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**L'attitude des enseignants français relativement
au travail de groupe : Le cas des mathématiques**

**Teacher's Attitude Towards Specific
Components of Group Work in French Public
Schools: The Case of Mathematics**

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TEACHER'S ATTITUDE TOWARDS SPECIFIC COMPONENTS OF GROUP WORK IN FRENCH PUBLIC SCHOOLS: THE CASE OF MATHEMATICS

“One must make a start in any line of research, and this beginning almost always has to be a very imperfect attempt, often unsuccessful. There are truths that are unknown in the way that there are countries the best road to which can only be learned after having tried them all. Some persons have to take the risk of getting off the track in order to show the right road to others.... We are almost condemned to experience errors in order to arrive at truth”.

Denis Diderot. (Kline, 1980, p. 127)

Introduction

For those of us whose primary school was before the 70's, the idea of having a mathematics class in which the students work in groups and the teacher does not lecture, may be striking. Instead, I remember having eternal lectures followed by similarly eternal homework : a lot of exercises that promoted the assimilation of what my mathematics teacher did during the class. Things have changed, though, almost all around the world. Here in the United States the last curriculum reform promoted by the National Council of Teachers of Mathematics as a response to what was called the “rote learning” suggested that working in groups foster the critical thinking, and the communication and cooperative work skills of our future citizens. (National Council of Teachers of Mathematics, 1989, pp. 3-10) Other countries had begun a change too:¹

“For many years, France had the reputation of being a country in which, say, 7th grade students throughout the land all had their textbooks open at exactly the same page at any given time. More recently the country was associated with some of the worst excesses of modern mathematics in the classroom. The former view is now accepted as a caricature –perhaps it was once related to fact, but it is so no longer. The influences of Bourbaki have also been swept away.” (Howson, 1991, p71)

In fact the works on genetic psychology of the School of Ginebra and Piaget's work let constructivism to appear in the didactic process (Artigue, 1995a, p 46). The last reform, (1980) was done by the teachers of the APMEP, Association des Professeurs de Mathématiques de l'Enseignement Public² and supported by the IREM, Institut de Recherche sur l'Enseignement des Mathématiques.³ (Artigue, 1995b, p 104). Nevertheless, teachers' attitude to particular components of the methodology imposed by the new curriculum is changing slowly. The APMEP has published a series of evaluation documents that show how the reform has been taking place; the documents show how the

¹ Although by different reasons.

² Association of Teachers of Mathematics of Public Schools.

³ Institute for Research on Teaching of Mathematics.

content has changed, the implications for students' achievement and the implications for teachers' performance. It is interesting to see that only one question of a 30 questions test asks teachers about their perception of the group work –the methodology most common used in constructivist approaches–. Although the answers to the question seem similar from grade to grade, some differences can be seen; teachers of higher levels may perceive that this methodology is good enough for children for learning basic mathematics but that may not be so good for teaching real mathematics. That is the general problem that I want to study; a statistical analysis is required in order to support or to redefine this feeling.

Problem Statement

The purpose of this study is to compare the attitude (positive or negative) of 3rd grade teachers in public schools in France towards different components of group work in mathematics with the attitude (positive or negative) of 4th grade teachers in public schools in France towards the same components of group work in mathematics.

Research Hypotheses

It is hypothesized that there will be a statistically significant difference between the proportion of the 3rd grade teachers of French public schools who have a positive attitude towards group work and the proportion of the 4th grade teachers of French public schools who have a positive attitude towards group work.

Population

This research study addresses the population of all teachers of public schools in France that taught during the period 1990–1991 either 3rd or 4th grades.

Sample

The sample was obtained gathering the answers to a questionnaire that was sent by mail to 3,000 public schools' teachers in France. The part of the questionnaire concerning teachers' attitude towards the work group was answered by approximately 13% of the teachers I.e. about 400 questionnaires were received by the time in which the evaluation was done. This sample can not be considered as fully representative of the population, in particular because:

- Teachers who answer the questionnaire may be precisely those who, in general terms, may have a positive attitude towards teaching and in particular towards all the new ideas that help them to improve their practice;
- this implies that it is possible that we never happen to know what is the attitude of the teachers that did not have time for answering the questionnaire even having a

positive attitude;

- and then it is less plausible that we find here the opinions of those teachers who really do not like the idea of introducing group work in their classes.

For these reasons it is not possible to talk about a representative sample, and so, the conclusions that are going to be produced can probably not be generalized to the whole population addressed.

Instruments and variables

The instrument used for collecting data was a five section questionnaire with 33 questions. The section concerning group work has 10 questions, nine of them to be answered YES or NO according to a strong agreement or disagreement with the given sentence. One question referred to the willingness of teachers to devote time for work group in their classes. The items were:

1. Do you let your students work in groups of 3 or 4? (Choose one from: Never, Occasionally, Sometimes, Systematically)

On your opinion, the group work (Answer Yes or No):

2. constitutes a good motivation for students
3. can not be done when the class is big (more than 24 students)
4. is a good way to make students to produce arguments
5. demands an unnecessary amount of time
6. demands a formation that I do not have
7. leads to superficial knowledge
8. promotes the assimilation of concepts
9. develops a cooperative attitude among students
10. is difficult to use in a standard class

The Appendix contains the observed data for each question for the two samples of the two groups of teachers considered.

Statistical Analysis

The statistical test used in this study was the chi-square for testing independence of two variables. The level of significance chosen was $\alpha = 0.05$ because the main concern of the comparison was to determine if there is a difference in the teachers' attitude towards of the two groups. I am concerned about detecting differences in order to organize a deeper exploration on the problematic. Considering the size of the sample, $N \approx 400$, I have a big

concern with reducing the chances of making a Type II error. If I find a statistically significant difference I want to refine the process and analyze possible causes of the phenomenon.

Findings

The following table shows the value for the chi-squared test for each of the 10 questions, and the probability of occurrence of that value (See Appendix for the complete data set).

Table 1: Chi-squared Value for the Questions of the Test

Question	Actual χ^2	d. f.	Probability
1	6.1783	3	0.10325
2	0.1151	1	0.74750
3	0.4451	1	0.50999
4	0.3155	1	0.57899
5	8.4129	1	0.00209
6	1.2324	1	0.26865
7	0.8686	1	0.35540
8	0.5236	1	0.47358
9	2.4607	1	0.11807
10	1.642	1	0.20139

The findings of this study do not support the research hypothesis. For question 1, in order for the hypothesis to be rejected at the 0.05 level of significance, with 3 degrees of freedom, it was necessary to have a χ^2 value as big as 7.81473. For questions 2 to 10, in order for the hypothesis be rejected at the 0.05 level of significance, with 1 degree of freedom, it was necessary to have a χ^2 value as big as 3.841. Observe that only question 5 shows a significant value for rejecting the null hypothesis.

Conclusions

The study compared the attitude of two groups of teachers of public schools in France towards some components of the work group. The information available does not support to hypothesis that there is a statistically significant difference between teacher's attitudes for different grades, which implies that teacher's attitude towards group work in classroom is not affected by the grade they are teaching.

This study suggests that teachers do not change their attitude towards group work in the classroom when they teach higher levels. A possible explanation may be that the grades tested are quite similar, third and fourth grades. Nevertheless is worth to note that contrary to what the researcher suspected, the component of time (Question 5) suggests that there is a difference between third grade teachers' perception of the quality of the time used in the work group compared to that of the fourth grade teachers. The proportions suggest that third grade teachers may think that the methodology demands

an unnecessary amount of time, while the fourth grade teachers have a better perception of the process at this respect.

Application

The conclusions made upon the data available have to be used carefully. As Dr. Antoine Bodin says:

I suggest just to keep the teachers' results for research hypothesis or tendencies indicators. (Bodin, 19 May 1996, E-mail communication)

So any recommendation derived from this study has the character of suggest more research rather than recommend specific changes. The data offer different possibilities for analysis, their results can guide future decision making processes about, for example, teacher training programs, or workshops designs.

An analysis of teacher's attitudes towards group work when they teach different grades, primary and secondary, may show different tendencies. This can be used as a new starting point for future studies. It is important to consider also the size of the samples. Although 400 questionnaires were received, only 300 were used for analyzing the work group aspect: those that had answers to the corresponding set of questions. As pointed in the Sample section (See p. 3) the sample can not be considered as representative, for the whole population of teachers in public French schools. The interesting question would be: How to guarantee that the 3,000 teachers will answer all the questions that refer to their practice? This sample would be more representative and the conclusions derived using it would be more reliable.

Finally, we must be aware that, as Diderot says, there may be truths that we will never be able to disclose. Nevertheless, I think, that there is where statistics shows its value for research in education.

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