

The Effect of Video Episodes on School Children's Knowledge of Mathematics, Science and Values

DE VERA, Marina Kathlyne

ABS-CBN Foundation, Inc.

CRUZ, Darlene Dolly

ABS-CBN Foundation, Inc.

IBE, Milagros

Consultant, ABS-CBN Foundation, Inc.

Abstract: The effectiveness of video episodes on elementary school children's achievement in three school subjects was assessed through a quasi-experimental study using two elementary schools. One school served as the control school, the other was the experimental school. The two schools are about 100 km away from each other to offset contamination effects. Pupils in Grades 3, 4, 5 and 6 in the experimental school were exposed to educational video episodes in Science, Mathematics and Values (which is part of the learning competencies in a group of subjects anchored on Social Studies). Viewings were done at least twice a week in each subject. The video episodes were on compact discs (CDs) as part of Educational Television (ETV) learning packages, which come with a TV set. Counterpart classes in the four grade levels from the control school were not exposed to the educational video viewing or ETV viewing in class. Pupils from both schools were given a test in Mathematics, Science and Values before the start of the experiment. The tests were on topics, scheduled for the period quarter as indicated in the national curriculum for the subjects under study, and for which the episodes closely related were chosen. Twelve weeks after, the same tests in Science, Mathematics and Values were administered as posttests. Posttest scores as well as mean gain scores from the two schools were compared by grade level in Science, Mathematics and Values. Results showed significant differences both in the posttest scores and gain scores from the pretest to the posttest in Grades 5 and 6. Numerical differences in favor of the groups exposed to the video episodes were also found among Grades 3 and 4 samples. However some of the differences failed to reach the .05 level of significance, indicating a greater impact of the use of video episodes on 5th and 6th grade pupils.

Keywords: Educational Television Shows, Values Formation, Academic Learning, Academic-related attitudes and behaviors, Philippine Setting

The State of Philippine Education

Several economic realities beset Philippine Education. Public School students and teachers endure a learning environment beleaguered by shortages in classrooms, teachers and textbooks. The Philippines' Department of Education needs 8,684 classrooms, 2.24 M seats and 26.85 M textbooks, to fill in the gaps. There also have been numerous recommendations to strengthen teaching competencies of incumbent educators.

It is therefore not surprising to find out the general poor student academic performance in the fields of Math, Science and English. Statistics from the most recent National Achievement Test reveal that elementary public school students barely reach the 60% mark. They scored 59% in Math, 54 % in Science and 59% in English.

Aside from poor student performance, another significant challenge faced by the Department of Education is a very alarming high drop-out rate.

These problems have been attributed, by numerous state agencies and reputable assessments, to the following factors: poor reading comprehension; poor teaching preparation and large class sizes. Results of nationwide tests likewise show poor English comprehension and proficiency among public school students and teachers. Moreover, schools lack teaching and learning materials that promote both independent learning and cooperative learning activities. This is aggravated by the current economic condition of the country, wherein majority of public school children are among those from the poorest sector. As such, children suffer from weak family and home environment as well as malnutrition. With poor value formation and an empty stomach, the challenge is to design creative and innovative strategies which make students learn better and be motivated to stay in school as well as strategies to help teachers become better effective facilitators of learning.

The Initiatives

Alarmed with this state of education, ABS-CBN Foundation, Inc (AFI), the corporate social responsibility arm of one of the biggest television networks in the country, conceptualized, produced and aired supplementary instructional materials.

In 1994, AFI took on the challenge of developing high quality and locally produced educational television shows to supplement the existing national curriculum. The shows were produced in partnership with the Department of Education (DepEd). This paved the way for the production, airing in free television channels and eventual distribution in video formats of educational shows such as *Sine'skwela* (for science), *Mathinik* (for Mathematics), *Bayani* and *Hirayamanawari* (for values formation), *Epol-Apple* (for English) and *Pahina* (for Philippine Literature).

To date, in partnership with various government agencies and officials, for-profit corporations, civil society organizations and private individuals, more than 8,000 public elementary schools have benefited from the Educational Television Infrastructure Project (ETV Project). Majority of these schools received one (1) TV set, one (1) Visual Player Playback Device and a complete set of ETV videos either in VHS Format or DVDs.

The Research Study

To ascertain if the ETV Project was indeed creating a difference in the lives of Filipino children, the Research and Teacher Training Department was mandated to conduct an in-depth Impact Assessment.

The study utilized triangulation in data collection. The aim was to provide a more comprehensive and holistic information on the Impact of the shows. The study measured the impact of the shows on students, teachers and the entire school setting. Communities, represented by parents, were included as additional sources of information.

Furthermore, the study provided information on the impact of the shows not only on students' academic performance but also on students' value-formation and subject-related attitudes and behavior.

The Research Objectives

- To determine if the ETV Project is creating a difference in students' academic learning, specifically in the areas of Science and Math.
- To measure the effects of the project on students' academic-related attitudes and behaviors.

- To identify the benefits of the project on students' value system.

The Research Design

The study used the *Separate Posttest-Pretest Control Group Design*. Pretests were administered prior to the implementation of the project. The posttests, on the other hand, were conducted 12 weeks after the administration of the pretests. ETV Viewing sessions, for the experimental group only, were introduced and implemented during the 12-week period. The ETV Viewing sessions were held at least twice a week. The control group, however, continued their regular classroom activities i.e. lecture recitation, evaluation, etc. The researchers made sure that the control school had no access to AFI-produced educational shows.

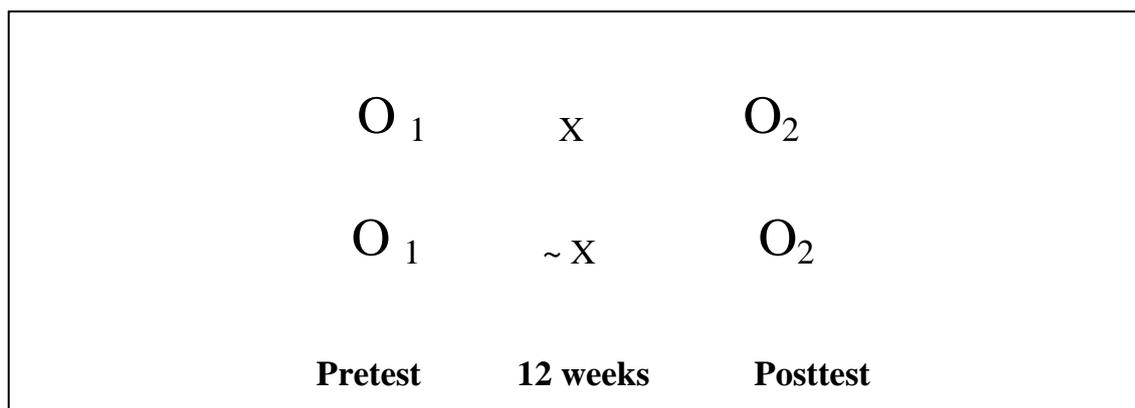


Figure 1: *Research Design*

Pretests were administered in August 2005. Site Visits and monitoring visits were conducted twice during the three-month period of project implementation. In November 2005, posttests were conducted. Interviews and focus group discussion with students, teachers, school heads, parents and field workers were likewise carried out during the posttest.

Sampling Design

Purposive Sampling Design was used to identify the respondents. Two comparable schools were selected to participate in the study. Subjects were matched based on their National Achievement Test Ratings and Average Class Grades.

San Isidro Elementary School, which is located in Aurora Province, was used as the Experimental Group. The Control School was selected from a nearby province. La Fuente Elementary School served as the Control School. To avoid contamination effects, the schools are situated at least 100 km away from each other.

Instruments

School Profile Form - This served as the basis for experimental-control school matching. Variables included in the form were enrolment profile, students' academic performance ratings, school facilities, teacher competencies, etc.

Achievement Tests- The assessment tests were constructed by the Test Consultants with the aim of gauging students' aptitude level on learning objectives found both in the DepEd

curriculum and in the DVD Package. The tests were administered to Grades 2 to 6 students and were focused on Math and Science.

Student Attitude Questionnaire - The questionnaire was constructed by the Research and Teacher Training Department to measure specific academic-related attitudes. Variables included in the questionnaire were perceived interest, ease, relevance, and felt confidence. This instrument was likewise subjected to validity and reliability tests.

Projective Tests- The tests were designed to measure students’ value-system. Items were anchored on Dr. Sutaria’s Values Framework and on specific *Hirayamanawari* and *Bayani* Value Foci. The researchers utilized the comic-strip format. The tests were constructed and pilot-tested by the Research and Teacher Training Department in comparable school.

Site Visit Checklist – The checklist is composed of three components, the physical set-up assessment, the observation checklist and the interview guide. The instruments were used by field researchers during the conduct of monthly monitoring visits.

FGD Guides/ One-on-one Interviews – To validate the results of the quantitative measures, qualitative data were collected through one-on-one interviews and focus group discussions. The target respondents for the interview sessions were selected students, teachers, school heads, district supervisors and parents.

Results

Significant differences between mean scores were computed using the Independent-samples t-test. It was difficult to compare the achievement test pretest scores because the scores were erratic, indicating initial noncomparability. The gain scores, therefore, could not be reliably based on the change scores from pretest to posttest. Thus, only posttest scores of the experimental and control schools were compared statistically.

Achievement Test

➤ **Science**

The figure below shows the posttest mean scores of the experimental and control groups per grade level. There were non- significant differences in Grade 3. However, for grades 4 to 6, differences were significant at the .05 level. It can be seen that for these grade levels, the experimental group had significantly higher scores compared to the control group.

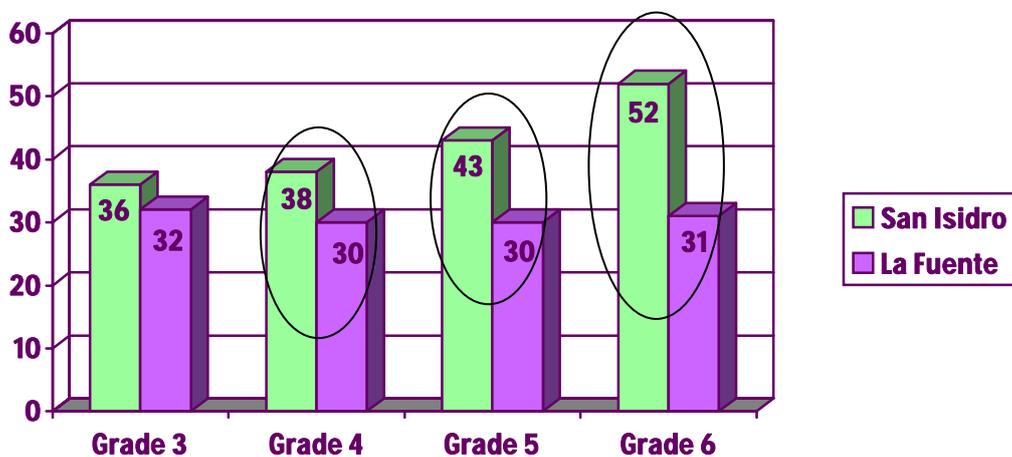


Figure 2: Comparison of Science Achievement Test Scores (scores in %)

Item analyses revealed that the experimental group scored higher than the control group in the following science concepts.

Table 1: Science concepts successfully learned by the Experimental Group (E>C)

Grade 4	Grade 5	Grade 6
<ul style="list-style-type: none"> ➤ Skeletal System ➤ Digestive System ➤ Asexual Reproduction 	<ul style="list-style-type: none"> ➤ Photosynthesis ➤ Electric Circuit ➤ Kidney and urinary system 	<ul style="list-style-type: none"> ➤ Blood ➤ Growth and Development ➤ Nervous System ➤ Diseases ➤ Food Chain ➤ Ecosystem ➤ Solar Energy ➤ Marine Organisms ➤ Force and Motion ➤ Typhoon

Math

At the Primary Level (Grades 2 & 3), there is not much difference between effects in the Experimental and Control schools. However, there are significantly higher experimental groups scores in Grades 5 & 6. Specifically, in Grade 6, the experimental group scored 45% higher than the control group.

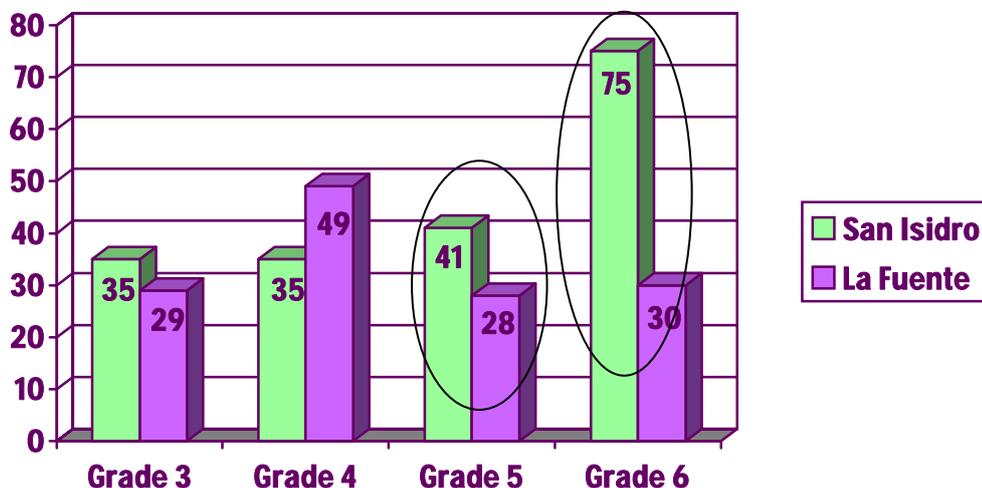


Figure 3: Comparison of Math Achievement Test Scores (scores in %)

The experimental group performed better than the control in the following items:

Table 2: Mathematical concepts successfully learned by the Experimental Group (E>C)

Grade 5	Grade 6
<ul style="list-style-type: none"> ➤ Division ➤ Decimals 	<ul style="list-style-type: none"> ➤ Patterns ➤ Multiplication

<ul style="list-style-type: none"> ➤ Fractions 	<ul style="list-style-type: none"> ➤ Division ➤ Average ➤ Decimals ➤ Divisibility Rules ➤ Fractions ➤ Ratio and proportion ➤ Symmetry ➤ Metric ➤ Graph ➤ Integers ➤ Algebra
---	--

Results of the achievement tests were likewise validated by the interview and focus group discussion data. According to the parents, ETV Viewing in school resulted to better comprehension of scientific and mathematical concepts. Specific concepts cited as learned well were: solar system, experimentation, problem solving, determining the most appropriate formula in solving math problems and proper waste disposal.

The teachers likewise shared some significant observations vis-a-vis their students' academic performance. Apparently, children who were exposed to ETV were able to deal with higher-order questions and thought processes. Aside from having a better grasp of scientific and mathematical concepts, experimental students were likewise able to apply these concepts in practical and everyday situations. Thus, making mathematical and scientific concepts relevant in their daily life.

Academic-related Attitudes and Behaviors

In general, there were non-significant differences in the two schools in attitudes toward school subjects. There were likewise minimal gains. However, Grade 6 experimental group's score in their attitude towards Math was significantly higher compared to that of the control group. It was likewise observed that in the same group, students were more interested in Math. Differences between the experimental group's and control group's total score and interest in math were significant at .05 level.

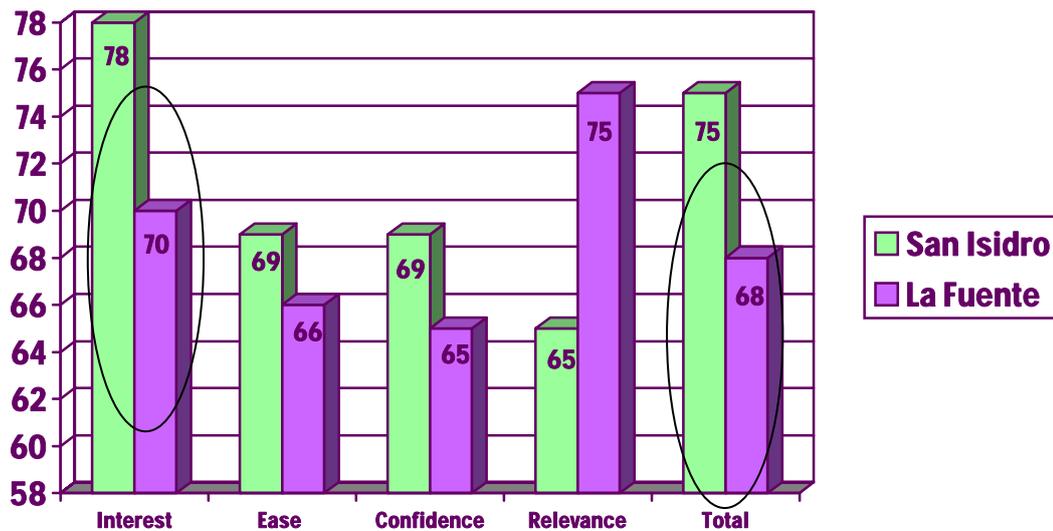


Figure 4: Respondents' attitude towards Math (Grade 6)

In terms of their attitude towards their Social Studies, the grade 6 experimental group perceived this subject as more relevant in their everyday life.

Qualitative data gathered through the interviews suggest that students exposed to ETV were more participative during class discussions, were more motivated to study and displayed positive changes in attitudes and behavior.

The parents likewise noted that due to ETV Viewing, their children are more disciplined, have higher motivation to study and finish their education. They also mentioned that their children are able to apply lessons learned from the episodes to actual and real life situations.

Values Formation

Content analyses of students' responses to the comic strips show that students in both schools consistently displayed positive values. However, significantly better and more stable values are indicated in the intermediate grades in the experimental group.

Students exposed to the educational shows, learned and imbibed values - - further showing that ETV Viewing does not only address students' poor concept comprehension but also promotes better values system. The values are:

Primary Level (Grades 2-4)

- Good relationship with members of the Family
- Concern for father
- Perseverance
- Admitting one's mistakes; apologizing for them and being ready to bear the consequences
- Willingness to bear sacrifices

Intermediate Level (Grades 5-6)

- Performing one's duties and responsibilities
- Consideration for the feelings of others
- Harmonious relationship with members of the family

- Respecting the worth and dignity of every individual
- Perseverance
- Promoting the welfare of others

In the same vein, according to the parents, the characters in the episodes provide good role models to the children.

Over-all Impressions

In subject achievement, attitudes and values more positive effects were observed in the intermediate grades than in the primary grades. Content analyses of the episodes vis-à-vis the existing Department of Education Curriculum, show that episodes intended for the intermediate level were more closely matched with the required learning competencies.

In Grades 5 & 6, the Experimental group scored significantly higher than the Control group in Science and Math. During the monitoring visits, it was observed that Grade 6 students in the experimental group had more regular and frequent exposure to ETV shows, since they had their own TV set in the classroom.

In Grade 4, the experimental group obtained significantly higher scores in Science as opposed to the control group.

In Grades 2 and 3, there were no significant differences between the experimental and control schools.

In two cases, the control group scored higher than the experimental group.

In terms of values, more learning was observed in Grades 5 & 6. Values were likewise sustained over the treatment period.

Students exposed to the educational video materials likewise displayed significant changes in their attitude and behavior towards school, specifically in the fields of science and math. In the experimental school, there was a marked increase in students' participation. Further, it was observed that the video materials encouraged the use of higher thought processes. ETV likewise contributed to students' increased motivation to study and work.

Recommendations

ABS-CBN Foundation's educational video materials showed positive benefits in students' academic learning, academic-related attitudes and value formation. Thus, it is recommended that the Department of Education should encourage the use of ETV materials in all schools. ETV resources should also be given to more schools. These can fill in the gaps in terms of lack of textbooks and other innovative teaching materials. As cited in the study the materials can likewise contribute in the improvement of students' concept understanding and interest in school.

Following the success of these shows, development, production and distribution of high quality, locally produced educational materials should be encouraged and pursued. The shows should be based on local development frameworks and the national curriculum.