

A Comparison of Evaluation of Digital Versatile Disc (DVD) Instruction and Live Instruction in Third Grade Classrooms



*Jenise C. Platt¹, Clinton P. Rusk¹, Christine R. Blomeke¹,
B. Allen Talbert¹, and Mickey A. Latour²*
**Purdue University
West Lafayette, IN 47907**

Abstract

The purpose of this study was to compare the performance of third grade students receiving classroom instruction from a teacher, along with hands-on learning materials and live animals, versus the same instruction taught from a recorded lecture on a Digital Versatile Disc (DVD) without live animals in the classroom. Six schools were randomly assigned to either DVD or live instruction teaching method. Eight of the classrooms within these schools utilized DVD instruction and six classrooms received live instruction. The students were evaluated using a 30 question pre- and post-evaluation instrument. Overall, the type of instruction did not affect the increase in student knowledge. DVD classrooms had a pre-test mean score of 61.9% and a post-test mean score of 80.5%, which represents an increase of 18.4%. Live instruction classrooms had a pre-evaluation mean score of 63% and a post-test score of 84.8%, which represents an increase of 21.8%. The results of this study indicate that DVD instruction is equally as effective as live instruction at increasing the knowledge of third grade students about general poultry information, food nutrition, food safety, eggs, and the function of incubators.

Introduction

Digital based instruction is rapidly gaining acceptance as an alternative to traditional classroom instruction (Rahm and Reed, 1997). The development driving digital learning is becoming more technologically sophisticated. Only a few years ago, most Internet courses were conducted using various combinations of media formats; e.g., e-mail, web sites, and bulletin boards (Dumont, 1996), but today, new instructional software makes it possible for courses to be conducted on a single platform and considerably more advanced. Advancements in software have made teaching via digital media more accessible to less-technologically savvy faculty members and in turn, accelerated the use of alternative teaching styles. Although there is substantial debate on the merits of digital-based education versus the traditional classroom (Dumont, 1996; Rahm and Reed, 1997), competitive pressures are

driving the push for more digital courses (Gilbert, 1996). In a comprehensive meta analysis of over 200 articles, the comparison of distance education vs. traditional learning was shown to be equal in terms of learner outcomes (Bernard et al., 2004).

A vibrant educational program developed at Purdue University and delivered to hundreds of classrooms throughout Indiana, entitled "Incubators in the Classroom," was designed to improve the learning of scientific Agricultural concepts in elementary schools (Meunier et al., 2002). This particular program is taught daily for thirty-minutes in five sessions and incorporates newly hatched chicks. What is unknown and important to the present study is: Do live chick demonstrations enhance learning vs. using the same materials in a recorded manner? The importance of testing this notion is critical to how this program or perhaps similar ones will be conducted in the future, because putting live animals in a classroom is not widely supported, as they must be carefully monitored from a human risk standpoint. Moreover, the accountability for animals and their welfare must be carefully considered when developing learning materials, procedures for proper animal handling and general husbandry guidelines.

Therefore, the purpose of this study was to evaluate third grade student performance using live, in-person instruction supplemented with hands-on learning materials, which included live animals, versus the same instructional materials presented through a Digital Versatile Disc (DVD).

Methods

In this study, 245 third grade students representing 14 classrooms and six schools of similar demographics participated. The six schools were randomly assigned to either DVD instruction or the live teaching method used in the ongoing program, "Incubators in the Classroom."

Curriculum

The curriculum was taught over a three-day period. Students were taught by the researcher in both live instruction and DVD classrooms; thereby,

¹Department of Youth Development and Agricultural Education

²Department of Animal Sciences; Email: mlatour@purdue.edu

maintaining the integrity of the information provided and eliminating any differences between instructors. Regardless of instructional format, lessons included lecture material and hands-on activities, which lasted approximately one hour per day for three consecutive days. On Day One, the curriculum focused on general egg related topics, such as: animals that lay eggs, parts of an egg, grading eggs, and egg nutrition. On Day Two, chicken incubation was covered, as well as changes in embryonic development. Incubator function, the types of eggs that can be incubated (fertile versus non-fertile eggs) and embryonic development were the main points of discussion. On Day Three, the researcher focused on the safe handling of eggs and chicks to help students learn about germs.

Pre- and post-tests were used for student assessment. The evaluation instrument was beta tested for readability using third grade students unrelated to the project. Question one asked students about their knowledge of chickens. Questions two through seven and question thirty were qualitative in nature. These questions were used to evaluate motivation and feelings toward the topics being taught. Questions eight through twenty-nine were fact-based and taken directly from the curriculum being used. On Day Three, following the hands-on activity, students were given the same test to evaluate a change in their understanding of the material.

Statistical Analysis

The absolute composite score of the knowledge questions, as well as the relative difference within questions were monitored. Within each question, a student could either get the question correct, wrong or choose "I do not know." These were the same choices available on the post-test. Therefore, this study examined how the student changed his or her choice within questions between the pre- and post-test that followed the two delivery methods (DVD or live instruction). All scores were analyzed (t-test) using the Statistical Package for the Social Sciences (SPSS® 12.0 for Windows, 2003). Significant differences were set at $P < 0.05$ unless otherwise noted.

Results

No differences were found between the classrooms when comparing overall composite scores. The DVD classrooms had a pre-evaluation mean score of 61.9% and a post-test score of 80.5%, which represented an increase of 18.4%. The live instruction

classrooms had a pre-test score of 63% and a post-test score of 84.8% for an increase of 21.8%. In the next section, questions were grouped in the following categories: general poultry knowledge, food nutrition and food safety, eggs, and incubator. As anticipated, the pre-test scores between students taking live vs. DVD instruction were similar and not different. Even though not significant, students in the live instruction classrooms more often changed from an incorrect answer on the pre-test to correct answers on the post-test in the categories of eggs and incubators (Table 1). There was no difference between the DVD and live classrooms regarding the number of students who changed their answer from the pre-test to the post-test in the areas of general poultry knowledge, food nutrition and safety (Table 1).

Table 1. Average percentage correct for each question category on pre-tests and post-tests and overall change in category score by instructional type (Digital Versatile Disk (DVD) vs. Live instruction)

Category		DVD (%)	Live (%)
General Knowledge (3 questions)	Pre-test	91.27	88.52
	Post-test	97.60	92.72
	Change	6.34	4.20
Food Nutrition & Food Safety (3 questions)	Pre-test	56.16	55.18
	Post-test	77.07	85.58
	Change	20.91	30.39
Eggs (12 questions)	Pre-test	43.09	45.14
	Post-test	73.60	77.56
	Change	30.51	32.42
Incubator (4 questions)	Pre-test	49.35	53.99
	Post-test	70.16	81.23
	Change	20.81	27.24

In the qualitative portion, students were asked which day they learned the most information. Regardless of instruction method, students clearly favored Day Three (Table 2). However, a higher percentage ($P \leq 0.05$) of students in live instruction classrooms indicated they learned more on Day Three (79.83%) than the percentage of DVD instructed students (54.76%). Within the DVD classrooms, there was no difference in students' perception of learning between days one and two (Table 2). Conversely, in the live instruction classrooms, there were daily increases ($P \leq 0.05$) in the percentage of students who indicated they learned more on a particular day, with the highest ($P \leq 0.05$) percentage of students choosing Day Three.

Students in live instruction classrooms displayed an increase ($P \leq 0.05$) from pre- to post-test in their choice of 'always' as the response to the statement, "I am able to focus more when I can see what is being taught." However, there was no difference from pre- to post-test in the percentage of DVD classroom students who chose 'always' as a response to the same statement. Regardless of classroom instruction, the trend for choosing 'sometimes' and 'I do not know' as responses to the same statement displayed a sharp decrease ($P \leq 0.05$) from pre- to post-test. When faced

A Comparison

Table 2. Percentage of answers to the question, “I felt that I learned more on day?” from third grade students receiving either live classroom instruction or digital versatile disc (DVD instruction vs. live instruction)

Day	DVD (%)	Live (%)
1 - Incubation	22.22 ^{a,y}	5.88 ^{b,x}
2 - Eggs	19.05 ^y	14.29 ^y
3 - Hatching	54.76 ^{b,z}	79.83 ^{a,z}
None	3.97 ^{a,x}	0.00 ^{b,w}

SE* ± 0.05 (rows) ± 0.04 (columns)

^{a,b} Percentages within a row for each parameter with no common superscript are significantly different ($P \leq 0.05$) by T-test.

^{x,z} Percentages within a column for each parameter with no common superscript are significantly different ($P \leq 0.05$) by T-test.

*Standard error (SE) based on pooled estimate of variance.

with the statement, “I am able to focus more when I can see what is being taught,” a higher percentage ($P \leq 0.05$) of DVD classroom students chose 'never' as a response on their post-test than the same students did on their pre-test. Students in the live instruction classroom decreased their choice of 'never' as a response to this same statement from pre- to post-test. When given the statement, “I understand a topic more just by hearing and seeing the information with no live animals,” 'sometimes' was the most frequent response from both DVD and live instruction classrooms. However, only DVD classroom students displayed a sharp increase ($P \leq 0.05$) in this response from pre- to post-evaluation. A larger number of DVD classroom students chose 'always' as a response to this statement on their post-test than they did on their pre-evaluation. On the contrary, a lower number of live instruction classroom students chose 'always' on their post-evaluations than the same students did on their pre-test. Twenty-eight percent of the students in the DVD classroom answered 'I do not know' to the above statement on their pre-evaluation. The percentage of students who chose this same response dropped ($P \leq 0.05$) sharply on the post-test. The live instruction classrooms had only a numerical decrease from pre to post-test for 'I do not know' as a response. There were no differences between pre- versus post-evaluation scores within or across classrooms for the choice of 'never' as a response to this same statement.

Discussion

The original hypothesis was to examine the learning outcomes for students given traditional materials vs. DVD recorded information. Not unlike the findings of Bernard et al. (2004), this study demonstrates that overall learning is very similar. The similarity of results between DVD and live instruction classrooms could be the result of several factors. Technology has become very important in the lives of students and it is possible, the DVD instructed students may have been intrigued by the idea of learning by watching a 'movie.' However, the use of a new media may have set-up unrealistic expectations, because today's students are more exposed to media technology than at any other period in history. Hence,

the students in this study may have expected something “interactive” as opposed to a static movie which simply provided facts; for example, the hottest media distance learning move on the Purdue University campus is “gaming.” Depending on the set-up, gaming could be highly interactive compared to traditional ways of instructing students. The

implication of this finding is significant, because of the factors involved, e.g., live animal models, teacher time in securing resources, and potential reduction in risk factors to students. This is not to imply that animal-based lessons will be less important in future work, but educators will need to critically examine “the true impact” of having live animal models in the classroom as they relate to educational outcomes.

The data suggest that animals in the classroom were well received by students. Many factors may have contributed to this finding. On Day One, materials may have flooded the students with information in both the DVD and live instruction classrooms. However, students within live instruction classrooms had several factors competing for their attention, such as a new instructor and an incubator. Day Two materials related to eggs only and were likely more interesting than Day one materials. Day Three included hatching chicks. Over half of the students in both the live instruction and DVD classrooms indicated that they learned the most on Day Three. However, a higher percentage of live instruction students (79.83%) marked Day Three as the day they learned the most, compared to 54.76% of DVD students, who said they learned the most on Day Three. The most likely explanation for the difference between the two groups on Day Three would be the chicks actually being in the live instruction classrooms coupled with the sounds they were making. Students in the live instruction classrooms were able to physically touch and hold the chicks on Day Three, unlike the DVD classroom. This response is somewhat expected, because animals have long provided positive benefits to individuals in a variety of situations, such as hospital patients, nursing home residents, prison inmates, and disabled individuals (Weigel et al., 2002).

Summary

The purpose of this study was to evaluate the performance of third grade students receiving instruction from a teacher in the classroom, along with hands-on learning materials including live animals, versus the same instruction taught from a recorded lecture on a Digital Versatile Disc (DVD) without live animals in the classroom. Overall and

regardless of instruction, there were no differences in composite scores. One trend began to emerge from the post-test in that live instruction students were numerically more successful at selecting a correct answer on their post-test compared to DVD instructed students. Based on the findings of this study, the following conclusions can be drawn: The teaching method did not affect the students' tests scores and there is a benefit to incorporating both DVD and live instruction in classrooms. Both DVD instruction and live teaching were effective at increasing the students' knowledge of eggs, food safety and nutrition, embryonic development and the function of incubators. The utilization of DVD instruction would allow for the same instruction to be provided by a single instructor and reduce the number of animals harvested for educational purposes. However, this is not to imply there is no educational value in using animals in the classroom.

Over the past eight to ten years, different states have pushed to band animal use directly in the classroom as it relates to safety and animal welfare. College programs need to look carefully at alternative ways to educate students about animals, at all educational levels. This study shows that DVD technology is one alternative.

Literature Cited

- Bernard, R.M., P.C. Abrami, Y. Lou, E. Borokhovski, A. Wade, L. Wozney, P. Wallet, M. Fiset, and B. Huang 2004. How does distance education compare with classroom instruction? A Meta-Analysis of the Empirical Literature. *Review of Educational Research* (74)3: 379-439.
- Dumont, R.A. 1996. Teaching and learning in cyberspace. *IEEE. Transaction on professional communication* (39)4: 192-204.
- Gilbert, S.W. 1996. Making the most of a slow revolution. *Change* 28(2): 245-258.
- Meunier, R.A., B.A. Talbert, and M.A. Latour. 2002. Evaluation of the incubators in the classroom program: Does it increase fourth grade students' knowledge of agriculture-related science concepts?" *Journal of Agricultural Education* 43(3): 49-54.
- Rahm, D. and B.J. Reed. 1997. Going remote: The use of distance learning, the world wide web and internet in graduate programs of public affairs and administration. *Public Productivity and Management Review* 20(4): 459-471.
- Weigel, R.R., B. Caiola, and L. Pittman-Foy. 2002. 4-H animal care as therapy for at-risk youth. *Journal of Extension* 40(5). Retrieved from <http://www.joe.org/joe/2002october/iw6.shtml>.

“Advancing the scholarship of teaching and learning”

