperation", the indicies used were necessarily limited. Cooperation comes from knowing each other and from having developed standard operating procedures. For adequate measurement one would need to observe formal team meetings as well as the informal interaction of team members, both of which were beyond the scope of this study. The measures used were responses to straightforward questions given to all teachers in the open-space team teaching schools.[13)]

In addition to expecting the school organization to have a relationship to the "active" classroom, we also wanted to take the teacher's attitude towards an "active" classroom into account. It seemed only reasonable to expect that a teacher who was not interested in conducting an "active" classroom would not structure the classroom for that purpose. If this were true, the amount of "activity" could be a function of attitude as well as of organizational variables. More generally, a positive correlation between belief in an "active" classroom and the existence of one was expected. Such a positive

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[13]Questions were in the nature of: Does the team divide the labor (e.g., preparation for the teaching task, cooperative teaching)? Do teachers know where all the children of the team are during the day? How often does the team meet formally? How many hours per week does the team spend in cooperative teaching?

correlation might also be caused by the teacher who experiences such an "active" classroom coming to believe in it, since task experience can alter attitudes.[14]

It was also expected that teachers who believed in informal methods of control would cooperate more because that would help them achieve the more "active" classroom they desired; and, similarly, that teachers who cooperated a lot would find informal control methods more effective and so tend to develop a more informal attitude towards the classroom. (No hypotheses were made concerning the effects of the principal's attitude. It's relationship with the teachers' attitudes and the "active" classroom were to be investigated.)

Attitude towards an "active" classroom was difficult to ascertain. A special questionnaire was developed to measure only a certain aspect: the degree to which the teacher believes in the use of formal control of children.[15] The questionnaire contains nine items which were combined into an index, which was defined to measure "Control Orientation". The poles of the index are henceforth described as formal and informal "Control Orientation".

Summary of the Research Problem

This theorizing on the relationships between school organization and the "active" classroom can be summarized: a team of teachers is defined as a group working in the same classroom area who plan together and share responsibility for classroom management. It was expected that through this

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[14] See Breer and Locke

[15] See Appendix

cooperation teams would be more able to create "active" classrooms than the isolated self-contained classroom teacher. A team of three or four teachers was expected to have a more "active" classroom than a team of two. A large team (e.g., eight teachers), particularly if it taught several grade levels, was expected to experience major organizational problems. We therefore expected that where a team contained a large number of teachers it would divide itself into several small teams or, if this did not happen, there would be evidence of lack of cooperation and a less "active" classroom, and that medium sized teams would cooperate more than small or large teams.

An original measure of a teacher's attitude to the control of children was developed. It was expected that teachers with formal "Control Orientation" would have less "active" classrooms than those with informal "Control Orientation"; this was expected both because the informally oriented teachers would want more "active" classrooms, and because teachers with "active" classrooms would become more informally oriented.

Predictor Variables

The predictor variables then are: the type of school (self-contained or open-space); teacher "Control Orientation"; the numbers of teachers in the team (those teachers who plan together and share responsibility for classroom management); the number of grade levels taught by the team; and the amount of teacher cooperation.

Dependent Variables

There is no definitive way of identifying an "active" classroom. The measures chosen were an attempt to find out how the teacher structures the environment for the child (either encouraging or discouraging independent

active behavior), as well as how actively and independently the child behaves in the environment. The chosen indicators of an "active" classroom were the amount of child movement and the types of learning groups and learning activities children engaged in.

A new instrument was designed to measure these. It had to be simple to use, enabling data collection from a large sample. A detailed explanation of the instrument can be found elsewhere.[16] In this paper we shall only deal with the four major measures of an "active" classroom which were used in the research;[17]

The Four Key Measures of the "Active" Classroom

The amount of movement not specifically directed by the teacher ("Movement") gave a positive measure of an "active" classroom.

> Several types of movement were distinguished, but those that were not directed by the teacher were of prime interest. Only clear physical movements were scored, such as a student walking, running or crawling from one place to another. Just twitching in the chair or lifting an arm were not scored as movements. It was assumed that the teacher who allows the student to move around freely is giving them much more opportunity for independent and active behavior than one whose class is made to sit in chairs unless directed by the teacher to move.

The proportion of time children spent Waiting, Listening and Passive ("Passive"), gave a negative measure of an "active" classroom.

> This category comprises those experiences which involve least activity on the part of the child. (Listening was included here because it is impossible, when making quick observations, to know what is going on in a child's head.)

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[16] Lueders-Salmon, "Manual for the Classroom Activity Measures".

[17] A full description of the research and its findings is given in Lueders-Salmon, Team Teaching and the "active" classroom: a comparative study of the impact of self-contained classrooms and open-space team teaching schools on classroom "activity".

The proportion of time children spent in Educational Games, Cooperative Work and 'Doing' when not in Large Groups ("Doing") gave a positive measure of an "active" classroom.[18]

> This category was used for situations where the child was doing something with his hands or body in a fairly structured way -- especially at elementary school age an obvious indicator of opportunities for independent work and active behavior. The main concern was with "Doing" activities taking place in small groups and in isolation. Similar activities in large groups (e.g., all children cutting and pasting the same shapes) may indicate quite a high degree of activity, but not a high degree of independence from the teacher. Such activities in large groups were therefore excluded from the measure.

The proportion of time children spent in large Groups ("Large Group") gave a negative measure of an "active" classroom.[19]

> Research has shown that in many classrooms the individual student has very few chances to be the emitter or target of interaction.[20] In small groups and tutorial situations, these chances increase. Another kind of learning occurs when the student works alone and independently. The student has the least opportunity to learn for himself if he is part of a large group or works alone on an assignment common to the whole class (e.g., "problem 9 on page 43"). We therefore defined a "Large Group" to include both normal large groups (of ten students and above) and situations when ten or more students worked separately on the same problem.

The first three measures were taken independently of each other; the fourth measure, "Large Group", is slightly dependent on "Doing" since Large Group work is excluded from "Doing". Consistent results would therefore strongly suggest that a basic general characteristic was being assessed.

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[18] There were three other categories for activities which were not used as major indicators in the final analysis: Reading, Writing and Discussing; Free Play and Social Talk; Deviant.

[19] There were five other categories for learning groups which were not used as major indicators in the final analysis: Alone; Student with Student Interaction; Small Group without an Adult present; Small Group with an Adult present; Tutorial of one Student with one Adult.

[20] See Adams and Biddle

Training of Observers and Reliability Checks

Observers were trained in one open-space pod. The teachers and students of this pod were used to being observed and did not mind the repeated visits.

The observation sheet contained 16 sub-totals (six groupings, five activities, four kinds of movement and total movement). The reliability standard required at least 14 of these 16 sub-totals to "match" for the two observers; a "match" meant the totals differed by less than ten per cent (or by at most two, if the totals were less than twenty).

Of the 51 reliability checks taken in the research, 46 met this criterion and adequate corrections were made following the other five.

Description of the Sample

The investigator spent approximately eight weeks at the beginning of 1971 visiting most of the open-space team teaching schools within driving distance of Stanford University. During this time the possibility of a study was discussed with the principals and all responded favorably. When the design of the study was completed, schools with individualized instruction programs and hierarchical teams[21] were eliminated. The remaining principals were contacted again; all of them agreed to ask their teachers for cooperation.

Some schools just asked us to come in any day, choose any team, and go ahead with the observations. In other schools, team participation was on a volunteer basis and only volunteering teams were chosen. In order to obtain proper variability in the sample, criteria for selection were the size of the team and the grade level of children.

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[21] There were very few hierarchical teams within these open-space schools and in order to keep the sample homogeneous, the few in existence were eliminated.

The teachers were put at ease about the observations by truthfully telling them that the objects of observation were the children and not them; most of the teachers soon seemed to forget about the presence of the observers. (Because of the novelty of open-space team teaching schools, they were accustomed to visitors.)

All of the open-space team teaching schools were in middle class neighborhoods. Therefore the self-contained classroom schools were selected from the same school districts and similar neighborhoods.

Since the investigator had not had previous contacts with the principals of self-contained schools, the selection procedure differed. The assistant superintendent of the school district from which most of the open-space team teaching schools had been drawn was contacted and asked for cooperation. He, in turn, sent a letter to all self-contained classroom school principals approving the proposed research and asking for their cooperation. This made it very easy to obtain such cooperation by telephone.

Again, some schools had to be eliminated because of special ongoing projects. In the participating schools, principals talked to their teachers and called back indicating who would volunteer. Several gave a choice of grade levels, but some chose the particular teachers they wished to be included. This may account for the fact that the self-contained classroom teachers in our study are relatively more experienced than the open-space team teachers. Since visitors are not very frequent, we also may have had more of a "special day" effect in the self-contained classrooms than in the open-space team teaching schools, and some observers were a few times greeted with apprehension by the self-contained classroom teachers.

Eventually, twenty-two collegial teams in eleven open-space team teaching schools and eleven teachers in self-contained classroom schools were observed. In each self-contained classroom or team area a minimum of fifteen independent observations was taken.[22] All children present were observed; no selection of individual students took place (this was possible because the observation scheme was clearly limited: while observing activities and learning groups each student was scored just once; while counting movements only clear physical movements were scored and observations were maintained for only three minutes -- a time span short enough to concentrate fully). The unit of analysis was the team of teachers and their combined classload in open-space team teaching schools and the single teacher and his classload in a self-contained classroom.

The selection of teams had to be biased into over-representation of large teams. Within the first two years of their existence, six of the eleven sampled open-space schools had experienced the formation of smaller teams from originally larger ones. While limiting the sample to a maximum of three teams from any one school, those teams that had three or more members were automatically selected. Even with this bias, only two teams with more than four members could be included in the study.[23] The distribution of grade levels (grades one through six) was fairly uniform.

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[22] Five observations in each of Reading, Mathematics and Social Studies or Science.

[23] Meyer, Cohen et al. found a very different distribution of team sizes in their study done in 1969 on the same population of schools: 35% were four member teams, 30% were three member teams, 25% were teams with more than four members and only 10% were two member teams.

Formal Statement of Predictions and Findings

All four measures of the "active" classroom gave consistent results, although three independent indicators of an "active" classroom were used. This greatly reinforced the significance that could be attached to the findings.

First Prediction: Open-space classrooms would be more "active" than self-contained classrooms.

This was found to be true on all measures of the "active" classroom: the open-space classroom showed almost twice the level of movement of the self-contained classroom.

Second Prediction: Teachers with informal "Control Orientation" would have more "active" classrooms than those more formally oriented.

This was found to be true for the measures of movement and passivity; a less strong relationship appeared between teacher "Control Orientation" and the use of "Large Group" and "Doing" activities by teachers.

Third Prediction: Medium sized teams would have more "active" classrooms than small teams.

Three and four member teams had more "active" classrooms than two member teams as measured by the use of "Large Group" and "Doing" activities. Size of team was less strongly related to movement and passivity.

Fourth Prediction: Very large teams would either divide themselves into several smaller teams or would have less "active" classrooms than medium sized teams. This effect would be particularly strong if the large team taught several grades.

It was found that in a large population of open-space team teaching schools most of the teams that started with six members or more had divided into smaller teams. It proved impossible to sample enough large teams to

test whether they did have less "active" classrooms.

Fifth Prediction: Small and medium sized teams teaching two grade levels would have more "active" classrooms than those teaching just one grade level.

This was not found to be the case. It was found that those teams (with two, three or four members) teaching two grade levels had less "active" classrooms than those teaching just one grade level. This may have been caused by a general lack of planning for the ungrade situation or by the teachers finding the organizational tasks too difficult.

Other Predictions: The remaining predictions concerned the level of teacher cooperation in the open-space schools. The measures of teacher cooperation used proved inadequate to test these hypotheses. However, the one measure that was usable, teachers' report of "hours spent in cooperative teaching", as predicted, correlated highly with teacher "Control Orientation", with the more informally oriented teachers reporting more time spent in cooperative teaching.

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[24] Goodlad and Anderson make a strong case for the ungraded classroom. The writer believes that properly planned ungraded classrooms could be very "active"; however, ungradedness should not be just a side effect of an organizational decision to team.

DISCUSSION OF THE FINDINGS

School Type and Teaming

The main emphasis of this study was to assess if organizational differences in elementary schools are associated with differences in the school environment as experienced by the child: the presence or absence of an "active" classroom. Since only teams were observed in open-space schools, and only single teachers in self-contained classrooms, it is impossible to separate the effects of teaming from those of school architecture. That these two in combination lead to a more "active" classroom is, however, undeniable. The combined effect is large, and it will be noted the four indicators of an "active" classroom consistently give the same results. This strongly suggests that the findings are not the result of the peculiarities of a single measure, and that a basic general characteristic of the classroom is being measured.

As mentioned before, observations were taken in three different subjects: Reading, Mathematics and Social Studies (or Science).[25] In order to make figures more comprehensible, the three subjects have been combined with each subject given the same weight. For each team (or self-contained classroom teacher) in the sample, the proportion of time children

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[25] Even though there are differences between the three subjects, they are only of degree and not of substance. All the differences between the two types of school are in the same direction for the three subjects -- except in very minor instances -- with the open-space schools being the more "active". The differences are most marked in Social Studies and Science and least difference occurs in Mathematics. A plausible interpretation is that Social Studies has the least confining curriculum, enabling the teacher to make fullest use of the opportunities inherent in an open-space team teaching situation; in contrast Mathematics has the most structured curriculum.

Table 1

Mean number of "Movements" per child per minute and mean percentage of children's time spent "Passive", "Doing" and in "Large Group": analyzed by self-contained and open-space classrooms

	Self-Contained Schools	Open-Space Schools
Non Teacher-Directed Movement "Movement"	0.091**	0.176
Waiting, Listening, Passive "Passivity"	34.7*	24.3
Educational Games, Cooperative Work, Doing, not in Large Group "Doing"	4.7*	9.4
Large Group "Large Group"	60.5*	43.3
N (Classrooms)	11	22

* Difference significant at .05 or less) one-tailed t-test
** Difference significant at .01 or less) 31 degrees of freedom

spent "Passive", "Doing" and in "Large Group" was computed, as was the number of movements per minute which were not directed by the teacher. Within each school type these figures were then averaged over the classrooms observed, to give a mean proportion of time spent in this way or (for "Movement") a mean number of movements. Thus the 60.5 figure appearing in the lower left cell of Table 1 indicates that averaging over observations in the three subjects 60.5% of the children's time in the eleven self-contained classrooms was spent in "Large Group".

The first row of Table 1 concerns the number of movements made by the children that were not directed by the teacher. A high frequency of "Movement" was defined to indicate an "active" classroom.

The difference between the two types of school is dramatic. In order to communicate more fully what is meant by a figure of 0.091 movements per child per minute, let us consider a ten minute time span in a classroom of 25 children: in such a self-contained classroom there are 23 "Movements" (25 x 10 x 0.091); in an open-space team teaching school the corresponding figure is 44!

The second and third rows of Table 1 concern the frequency with which children were engaged in various activities. A high incidence of "Passive" behavior (Waiting, Listening and Passive) was taken to indicate an "inactive" classroom, since this represents a situation where children have least opportunity to be active. A high incidence of "Doing" (Educational Games, Cooperative Work, Doing, not in Large Group) was taken to indicate an "active" classroom, since it is in such situations that a child has greatest opportunities to learn for himself and to take initiatives. Table 1 shows that on both of these measures the open-space team teaching are significantly more "active" than the self-contained classrooms. Compared to their peers in self-contained classrooms, children in open-space team teaching schools are found twice as often involved in "Doing".

The last row of Table 1 concerns the frequency with which children were observed in "Large Group". A high frequency of "Large Group" was taken as an indicator of an "inactive" classroom: an "active" classroom was expected to give children many opportunities for independence and interaction with others, which is relatively rare in "Large Groups". Again, there was significantly less "Large Group" instruction observed in the open-space team teaching schools than in self-contained

classrooms.

Thus the four key measures of the "active" classroom all show open-space team teaching schools as being significantly more "active" than comparable self-contained classrooms. Given that three independent forms of indicator were used, this is strong evidence that something "general" is being measured, and that the indicators are meaningful. The consistency of the relationships gives construct validity to the concept of an "active" classroom.

There are many possible reasons for this difference between the two school types. It was originally hypothesized that teaming would enable teachers to share the planning of their lessons, which would help them provide a more "active" environment. The greater space in open-space schools may encourage the children to move more, and the teachers to let them move more. Moreover, movement may be less disturbing to the teacher as the larger space allows it to be more often outside his line of vision.

However, just as there are no real boundaries for a class of students or an individual teacher and they constantly step physically over their section boundaries, so some noise from their activities carries over. This constant background noise seems to make the teacher less aware of noise from his own section as well. The carpeting that was common to all the open-space schools studied reduced the noise caused by movement considerably, thus making both noise and movement less obtrusive; it also made the floor into a functional play and sitting area. When visiting self-contained classrooms (all of them without carpeting) the observers were struck by the dramatic increase in noise caused by movement of any kind. The noise factor may well contri-

bute to the much lower average level of movement in self-contained schools.

There also seems to be an "organizational rule" in open-space team teaching schools that movement is acceptable: presumably this is in part a consequence of the existence of greater movement, but such a norm can clearly also reinforce tendencies to greater movement. Principals of open-space schools seem to be proud when they can point to students moving about while showing a visitor around. Students seem to be quite aware of this: there is usually no hiding from the principal, but rather a very friendly "hello" when they meet in the hallway.

Further Analysis of the Data

The predictor variables are all correlated with one another; it is therefore possible that the effects of one variable can show up as the effects of another, or cancel out the effects of a third. Further data analysis was therefore conducted using partial correlations, controlling for the effects of other predictor variables (the sample was too small to be divided).

The first such analysis of the data considers all classrooms and those predictor variables that apply in both school types (school type, "Control Orientation" and grade level). The second analysis is confined to open-space team teaching schools. Here, teacher and principal "Control Orientation" are included as control variables; the main predictor variables are the number of different grades taught by the team, the average grade level taught, the number of hours teachers reported as spending in cooperative teaching and team size (dichotomized: two member teams versus teams of three and four members).

Table 2

Independent correlations of school type, teacher and principal "Control Orientation" and grade level with measures of the "active" classroom

(Pearson partial correlations holding the other three predictor variables constant)

N = 33

	"Movement"	"Passive"	"Doing"	"Large Group"
School Type[a]	.57**	-.47**	.32*	-.33*
Teacher Formal "Control Orientation"	-.48*	.42*	-.30	.38*
Principal Formal "Control Orientation"	-.05	-.00	-.08	.25
Grade Level[b]	-.11	.18	-.10	.21

*Significant at .05 or less
**Significant at .01 or less

[a]Self-contained classrooms have value 1, open-space value 2

[b]In mixed-grade classes "grade level" is the average grade present

Table 2 again shows clearly that school type is a major determinant of "activity", with particularly high correlations with the "Movement" variable.

Teacher and Principal Control Orientation

Table 2 shows that after controlling for school type, teacher "Control Orientation" has the strongest relationship to the "activity" measures. It is most clearly related to "Movement" and its opposite, "Passive" behavior. It is also related to "Large Group" and "Doing", but

the correlations are lower. This suggests that responses to the questionnaire relate principally to the teacher's beliefs about keeping control over children and not so much to the teaching techniques used. relationship
A two-way/was originally hypothesized between teacher "Control Orientation" and classroom "activity". It was argued that more informally oriented teachers would encourage movement; it was also expected that where a teacher experienced more movement in his classroom he would become more informally oriented. It seems very unlikely that this reverse relationship occured in the sample: we have found that in open-space team teaching schools there is more "Movement" than in self-contained classrooms; therefore, if movement affected "Control Orientation" one would expect the teachers in the open-space schools to be more informally oriented than those in self-contained classrooms. In fact, the relationship is slightly the reverse of this. The data therefore suggest that there is no significant effect of classroom movement on teacher "Control Orientation" and that informal "Control Orientation" causes greater movement in the classroom.

The limitation of the questionnaire in assessing the teacher's belief about classroom control rather than his preference for different teaching techniques becomes even more clear in Table 3. Within the open-space team teaching schools it seems that teacher "Control Orientation" is related only to the measures of "Movement" and "Passivity" and not to either "Large Group" or "Doing". It is, however, of interest that the principal's "Control Orientation" seems to be related to these two latter variables and not to "Movement" or "Passivity", though none of the correlations is statistically significant. It is possible that with

Table 3

Independent correlations of teacher and principal "Control Orientation", grade level, team size (dichotomized), number of grade levels taught by the team and teacher report of hours spent in cooperative teaching with measures of the "active" classroom in open-space classrooms with teams of 2, 3 and 4 teachers only

(Pearson partial correlations holding the other five predictor variables constant)

N = 20

	"Movement"	"Passive"	"Doing"	"Large Group"
Teacher Formal "Control Orientation"	-.46*	.41	-.00	.06
Principal Formal "Control Orientation"	-.10	-.08	-.22	.37
Grade Level[a,b]	.47	-.34	.32	-.15
Team Size[c]	.25	-.35	.50*	-.52*
Number of Grade Levels Taught by Team[b,d]	-.5[illegible]	.65**	-.57*	.54*
Teacher Report of Hours Spent in Cooperative Teaching	.33	-.13	.37	-.41

*Significant at .05 or less
**Significant at .01 or less

[a] In mixed-grade classes "grade level" is the average grade present

[b] Correlations were not hypothesized: two-tailed significance given

[c] Teams of three and four members combined, and compared with teams of two members (see footnote 27, page 30)

[d] All teams in this sample taught either one or two grade levels

teachers respond to the "Control Orientation" questionnaire in the context of what happens in the real life situation in their classrooms, the principals' responses reflect rules, or how the principal thinks classrooms in his school should be managed: a teacher has to be concerned

with the effect of teaching activities and the effect of loose and strict control over children on the atmosphere and manageability of the classroom, while the principal can afford to be more concerned with the type of teaching and learning that ought to take place. A principal who sets rules associated with "activity" might find it much more difficult to reprimand teachers for having passive or day-dreaming children than to give positive feedback to teachers who encourage "Doing" through the use of games, resource centers etc. It is virtuallyimpossible for a principal to rule that teachers must encourage movement by children, but relatively easy to state that there should be no large group instruction in the school when not absolutely necessary. Thus it is not unreasonable that principal "Control Orientation" is more related to "Doing" and "Large Group" than to "Movement" and "Passivity".

Number of Grade Levels Taught by Team

Of the twenty teams analyzed in Table 3, fourteen taught just one grade level and six had two grade levels assigned. It was originally hypothesized that the ungraded classrooms would be more "active"; however, Table 3 shows an opposite relationship -- a strong negative correlation between two grade levels per team and classroom "activity" on all four measures. This result suggests that there were organizational problems in handling two grades per team. The writer gained the impression that most of the teams in the sample

that handled two grade levels did so not because they wanted an ungraded situation per se, but rather because of limited enrollment that made it impossible to team except by combining grade levels. In consequence, it seemed there may not have been any real commitment to the idea of an ungraded classroom and no special planning to take advantage of its possible benefits or to minimize its disadvantages.[26]

Team Size and Teacher Cooperation

Nearly all the pods of the teams sampled contained six teachers, though in all but two cases the teachers organized themselves into two or more teams within the pod. We found that in most schools the teachers in the pod had originally formed one team, and that this team had then divided into smaller sub-teams. This confirmed the original hypothesis that organizational problems in large teams would lead to such a break-up. It was also predicted that large teams that did not break-up into smaller teams would not cooperate effectively and would have less "active" classrooms. Unfortunately, not enough large teams were available to test this hypothesis![27]

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[26] E.g., see Goodlad and Anderson, The Non-Graded Elementary School.

[27] We were only able to include two large teams in our sample. To avoid biasing results by including these two teams in correlations with team size (where they would have received particularly heavy weighting) correlations were calculated on the sample of open-space team teaching schools excluding these two teams. Eliminating them left ten two-member, eight three-member and two four-member teams. Again to avoid possible bias, the three and four member teams were grouped together, thus dichotomizing the variable team size in Table 3.

It was predicted that, compared to two member teams, teams of three and four members would be able to share the task of planning and managing the classroom to a greater extent, resulting in greater co-operation and a more "active" classroom. We found, as predicted, that the three and four member teams did have more "active" classrooms, particularly on the measures of "Large Group" and "Doing". The lower negative correlation with "Passive" behavior is also consistent with the hypothesis --the direct effect of planning is likely to be on the type of groupings and the multitude of activities used; less passive behavior is likely to be an indirect effect. The lowest correlation is with "Movement", which does not fully support the original prediction that more teachers could supervise proportionately more movement. The obvious interpretation is that increased ability to plan lessons with colleagues leads to a greater number of activities and fewer of the "Large Group" exercises that a solitary teacher or a two member team may use with less aggregate time for preparation available. (The greatest effect of all is in "Large Group" instruction.)

The measures of cooperation used proved to be inadequate and all predictions involving teacher cooperation remain untested. "Teacher report of hours spent in cooperative teaching" was, however, included in the partial correlations as a control variable. As was hypothesized, it correlates positively with the "active" classroom; but the correlations are not statistically significant. Whether the relatively low correlations reflect an overstatement of the original hypothesis or merely inadequacy of this measure of teacher cooperation, is impossible to say.

Table 4

Kendall correlations between grade level[a] and measures of the "active" classroom, in self-contained and open-space schools

	"Movement"	"Passive"	"Doing"	"Large Group"
Self-contained Classrooms (N = 11)	-.52*	.29	-.52*	.29
Open-space Schools (N = 22)	-.03	.01	-.09	.04

*Significant at .05 or less

[a]In mixed-grade classes "grade level" is the average grade present

Grade Level

The partial correlations in open-space team teaching schools (Table 3) show the higher grade levels as being more "active".[28] In contrast Table 4 shows that in self-contained classrooms the reverse is true: the higher grade levels are less "active", particularly as regards "Movement" and "Passive" behavior.[29] Even though these results are obtained with the use of partial correlations for the analysis of open-space team teaching schools and on a small sample, it is possible that there is a genuine difference between the school types as regards the effects of increasing grade level on "activity". This could be caused by differing

[28]This relationship does not show in Table 4. The reason being that the teachers in open-space schools in our sample are significantly more formal on "Control Orientation" in the upper grade levels; it is only when this is controlled for that the underlying relationship is measurable.

[29]If the "activity" measures in self-contained classrooms were

emphasis on curriculum. It is plausible that while an upper grade level teacher in a self-contained classroom finds himself regimented by the curriculum, members of a team can give each other support in resisting curriculum pressures. This would be supported by the findings of Meyer, Cohen et al. that teachers in self-contained classrooms were more curriculum oriented than those in open-space team teaching schools.

Summary

The predictor variables considered in the study are all related to one another; it is therefore possible that the effects of one variable can show up as the effect of another, or cancel out the effects of a third. Analysis was therefore conducted using partial correlations, controlling for the effects of other predictor variables.

Open-space architecture in combination with team teaching is strongly related to all four key measures of the "active" classroom. This relationship persists after controlling for teacher "Control Orientation" and the grade level of students being taught.

Several factors are thought to contribute to this relationship: the existence of teams of teachers may have facilitated division of the tasks of planning activities and managing the classroom, and thus led to a more "active" environment; the extra space and visibility may encourage students

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calculated after controlling for teacher "Control Orientation" (as is effected by the use of partial correlations in open-space team teaching schools), the difference would be even sharper, because teachers in the higher grade levels in our sample of self-contained classrooms were more informal on "Control Orientation" as compared to those in lower grade levels.

to move more and teachers to let them move; the carpet found in all the open-space schools observed dampened noise, and may have encouraged movement by making it less obtrusive.

Informal teacher "Control Orientation" is clearly related to greater movement and less clearly related to the use of "Large Groups" and the provision of "Doing" activities. It seems that the "Control Orientation" index is measuring an aspect of teacher attitude directly related to the incidence of movement and passivity of children in the classroom.

Within open-space schools the teams containing three and four members have more "active" classrooms than teams with just two members, particularly as measured by the use of "Large Group" instruction and the provision of "Doing" activities. It is suggested that the larger teams can collectively plan more activities for the children than isolated teachers or teams of two members. Moreover, a large team is likely to have a greater range of materials readily available, further increasing the amount of "Doing" taking place.

Teams in the sample teaching two grade levels had much less "active" classrooms than similar teams teaching one; the difficulty of handling two grade levels seems to counteract other positive teaming effects. However, it seemed that little planning had been done specifically for the ungraded situation, which was sometimes no more than a side-effect of two teachers, teaching two grade levels teaming together.

In the open-space team teaching schools there seems to be more autonomous child movement and less passive behavior in the upper grade levels than in the lower, when teacher "Control Orientation" is held

constant. This finding is particularly striking since in self-contained classrooms the upper grade levels are the less "active", presumably because of emphasis on curriculum; it seems that the open-space team teaching environment counteracts such effects.

SUGGESTIONS FOR FUTURE RESEARCH AND DISCUSSION OF POSSIBLE LONG-RANGE EFFECTS OF THE "ACTIVE" CLASSROOM

Implications of the Findings for School Design

This study documented that the school environment experienced by the student is affected by school organization: an "active" classroom is more likely to be found in an open-space team teaching school than in a self-contained classroom. Moreover, teams with three or four members are likely to have more "active" classrooms than teams with two members. If administrators wish to encourage the existence of such "active" classrooms, the building of open-space schools could be appropriate.[30]

The tendency of large teams to divide into several smaller teams indicates that large teams may experience severe organizational problems. The organization of workable teams is likely to be helped by the provision of "flexible" buildings. If the walls are movable, the internal structure of the pod can be adapted to changes in team organization.[31] A team is

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[30] In all of about fifty open-space classrooms known to the writer, the teachers formed themselves into some kind of a team. The clear implication is that open-space structure leads to teaming and that the classroom will be relatively "active".

[31] It might be dangerous to make it possible for the teachers to recreate sections within a pod which are closed and of a standard size classroom: such an extreme version of "flexibility" could enable unadventurous teachers merely to reproduce self-contained classrooms.

likely to be helped by being somewhat isolated acoustically from other teams; yet also helped if children have plenty of space in which to move, and if other teams are physically and visually close enough to encourage inter-team cooperation. It is possible to build a pod for six or eight teachers with walls that are both fairly soundproof and movable; if the walls of a team area are not completely closed, but leave a center area free, the teachers lose few of the advantages of open-space but gain in the reduction of noise (and extra space for use as bulletin boards!).

Refinement of the Research

It is left for future research to identify just how the combination of team teaching and an open-space architecture leads to an "active" classroom. In spite of the speculations above, the effects of architecture on the working of teams are not yet determined: thus, it is not known if there is a qualitative difference between teaming in an open-space school from teaming based on self-contained classrooms. It would also be desirable to know how the isolation of teams from each other or its opposite, the existence of several teams within one pod, affects cooperation within teams and among teams.

Team cooperation was not adequately measured in this study. We still believe that the degree and the type of cooperation affects classroom "activity". Clearly, however, cooperation can take many forms, and different kinds of cooperation (e.g., collegial as against hierarchical teaming) are likely to affect classroom "activity" differently.

The data showed that the size of the team correlated with the teaching techniques utilized by the teacher. An increase of team size

seemed to make it easier for the teachers to have more students involved in "Doing" activities and less "Large Group" presentations. It can be asked, more generally, if it is easier for complex teaching techniques to be adopted by larger teams.

It would be desirable for research to be pursued into the nature and degree of teacher cooperation and how it affects the teaching techniques used and, ultimately, the student. Such research could be extremely valuable to school administrators and principals, as well as to team leaders and others concerned with school organization.

Extension of the Research to the Student and Possible Long-Range Effects of the "Active" Classroom

The study has shown that some determinants of an "active" classroom are definable. Administrators can therefore consciously plan for the creation or avoidance of an "active" environment. It is difficult, however, to do so without significant knowledge of the effect of an "active" classroom on the student. In particular, data should be obtained directly from students on how they perceive their role in "active" and "inactive" classrooms: Does the student feel any greater autonomy over his own learning? To what degree does he consciously choose and evaluate different learning activities? Do students in the two school types differ in their attitudes towards school, the teachers and themselves?

It is possible that the "active" classroom that gives the child choice, opportunities to work independently and encouragement to behave actively, makes him feel he has more control over his environment and that this, in turn, may affect his expectations of the school. Students who

become used to such opportunities in lower grades may demand them in upper grades as well. The data indicate developments towards more "active" classrooms in upper-grades in open-space team teaching schools as compared to self-contained classrooms. One can easily argue that this will affect the student's expectations of secondary and higher education.

It has been found[32] that teachers in open-space team teaching schools feel greater autonomy and influence, are more "child-oriented" and are less "curriculum-oriented" than those in self-contained classrooms. The combination of this change in teacher orientation combined with the possible change in student expectation could lead to the child actually becoming a main "client" of the school, joining today's "clients": society in general and the parents of the children.

If society and the parents were to cease to be the major "clients" of the school, significant changes could ensue. The curriculum could become more responsive to the immediate demands of students, possibly tending towards elective courses. With current developments in technology, most instruction could become programmed or computerized while the teacher might become a guide and counselor, advising the child on what studies to pursue. Like the university, the school might cease to consider itself in locus parenti, but nevertheless accept greater responsibility for the emotional and intellectual development of its students. Such a change in the school's "clientele" could, however, put the school into as complicated a political situation as it has already put the university.

Ideas of this kind are certainly very speculative, but trends are already evident. If schools are not to react blindly to new pressures, more research into the impact of innovations in education is needed.

[32] Meyer, Cohen et al.

APPENDIX

Attitude Questionnaire

The following questions are about children in general. Even though children do differ from each other, please answer these questions with the "typical" child in mind.

The answering categories are: SA= strongly agree; A= agree; U= undecided; D= disagree; SD= strongly disagree.

	SA	A	U	D	SD
1. In general, school children should be allowed a lot of freedom as they carry out learning activities.					
2. A child should obtain the consent of the teacher before moving about in the classroom.					
3. Children are not mature enough to make their own decisions about their learning activities.					
4. Children get distracted when other activities are going on around them.					
5. Most children are capable of being resourceful when left on their own.					
6. Children are unlikely to learn enough if they are frequently moving about.					
7. Children should normally be encouraged to get information from each other instead of asking the teacher.					
8. Children can learn from small group discussion without the help of an adult.					
9. It is good for the child to have his activities scheduled for him.					

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TEAM TEACHING AND THE "ACTIVE" CLASSROOM

A COMPARATIVE STUDY OF THE IMPACT OF SELF-CONTAINED CLASSROOMS AND OPEN-SPACE TEAM TEACHING SCHOOLS ON CLASSROOM "ACTIVITY"

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