

Effectiveness of Foldables™ Versus Lecture/Worksheet In Teaching Social Studies In Third Grade Classrooms

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Abstract

Foldables™ are interactive graphic organizers which encourage student ownership of study material, provide a kinesthetic component to teaching strategies, and promote long-term retention of academic lessons. This study examined the use of Foldables™ to promote the reading and retention of social studies information with third grade students and to enhance their attitude toward social studies. During the winter of 2007, two randomly selected third grade classrooms ($N=56$) served as treatment and control groups. The treatment group was taught (for two weeks) a social studies unit on history timelines using Foldables™ as presented by Dinah Might Adventures (2007), while the control group was taught using lecture and worksheets. For a second two week unit on maps, a reversal occurred wherein the experimental treatment group from the first two weeks became the control group and the control group from the first two weeks became the experimental group. Both control and treatment groups were given pre-tests and post-tests on cognitive and affective aspects of social studies. For analyses, all treatment groups' results were combined as were the results for the control groups. Pretest scores, changes from pretest to posttest, and net gain scores were compared for the treatment and control groups in both domains (cognitive and affective).

Test results indicated that the group taught with Foldables™ had a significant increase in affective scores from pretest to posttest, while the control group did not. The net gain score, however, was not significantly different ($p=.056$). In the cognitive domain both groups had significant increases from pretest to posttest, with no significant difference in net gain scores. These findings suggest that Foldables™ may have a more positive influence than lecture/worksheet in the affective domain while working as well in the cognitive domain. Further research on the effectiveness of Foldables™ in other discipline areas and with other age groups is recommended.

Introduction

Good educators are always looking for effective ways to improve students' learning and interest in academic subjects. Any activity that promotes reading and encourages critical thinking is especially valued by teachers. Among the methods used by educators to address these issues include those developed and promoted by Dinah Zike (Dinah-Might Adventures, LP 2007a). One of the key developments promoted by Zike is the use of Foldables™ in the classroom (Dinah-Might Adventures, LP 2007b). These are three-dimensional hands-on manipulatives and graphic organizers. According to literature provided by Zike, these graphic organizers:

...quickly organize, display and arrange data making it easier for students to grasp concepts, theories, processes, facts, and ideas, or to sequence events as outlined in the content standards.

...result in student-made study guides that are compiled as students listen for main ideas, read for main ideas, or conduct research.

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...provide a multitude of creative formats in which students can present projects, research, experiment results, and inquiry based reports instead of typical poster board or science fair formats.

...replace teacher-generated writing or photocopied sheets with student-generated print.

...incorporate such skills as comparing and contrasting, cause and effect, and similarities and differences into daily work and long-term projects. For example, these graphic organizers can be used to compare and contrast student explanations of inquiry based questions to explanations currently accepted by scientists.

...continue to "immerse" students in previously learned vocabulary, concepts, generalizations, ideas, theories, etc. providing them with a strong foundation upon which they can build with newly learned knowledge, observations, and concepts.

...can be used by students or teachers to easily communicate data through graphics, tables, charts, diagrams, models and Venn diagrams.

...allow students to make their own journals for recording qualitative and quantitative observations.

...Can be used as alternative assessment tools by teachers to evaluate student progress or by students to evaluate their own progress.

...integrate language arts, social studies, mathematics, and science....

...provide a sense of student "ownership" or investiture in the curriculum. (Dinah-Might Adventures, LP 2007c, 2)

Although there is much commercial information regarding the use of Foldables™ in the classroom, experimental, peer reviewed studies of their effectiveness were not found in an extensive review of the literature. Anecdotal evidence was prevalent on the internet with some home-school parents finding these particularly useful and some even giving specific examples of uses ("Using", 2004). Some of Zike's books of activities have been favorably reviewed as well (Angus 1993; Landis 1994; Pearce 1994; "And the Winners Are" 1996), however, no studies of the effectiveness of Foldables™ were discovered. This study, therefore, examined the use of Foldables™ in third grade classrooms. Specifically, comparisons (on cognitive and affective assessment measures) were made between those taught using Foldables™ and those taught using lecture with worksheets.

Methods

This study took place in the winter of 2007 in an elementary school in a rural community in East Tennessee. Manufacturing and retail are the major area employers and residents are in the low to middle income level. The “city” has just over 16,000 residents, while the county where the city is located has just over 65,000. A liberal arts college draws approximately 500 additional residents to the community.

Participants. One out of 11 elementary schools in the county was selected for this study. This school was selected based on convenience. The K-5 school where the study took place had 625 students enrolled (96.5% White, 1.3% Black, 2.1% Asian, .2% Other) with 63% receiving free or reduced lunch (an indicator of family income level). Third graders were selected for this study as being typical of elementary aged students, although Foldables™ can be used for any age group, from kindergarten through college. Out of five third grade classrooms, three were randomly selected to participate in the study. The first classroom is referred to Classroom A, while the second one is referred to as Classroom B. For this study, students from the third classroom were randomly divided in half with half the students joining Classroom A and half joining Classroom B. The resulting gender distribution for Classroom A was 15 male and 14 female, while for Classroom B it was 16 male and 11 female.

Procedures. A pretest-posttest control group experimental design was used in this study. Since randomly assigning students to experimental and treatment groups was not possible (i.e. existing classrooms were used), a reversal element was also included in the experiment. In the first two week period of instruction (on history timelines) Classroom A (n=29) served as the control group while Classroom B (n=27) served as the treatment group. In the second two week period of instruction (on maps), Classroom B became the control group while Classroom A served as the treatment group (see Table 1).

Table 1

Experimental Design

Subject Taught	Classroom A (n=29)	Classroom B (n=27)
History Timelines*	CONTROL GROUP (Lecture/Worksheet) Pretests given on affective and cognitive domains; unit taught; affective and cognitive posttests given	TREATMENT GROUP (Foldables™) Pretests given on affective and cognitive domains; unit taught; affective and cognitive posttests given
Maps Unit)	TREATMENT GROUP (Foldables™) Pretest given on cognitive domain; unit taught; affective and cognitive posttests given	CONTROL GROUP (Lecture/Worksheet) Pretest given on cognitive domain; unit taught; affective and cognitive posttests given

*Note that the affective posttest given after History Timelines served as the pretest affective measure on the Maps Unit)

Two social studies units were taught in the classrooms; one on history timelines and one on maps. A college-level professor of education with lengthy experience in K-12 teaching and administration served as the instructor for all treatment and control groups. The treatment groups were taught the subject matter through the use of Foldables™, while the control groups were taught the subject matter using lecture with worksheets. The Tennessee Social Studies Curriculum Standards (Tennessee State Board of Education, 2001) served as the guidelines for developing the lectures and worksheets. Information from Zike (Dinah-Might Adventures, LP 2007c) as well as the Social Studies Curriculum Standards (Tennessee State Board of Education 2001) served as guidelines for developing the Foldables™. The performance indicator targeted for history timelines units was:

3.5.spi.2. - *Use a timeline to determine the order of a historical sequence of events.*

The performance indicators targeted in the maps unit were:

3.3.spi.2 - *Recognize and use a map key*

3.3.spi.3 - *Find a specific location on a school or community map*

3.3.spi.4 - *Use absolute and relative locations to identify places on a map (i.e. north, south, east, west, borders, lines of longitude and latitude, the equator, and the north and south poles)*

3.3.spi.6 - *Utilize skills to locate a place using cardinal directions and symbols given an appropriate map with a key.*

At the outset of the first instructional unit (history timelines) an affective measure of attitude toward social studies was administered to each student, along with a cognitive measure of subject matter knowledge (on history timelines). These were the pretest measures. The affective measure asked students to respond (on a five point scale) to eight statements (e.g., *I like it when we read in social studies*). The history timelines measure contained six open ended questions about when Ben Franklin was born, went to France, got interested in electricity, etc. At the end of the first instructional unit, the affective measure of attitude toward social studies was again administered, along with the cognitive measure on history timelines. These were the posttest measures. The treatment and control groups were then switched and another cognitive measure of subject matter knowledge (on maps) was given as a pretest to each group. The maps cognitive measure included 15 questions (fill-in-the-blank and matching) that focused on such things as finding locations on a map and identifying whether a certain street was east, west, north or south of another street. The posttest affective measure from the first instructional time period served as the pretest for the second instructional time period. At the end of the second instructional unit (on maps), the affective measure of attitude toward social studies was again administered along with the cognitive measure of subject matter knowledge on maps. The cognitive tests were developed based on guidelines provided by EdHelper.com.

Data analysis techniques. For analyses, all those taught with Foldables™ on both units were combined and are referred to as the Foldables™ group. All those taught with lectures and worksheets were combined and are referred to as the Lecture/Worksheet group. The pretest scores for the Foldables™ and Lecture/Worksheet groups were first compared using a t-test for independent samples to ensure groups were equivalent on the affective as well as the cognitive domains. Then, using a paired (non-independent) samples t-test, the pretest and posttest scores were compared separately for each group to see if a significant increase took place in both the affective and cognitive domains. Finally, net gain scores were calculated by subtracting the pretest scores from the posttest scores for each group in each domain. These net gain scores were

then compared using a t-test for independent samples for both affective and cognitive domains. For all significance tests the alpha level was set at .05. Cohen's d was used to determine effect size for any significant test results.

Results

This study focused on a comparison of two teaching methods (Lecture/Worksheet versus Foldables™) with 56 students in two classrooms (note that the number in each group varies in each test due to students missing class on dates when assessments occurred). Classroom A (n=29) was initially taught history timelines using Lecture/Worksheet while Classroom B (n=27) was taught history timelines using Foldables™. The teaching method was then reversed for the two groups (for a unit on maps). Classroom A was taught maps using Foldables™ while Classroom B was taught maps using Lecture/Worksheet. The results of tests in history timelines and maps units were combined and reported by method used (Lecture/Worksheets versus Foldables™.) Results were compared in both the cognitive and affective domains. Affective results are discussed first, followed by cognitive results.

Affective domain results. Initially the pretest affective scores of the two groups were compared to ensure that they had equivalent attitudes toward the social studies discipline. Table 2 indicates that the two groups were statistically equivalent on the pretests. The changes in affective scores from pretest to posttest for each group (Lecture/Worksheet and Foldables™) were then compared using a paired samples t-test. Table 2 indicates that the Lecture/Worksheet group had a .69 point mean gain from pretest to posttest, which was not statistically significant, while the Foldables™ group had a 2.67 point mean gain from pretest to posttest, which was statistically significant ($t = 3.729; p = .001$). Cohen's d for non-independent t-test results indicated this was a moderate effect size ($d = .55$). Finally, the affective domain net gain scores (posttest minus pretest) were compared for the Lecture/Worksheet and Foldables™ groups. Table 2 indicates no significant differences in net gain scores ($p=.056$).

Table 2

Affective Domain Comparisons

		Standard			
		Standard	Deviation	Error of the	Significance Test
		N*	Mean	Mean	Results
Pretest Comparisons					
By Method					
Lecture/Worksheet	52	28.5577	6.42731	.89131	<i>t</i> =.479
Foldables™	52	28.0000	5.39426	.74805	<i>p</i> =.633 <i>df</i> =102
Lecture/Worksheet					
Method					
Pretest to Posttest					
Comparison					
Pretest	49	28.5714	6.58597	.94085	<i>t</i> =.950
Posttest	49	29.2653	6.44779	.92111	<i>p</i> =.347 <i>df</i> =48
Foldables™ Method					
Pretest to Posttest					
Comparison					
Pretest	46	27.5000	5.48432	.80862	<i>t</i> =3.729**
Posttest	46	30.1739	6.25852	.92277	<i>p</i> =.001 <i>df</i> =45
Gain Score Comparisons					
by Method					
Lecture/Worksheet	49	.6939	5.11209	.73030	<i>t</i> =1.932
Foldables™	46	2.6739	4.86280	.71698	<i>p</i> =.056 <i>df</i> =93

*Note: N varies based on the number of students present for assessments

** *p* < .05, two-tailed test; Effect size calculation for non-independent t-test Cohen's *d* = .55

Cognitive domain results. Initially the pretest cognitive scores of the two groups were compared to ensure that they had equivalent knowledge levels in the subjects being taught. Table 3 indicates that the two groups were equivalent on the pretests. The changes in cognitive scores from pretest to posttest for each group (Lecture/Worksheet and Foldables™) were compared using a paired samples t-test. Table 3 indicates that the Lecture/Worksheet group had a 13.81 point mean gain from pretest to posttest, which was statistically significant, while the Foldables™ group had a 17.68 point mean gain from pretest to posttest, which was also statistically significant. Finally, the cognitive domain net gain scores (posttest minus pretest) were compared for the Lecture/Worksheet and Foldables™ groups. Table 3 indicates no significant differences in net gain scores (*p*=.468).

Table 3

Cognitive Domain Comparisons

<i>Pretest Comparisons By Method</i>	N	Mean	Standard Deviation	Standard Error of the Mean	Significance Test Results
Lecture/Worksheet	51	56.9882	28.23978	3.95436	$t=.141$
Foldables™	51	56.2471	24.67795	3.45560	$p=.888$ $df=100$
<hr/>					
<i>Lecture/Worksheet Method</i>					
<i>Pretest to Posttest Comparison</i>					
Pretest	48	57.9854	27.86064	4.02134	$t=-3.518$
Posttest	48	71.7917	26.16623	3.77677	$p=.001$ $df=47$
<hr/>					
<i>Foldables™ Method</i>					
<i>Pretest to Posttest Comparison</i>					
Pretest	46	54.7935	24.17648	3.56463	$t=-4.955$
Posttest	46	72.4739	19.45550	2.86856	$p=.000$ $df=45$
<hr/>					
<i>Gain Score Comparisons by Method</i>					
Lecture/Worksheet	48	13.8063	27.18680	3.92408	$t=.729$
Foldables™	46	17.6804	24.19937	3.56800	$p=.468$ $df=92$

*Note: N varies based on the number of students present for assessments

Conclusion

This study was designed to compare the effectiveness of two teaching methods (Lecture/Worksheet and Foldables™). In the affective domain, the Lecture/Worksheet and Foldables™ groups had equivalent pretest scores, meaning they were equivalent in attitudes toward social studies at the beginning of the units. Only those taught with Foldables™ had a significant increase from pretest to posttest on affective scores, however, the mean net gain scores for the Foldables™ group ($M=2.67$ points) was not significantly higher ($p=.056$) than the mean net gain for the Lecture/Worksheet group ($M=.69$ points). There was a 5.6% chance that the difference in the net gain scores was due to random sampling error.

In the cognitive domain, the Lecture/Worksheet and Foldables™ groups had equivalent pretest scores on the cognitive tests. Both groups had significant increases from pretest to posttest, however, the mean net gain scores for the Foldables™ group ($M=17.68$ points) was not significantly higher ($p=.468$) than the mean net gain for the Lecture/Worksheet group ($M=13.81$ points).

The experimental data indicated that Foldables™ are a promising alternative to the traditional method of Lecture/Worksheet. Using Foldables™ significantly improved students' attitudes toward the discipline while at the same time working as well as the Lecture/Worksheet method in the cognitive domain. Additionally, teachers who participated in the study commented about the improvement in attitudes when using the Foldables™. Furthermore, several teachers indicated that students were applying the Foldables™ across the curriculum, for example, using them to learn fractions as a part of a math unit. One teacher commented that when using Foldables™ there were fewer discipline problems since the students remained more engaged with the material. Another teacher indicated that her "overall impression from the students regarding social studies had been somewhat negative", but following the unit taught with Foldables™ "the students were excited and motivated". All comments received from both teachers and students regarding the use of Foldables™ were highly positive.

Further research, particularly in different discipline areas and with other age levels of students, is needed to more firmly establish the effectiveness of Foldables™ in the affective domain. Additional research may show an advantage in the cognitive domain as well. Any method which improves students' attitudes while involving them in reading, critical thinking, and kinesthetic learning should be pursued. This preliminary research indicated that an improvement in attitude is possible through the use of the Foldables™ technique.

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